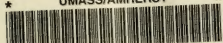


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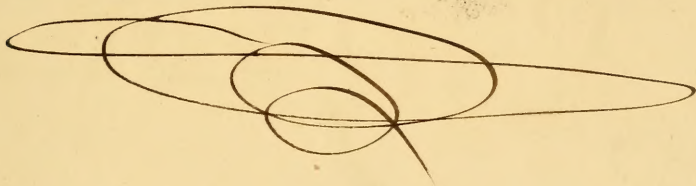
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THE "GARDENERS' CHRONICLE" AND "FARMER'S GAZETTE."

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The Gardeners' Chronicle

SATURDAY, JANUARY 7, 1871.

MEETING FOR THE ENSUING WEEK.

THURSDAY, JAN. 12.—Lincoln 8 P.M.

OUR usual retrospective glance over the **NOVELTIES of 1870**, so far as **Ornamental Plants** are concerned, leads us to the conclusion that there is scarcely any perceptible falling off as to numbers; and that, although we have nothing to chronicle of such importance as to place it strikingly in advance of its compeers, the past year has, nevertheless, brought to us many plants which are welcome additions to our collections. Their appearance, from time to time, at the various exhibitions and at the Wednesday meetings of the Royal Horticultural Society, and, moreover, done much towards keeping up the public interest in those pleasant periodical meetings.

In the category of **Hardy Plants** we find several subjects worthy of record. Amongst evergreens, the first place is undoubtedly due to the **Cupressus Lawsoniana erecta viridis**, represented at fig. 49 (p. 279) of our last volume, and which, though not strictly new, has this year been first recognised under the above name, as one of the richest coloured and most elegant of its class. There have been exhibited some new **Laurels**, which promise well. One of them, called the **Versailles Laurel**, **Cerasus Laurocerasus latifolia**, produces immense leaves on young plants, but it requires the test of time to ascertain if this peculiarity is permanent. In the compact habit and shorter rounder leaves of **C. Laurocerasus rotundifolia**, we have no doubt a useful modification of the ordinary common Laurel, and one which has been very fairly tested. The French gardens promise to furnish us (if they have not fallen victims to the devastating Franco-German war) with two good forms of **Yuccas**, the one, **Y. gloriosa** minor, being of relatively dwarf habit, with horizontal or reflexed flowering branches; and the other, **Y. patens**, said to be of Chinese origin, remarkable for its narrow rigid leaves. Deciduous flowering trees receive an accession in **Catalpa rubescens**, which has the flowers larger and more coloured, borne also in more compact panicles than in the common kind; and in **Xanthoceras sorbifolia**, from China and Mongolia, a small Sapindaceous tree, with pinnate leaves and terminal racemes of white purple-eyed flowers, which must be of a very ornamental character. This also has been introduced by the French, and was grown in the Jardin du Muséum, where it may be hoped it has escaped the general destruction of woody vegetation which the newspapers record. Of deciduous trees, ornamental from their foliage or habit, we may particularly **Dimorphanthus mandchuricus**, erect-stemmed and **Aralia-like** in character, with large decoumpound spiny leaves, much like

those of **A. canescens**, so often falsely called **A. japonica** in gardens. **Robinia Pseud-Acacia umbraculifera** Villaveille forms a close head, like the common **Parasol Acacia**, but is said to be more dense and robust; it is a seedling from the common **Locust tree**, raised by **M. VILLEVEILLE**. Two pendulous habited trees may be cited, namely, **Corylus Avellana pendula**, the growth of which is distinctly weeping; and **Quercus Libani pendula**, raised in the **Paris Jardin du Muséum**, having slender, very elegantly reflexed and pendulous branches. Among coloured-leaved arboreal or arborescent subjects we have—**Alnus glutinosa rubronervia**, with leaves of a dull bronzy red; **Catalpa syriagolfa aurea**, with leaves of a decided yellow or golden tint of green; **Acer palmatum reticulatum**, with emerald-green sub-translucent leaves, having the veins and veinlets marked out by a deeper tint of green; **Aralia japonica aureo-reticulata** (one of the forms of the garden **A. Sieboldii**), with yellowish green leaves reticulately marked with yellow; **Thuja (or Biota) orientalis sempervirens**, and **Cupressus Lawsoniana lutea**, both with spray of a yellowish hue, like that of **Thuja aurea**, and said to be permanently coloured—a point on which further evidence is required. A few flowering shrubs, chiefly of garden origin, have been made known, among them **Deutzia crenata alba-plena**, also known as **D. candidissima**, with double white flowers, from which the ordinary roseate tinge has been removed; **Philadelphus primulaeflorus**, with sweet-scented, pure white flowers, resembling those of the double white **Primrose**; **Philadelphus insignis**, very floriferous, but with the large white flowers scentless; **Staphylea colchica**, from the north of Europe, a shrub with pinnate leaves, and terminal panicles of white flowers, said to be found useful as a market plant; and two **Weigels**, raised at Nancy,—the one, **X.W. Lavallei**, with very showy deep crimson flowers, having a yellow throat; the other, **X.W. Lowii**, with large brownish blood-red flowers collected into great terminal panicles. Finally, under this head we notice two curiosities, also recorded from the French nurseries—**Cedrus Libani decidua**, a deciduous Cedar of Lebanon; and **Larix europaea sempervirens**, a Larch which has retained its evergreen character for several years.

New Annuals have been somewhat scanty. There are, however, two which will be decided acquisitions, namely, **Godetia Whitneyi**, the finest of all the spotted-flowered species, in the way of **G. Lindleyana**, but much dwarfier and larger-flowered; and **Leptosiphon roseus**, the **L. parviflorus rosaceus** of the "Botanical Magazine," a very showy plant, with lovely rosy pink flowers, and the habit of **L. luteus**. Figures of both these will shortly be given in our pages.

Several fine additions have been made to our **Hardy Perennial lists**, from amongst which we may particularise the following:—**Iris violacea**, a narrow-leaved Caucasian species, with rich violet-purple flowers, marked with yellow towards the base of the outer segments; **Iris iberica**, another Caucasian plant, but of dwarf habit, with immense white flowers, the deflexed segments of which are yellowish green, traversed by dark-coloured reticulated lines, in the way of **I. susiana**; **Kniphofia præcox**, noted as a handsome early-blooming species of the well-known **Tritoma** family, flowering in May; **Oenothera marginata**, introduced from the Rocky Mountains, a prostrate habited species, with lanceolate leaves, and immense white flowers; **Delphinium nudicaule**, a Californian plant, whose flowers are of a bright orange-red; **Paranephelus uniflorus**, a dwarf Andean composite, the large flower-heads of which are golden yellow, a plant of considerable merit if really hardy; **Eritrichium nanum**, one of those tufted alpine gems which seem to reflect the azure firmament in their brilliant flowers; **Primula verticillata simensis**, Abyssinian, and yellow-flowered, like a monster **P. verticillata** (see *Gard. Chron.* 1870, p. 597); **Dodecatheon Meadia frigidum**, an American Cowslip, with bright, reddish purple flowers of the characteristic form; and **Campanula Raineri**, a dwarf Italian Bell-flower, with broadly funnel-shaped deep blue showy flowers.

The favourite group of **Hardy Bulbs** has received several very interesting additions, the foremost being the blood-coloured **Brodiaea coccinea**, from California, whose spikes of drooping tubular flowers tipped with yellowish green are particularly gay, but bear very little resemblance to the **Brodiaea heterotrope** cultivated. Another fine Californian bulb is the **Calochortus**

Leichtlinii, with purple-spotted white flowers, figured at p. 1632 of our last volume—one of a family, too, which contains several species of remarkable beauty, and which have become, we fear, lost to our gardens. The Lily family has lately attracted more attention than formerly, thanks to M. LEICHTLIN, in Germany, and Mr. WILSON and others, at home; and some of the results are the importation of two fine varieties of Tiger Lily, *L. tigrinum* flore-pleno, and *L. tigrinum* splendens, the former producing a panicle inflorescence of full double reflexed flowers of the usual colour; the latter a grand advance upon the original, producing an immense branching head of brilliant flowers. Some handsome forms of *Lilium Thunbergianum* have also been introduced, notably a double-flowered one, which though not so handsome as the double Tiger Lily, is perfectly distinct, and has a beauty and interest of its own. In *Narcissus monophyllus*, a figure of which, borrowed from the "Florist and Pomologist," will be found at p. 665, 1870, we have a white variety of the pretty Hoop-Petticoat *Narcissus*. Besides these, one or two species of Grape Hyacinth (*Muscari*) have been brought into notice, namely, *M. grandifolium*, which has large leaves and very dark dull blue flowers; and *M. Heldreichii*, which has narrow leaves, and sky-blue flowers, tipped with white.

Our collections of Greenhouse Bulbs have been largely supplemented, chiefly from the introductions of Mr. WILSON SAUNDERS, from South Africa. *Hyacinthus candicans* is a magnificent plant, bearing but little resemblance to an ordinary *Hyacinthus*, having leaves upwards of 2 feet and flower scapes 4 feet long, the latter bearing a raceme of from 15 to 20 large pendulous white flowers, which are between funnel-shaped and bell-shaped in outline. *Hyacinthus princeps* is very similar, but the flowers are greenish-white, smaller and more spreading, and the racemes are shorter. Both are noble bulbs; so also are *Scilla princeps* and *S. floribunda*, the first having a dense 100–200 flowered raceme of yellowish green flowers, with a purple bar on each segment, and the latter a dense 60–100 flowered raceme of green flowers, purplish on the inner face. *Scilla ovalifolia* and *S. subglauca*, are pretty dwarfier species, with rosy and rosy purplish flowers respectively, and have more or less spotted leaves. *Scilla* gains also the following species—*linearifolia*, *pauciflora*, *prasinata*, *socialis*, *spatulata*, *pallidiflora*, and *zebrina*—mostly belonging to the *Drimia* group. The lovers of curious bulbs will welcome the *Callipsyches* from South America, also introduced by Mr. SAUNDERS, *C. mirabilis*, with an umbellate head of numerous flowers, having the general contour of an expanded parasol; and *C. auratum*, with golden-yellow flowers, and very long green stems.

Of other Greenhouse Plants, the first place for docility and beauty is probably due to *Blandfordia aurea*, a greenhouse perennial, which has elegant grass-like leaves, and large bell-shaped golden flowers. *Ceratostema speciosum*, and *Grevillea Preissii*, are shrubby species; the first being from Ecuador, and having brilliant orange-red yellow-tipped tubular flowers, very handsome, if a manageable plant; the second from West Australia, and with its finely cut leaves and pretty yellow-green and red flowers, looking as if it would form a good exhibition plant of an entirely novel character. Amongst soft-wooded subjects is *Salvia* mentions, a beautiful species, with bright crimson bracts and calyces, and rosy pink corollas—a Brazilian species, requiring warm greenhouse treatment, like other *Salvias*. And then we have several creepers of sufficient importance to be noted, though we must pass them by with a bare mention of their names; they are *Tacsonia speciosa* (see *Gard. Chron.* 1870, p. 955), *Passiflora Hahnii*, *Dioscorea retusa* (*Gard. Chron.* 1870, p. 1149, fig. 217), *Campsidium chilense* (*Gard. Chron.* 1870, p. 1182, fig. 228), and *Pandorea austro-caledonica* (*Gard. Chron.* 1870, p. 1085).

Amongst Succulent Plants we find several novelties especially worthy of record. *Aloe Croucheri* and *A. planifolia*, both belonging to the *Gasteria* section, are really handsome plants; the former from Kew, with stout, trigonous, white-spotted leaves, and panicle racemes of delicately pretty pale rosy flowers, greenish white at the tips; the latter from the Hillfield collection, dwarfier, with flat, ligulate, blotched leaves, and pale red ventricose flowers, greenish at the tips. Another showy Kew plant is the *Cereus fulgidus*, a stove species, with the habit

of *C. speciosissimus*, and having angular spiny stems, and very large (6–7 inches across) orange-scarlet flowers, the inner petals of which are blood-red. In *Agave horrida* and *A. Bessereriana* we have two acquisitions to the group of dwarf species of this interesting family, whose old popularity seems to be, and very deservedly so, reviving.

Bedding Plants require experimental culture before their adaptability to summer gardening can be vouched for; we can therefore only say of *Alternanthera amabilis tricolor*, that it is a promising plant for the carpet or panel bedding now becoming popular; the leaves are dark green at the edge, within which is an irregular band of orange-yellow, the central part being vivid rose traversed by purple veins.

New Ferns are not numerous, but there are some of the very first order of merit. Prominently so is *Adiantum peruvianum*, of which a figure will be found at p. 457 of our last volume. It is truly described as the noblest of the Maiden-hairs, and is alike remarkable for its large pinules, its ample much-divided fronds, and its gracefully drooping habit. *Adiantum Henslowianum* (or *sessilifolium*) is another beautiful stove Fern, also from Peru, quite distinct in character, the arching fronds having the basal pinules overlying the main rachis. *Todea Wilkesiana* (see *Gard. Chron.* 1870, p. 795, fig. 148), is a charming miniature Tree Fern of the Feejee Islands, belonging to the pellucid-fronded group, and has broad lanceolate bipinnate fronds. The Peruvian *Gymnogramma tartarea aurata* (see *Gard. Chron.* 1870, p. 493) is the finest of all the gold Ferns yet made known, combining the vigorous growth and broad blunt pinules of *G. tartarea* with the richest tint of *G. chrysophylla*. *Peris serrulata major cristata* is a fine greenhouse free-growing Fern, a well-vested form of that major variety of *P. serrulata* which rivals *P. umbrosa* in stature, while another variety, called *P. serrulata gleicheniaefolia*, is remarkable for its tall and very narrow more or less forked segments. Both these are of garden origin, as also is *Selaginella Martensii divaricata albo-lineata*, an elegant striped variety, which we noticed at p. 1535 of our last volume.

Of Stove Plants of shrubby habit the first place ought, we think, to be accorded to the free-flowering form of *Lasiandra macrantha*, which has been shown under the name of *L. macrantha floribunda*, and which differs from the plant originally shown and described in nothing but its greater prolificacy of flowers—a feature well shown in the plant exhibited; it came, it appears, out of the same stock, but whether a duplicate importation, whose fine quality was but tardily discovered, or a seedling, we are not aware. Next should come *Posqueria fragrantissima*, a magnificent Brazilian shrub, having bold leathery leaves, and panicles of white, exceedingly fragrant flowers, the slender tube of which is 6 inches long. This we had the opportunity of seeing at M. LINDEN's establishment at Brussels. *Gardenia hexagona*, another Brazilian shrub, with small elliptic leaves, bears beautiful fasciculate, terminal, white flowers, which are remarkably fragrant. Of Foliage Plants of shrubby character, we specially single out as the best plant of this class shown during the year, *Dracena porphyphylla*, a South Sea Island species, of noble habit, with bold, erect, broadly oblong leaves, which are of a fine deep bronzy hue, and remarkable for the contrast presented by the glaucous hue of the under surface. To these may be added one or two climbers,—*Solanum venustum*, from Brazil, which bears drooping panicles of pretty, pale mauve-coloured flowers; and *Strophanthus Bullenianus* (see *Gard. Chron.* 1870, p. 1471, fig. 257), a novel member of a singular genus, remarkable for the tail-like prolongation of the apices of the limb segments of its flowers.

Some of the most remarkable Stove Plants of the herbaceous class belong to the Gesneraceae, and notably the fine hybrid forms of *Plectropoma nageloides* and *Achimenes nageloides*, so admirably figured in the "Flora des Serres." Another of remarkable beauty is the *Sciadocalyx digitalifolia*, of New Grenada, which we saw at M. LINDEN's establishment. It is a species with robust bristly stems, large ovate hairy leaves, and panicle showy flowers, also shaggy with hairs, the corolla tubes being rosy purple above, and white beneath, the throat white spotted with crimson, and the limb spreading, green, thickly dotted with purple. *Hippocrastum Leopoldii*, figured by us (see *Gard. Chron.* 1870, p. 733,

fig. 140), is a grand stove bulb, remarkable for its stout growth and large flowers, which are of a creamy white in the upper, and of a clouded crimson in the lower half, where there is a white bar on each segment, forming a central star. *Xibonia perhensis* is interesting in a double sense; it is an elegant subshrub, with bright flowers of a crimson hue, passing into fiery red; and it is said to be a hybrid of *Libonia floribunda*, crossed with *Sericographis Ghiesbreghtiana*, a parentage which seems to be vouched for by its aspect. In *Peperomia resedaeflora*, from New Grenada, we have quite a novelty, more curious, indeed, than beautiful, though not inelegant; its flowers, which are white and fragrant, instead of being collected into simple green terete spikes, are grouped into filiform obovate decurrent and sulcate-nodose catkins, which form erect pyramidal panicles. Finally, among monocotyledons we have *Tillandsia (or Callisia) Hamaleana*, a handsome plant allied to *T. Lindeniana*, with large fragrant cant mauve-coloured white-eyed flowers. *Pepinia aphelandroidea*, a ramose-stemmed Bromeliad of dwarf habit, with linear-lanceolate leaves, and terminal spikes of bright vermilion convolute flowers; *Curcuma petiolaris*, an Indian plant, the connate bracts of which form deep pouches, and are rosy pink and recurved at the edge; and *Spathiphyllum Minahasae*, an *Orontiad* from the Sunda Isles, which has white spadicies rivaling in beauty those of the well-known African Lily.

Last, but not least, come the Orchids; and here we must first notice the skilful manipulation which has given us such charming hybrid forms as *X Cattleya Dominiana lutea*, *X Lælia Pilcheri alba*, *X Cypripedium Dominianum*, and *X C. vexillarium*. The first has handsome blossoms of a bluish tint, the lip being yellowish white, with a yellow disk marked with a rosy bar and veins; the second has charming French-white flowers, the lip being decorated with a patch of rich amaranth towards the apex; the third combines many of the characteristics of *C. Pearcei* and *C. caudatum*, which are its parents, and the fourth combines, in like manner, some of the peculiar features of its parents, *C. Fairrieanum* and *C. barbatum*. Passing from these to the introduced plants, we must give precedence to two splendid *Cattleyas* from the Rio Negro country, namely, *C. Eldorado splendens*, a truly splendid variety of the quadricolor type, the flowers being delicate rose, with a lip marked with orange white and reddish violet; and *C. superba splendens*, a dwarfish plant, with large, bright rose flowers, the lip deep violet at the tip, and white at the base, with golden lines and purplish veins. *Cattleya velutina*, supposed to be Brazilian, is another pretty plant, with the lip velvety and rose-coloured in front, and the flowers very sweet scented (see *Gard. Chron.* 1870, p. 140). *Dendrobium chrysotis* (see *Gard. Chron.* 1870, p. 1311) is a free-blooming showy Indian *Dendrobe*, with rich apricot-coloured flowers, spotted on the lip, which is remarkable for its deep fringing,—in the way of *D. fimbriatum oculatum*, but totally distinct in its habit, as it flowers on the stiff leafy stems. *Houlletia tigrina*, one of the products of New Grenada, is a handsome plant, with the pale yellow sepals blotched with purplish brown, while the bright yellow petals are blotched with crimson, and the lip is white, and barred with purple at the base, and cream-coloured, dotted with purple in the front. In the Central American *Mormodes Colossus* we have both a singular and showy epiphyte, the large flowers, 5 to 6 inches across, having pink sepals and petals, becoming yellow towards the tips, and a corolla singularly incurved yellow lip. Of the popular *Odontoglossa*, there are specially to be noted *Odontoglossum blandum*, a lovely species from New Grenada in the way of *O. nevium*; *O. Galeottianum*, a Mexican plant, nearly related to *O. nebulosum*; and *O. limbatum*, an interesting species from New Grenada, related to *O. gloriosum* and *crispum*. Two fine *Oncids*, both from Ecuador, may be noted in *Oncidium calanthum* and *O. Semelle*, both with golden-yellow flowers, having a large reniform lip, that of the latter being the smaller of the two. Then in the plant from Madagascar, which has obtained the garden name of *Angræcum Eliisii*, we have an exceedingly pretty object, on account of the long drooping spike of small wax white flowers, with buff-coloured tails 4 inches long; while *Vanda Parishii*, from Birmah, offers another beautiful epiphyte with yellow spotted flowers as large as those of *V. gigantea*.

We have thus lightly glanced over the novelties

of 1870, and in doing so have found much material, in sufficient variety to meet all tastes. Our object has not been merely to hunt up plants adapted to attract the vulgar gaze by the glare of their colour, or the magnitude of their blossoms, but to indicate such as combine either shewiness or elegance with variety of structure—such as may afford many a pleasant hour's amusement and gratification to those who love to note the peculiarities of their plants, and find delight in the discovery of some unthought of and unsought beauty of form or colouring, or some special adaptation of habit to suit the peculiar circumstances of their existence.

—In a recent number of the "Proceedings of the Academy of Natural Sciences of Philadelphia," Mr. THOMAS MEEHAN, alluding to the COMPASS PLANT (*Silphium laciniatum*), says, that those who affirm that the leaves of this plant are directed to the North, and that those who say that there is no such tendency, are both in the right. Mr. MEEHAN watched a plant in his own garden, and states that "there was the unmistakable northern tendency in the leaves when they first came up, and until they were large and heavy, when the winds and rain bore them in different directions, and they evidently had not the power of regaining the points lost." It depends, then, upon the season when the observation is made whether the leaves are seen to bear northwards or not. The attention of readers on this side of the Atlantic was first prominently attracted to this plant by LONG-FELLOW, who, in his "Evangeline," describes the good priest as solacing Evangeline in her search for her lover in the following terms:—

"Patience," the priest would say, 'have faith and thy prayer will be answered.'
Look at this delicate plant, that lifts its head from the meadow,
See how its leaves all point to the North, as true as the magnet;
It is the Compass flower that the finger of God has suspended
Here on its fragile stalk, to direct the travellers' journey.
Over the sea-like pathless limitless waste of the desert."

—The Committee appointed at a public meeting of representatives of the Seed and Nursery trades to take steps to restore the old SAMPLE POST, or to induce the authorities to adopt a PARCEL POST, has resolved, while maintaining independent action, to act, so far as possible, in concert with the Society of Arts and the Manchester Trade Association. We may remark that, as we ventured to predict would be the case (see p. 1693), the revenue of the Post Office has markedly diminished during the last quarter. If this diminution be really traceable, as we have no doubt it is, to a large extent, to recent unwise restrictions, we may speedily hope for the adoption of a more liberal policy.

—Our excellent correspondent, M. NAUDIN, so well known for his eminent services to horticulture, as well as to botany, has established as our readers are aware, an EXPERIMENTAL GARDEN at COLLIOURE, Pyrenees Orientales, France, where he is desirous of cultivating various plants of horticultural or botanical interest. M. NAUDIN is specially desirous of obtaining seeds of new varieties of CUCURBITACEÆ. One such was described by him in our issue lately (p. 1503, 1870), and in our present issue (p. 12) is an interesting description of a very peculiar variety of Pumpkin, remarkable for its late period of blooming, and the unusual form and hairiness of the fruit. M. NAUDIN is also desirous of cultivating as many varieties of Citrus as he can get, specially those from Eastern Asia. Seeds of the Kum Kouat would be specially acceptable to him, as hybrids from it would probably yield interesting results. Any of our readers who have in their power to send seeds, may transmit them to the above address, or, if they prefer, may make us the medium of communication.

—We notice amongst the trade announcements in the American journals a DOUBLE PURPLE WISTARIA, of which we have heard nothing in this country. Its flowers are said to be perfectly double, deep in colour, and to be produced in long dense clusters.

—Mr. ADAM FORSYTH, the well-known Chrysanthemum grower, of 120, Mount Street, Grosvenor Square, has recently introduced some NEW CONSERVATORY ORNAMENTAL PLANT BOXES, which are intended to supply a want long felt for the proper embellishment of conservatories and other positions where single plants are used. The framework is strongly constructed of Teak, a hard wood, suitable for its durability and resistance to the action of water; and it forms the setting for panels of GARRARD'S enamelled Spanish tiles. By a simple arrangement in construction, the plants and earth can be simultaneously and most easily shifted, and the roots examined, without detriment to the box or plant.

—Some discussion has been recently going on in our columns as to the cause of the disease or premature decay of the SILVER FIR (*Picea pectinata*). It may, therefore, be appropriate to quote the opinion of Mr. MICHIE, as given in a recent number of the "Transactions of the Scottish Arboricultural Society," on the conflicting testimony afforded as to the value of this

tree for timber. Mr. MICHIE says he has seen it do well in Scotland on all soils, except those of a gravelly nature, on which it is apt to lose its leaders; and that if much confined in its growth, it is liable to contract disease at the top, which dies down several feet, and sometimes causes death to ensue. Mr. MICHIE, after balancing the good and bad qualities of the Silver Fir, recommends planters to plant in its stead the Picea Nordmanniana, which, although at present much dearer than the common Silver, will, he anticipates, gradually become cheaper. Mr. MICHIE, however, does not tell us the grounds of his preference of the Crimean Pine.

—Here is a hint for those who follow out SUB-TROPICAL GARDENING. How truly noble would be the effect of fine well-flowered specimen plants of DATURA (*BRUGMANIA*) ARBOREA and SANGUINEA, and their allies, as centres for beds of low-growing flowering plants. The larger and more tree-like the individual plants thus employed the better. Their tropical forms of leaf and flower would be strictly in character in such an association.

—Among NEW PUBLICATIONS, to some of which we shall shortly refer more at length, are the *Student's Elements of Geology*, by Sir CHARLES LYELL, Bart. (MURRAY).—*Alpine Plants*, a series of coloured illustrations of Alpine Flowers, by DAVID WOOSTER, published in parts (BELL & DALDY).—*The Honey Bee*, a new edition, by W. A. MUNN (VAN VOORST).—*The Gardener* appears this month under the Editorship of Mr. DAVID THOMSON.—*The Journal of Botany*, which we are happy to find is increasing in circulation as an interest, appears this month in a typography which, if less ornamental than before, admits of the insertion each month of considerably more matter.

—Mr. R. HOLLAND mentions, in the current number of the "Journal of Botany," a singular case of time-mortality in *CAULIFLOWER*. The heart of the Cauliflower plant had been eaten by the larvæ of the stag-beetle, which infested the garden where it grew. The injury had taken place at an early stage of growth, and the scar had healed up, but further growth seemed to be arrested, and although the lower leaves remained green and healthy there were no sprouts found in their axils, no new shoots from the crown of the root, but instead a strange abnormal growth of the root had taken place.

—The number of the lower part of the collar, and from the axils of many of the larger rootlets; and these had pushed downwards into the soil, forming dense mass of underground shoots, bearing rudimentary leaves, and which, after penetrating the soil a short distance, began to turn upwards.

—The cold WEATHER which commenced on the 21st ult. continued throughout the week ending December 31, the cold on Sunday, the 25th, being intense. 5° 5 at Norwich, 7 at Leicester, 8° 7 at Nottingham, 9° 3 at Wolverhampton, and 9° 8 at Blackheath, are some of the temperatures recorded on that day, up to Saturday, 31st, 7° at Hull, 2 at Wolverhampton, &c. were observed. The MAXIMUM TEMPERATURES of the week in England ranged from 40° at Newcastle to 31° 2 at Bradford, with a mean for all stations of 35° 2; whilst in Scotland the two extremes are represented by 36° 5 (at Leith) and 34° 8 (at Glasgow), with a mean for the several stations of 35° 6. The MINIMUM TEMPERATURES of the week in England ranged from 5½ at Norwich to 19° at Leeds and Bradford, with a mean for the several southern stations of 9° 5, and for the eight northern of 14° 7; the latter value also being the mean of the several stations in Scotland. As in the preceding week, the cold would appear to have been most severe in the midland parts of England. The MEAN TEMPERATURES of the different stations in the southern country were more variable than those of the northern country, for whilst in the former we have a range of 8° 3, in the latter it is 5°. The highest mean temperature recorded in England was 32° 2 (at Westbury), with a mean for all stations of 25° 9, and in Scotland was 30° 1, with a mean for the several stations of 27° 8. RAINFALL.—Although no falls of rains have been recorded, snow has fallen in large amounts at different parts of the country. In England the mean fall (reduced to inches of water) was 0.16 inch, and in Scotland was 0.29 inch, the largest falls in the two countries being 0.42 inch at Blackheath and 0.44 inch at Perth respectively. (See Mr. GLAISHER'S Tables in our present issue.)

—At a recent meeting of the MAIDSTONE GARDENERS' SOCIETY, Mr. MUNN introduced the subject for discussion, "Of soils, and how to use them." He produced our sample of soil which he had to work upon, and expressed an opinion in favour of trenching, to allow the sun and air to penetrate deeper. An interesting discussion followed, and it was decided that the subject should be brought forward at the next monthly meeting, when it was hoped there would be a larger attendance of members.

—In allusion to the VARIATION existing in the so-called SPECIES of CINCHONA, and to the difficulty of distinguishing one form from another, Mr. WEDDELL, in a recent paper in the "Annales des Sciences Naturelles," makes the following remarks:—"The influence of soil, climate, and exposure, the two

latter particularly variable in mountainous districts, are specially observable in the Cinchonas. The forms produced in the same species, in consequence of these differences, are so anomalous that, in the absence of precise information as to their source, it would be difficult to refer them to their proper type. The same causes which act on the form, texture, and colour of organs influence no less energetically the nature and chemical properties of the substances elaborated in their tissues. Thus, KARSTEN has put on record the differences in the amount of alkalis contained in the same species growing at different heights on the same mountain. In order the better to arrange the forms of this difficult genus, and to indicate their filiation and the degree of relationship they bear one to the other, M. WEDDELL arranges the species first in groups, which he calls "Rami," these again are grouped in higher subdivisions called "Stirpes," and these are subordinated to genera. In this manner the genus Cinchona is first of all divided into five Stirpes, each one of which is subdivided into two or more Rami, and these comprise the species, with the sub-species and varieties. Save that the word Stirpes does convey an idea of generic affinity, we do not see the advantage of introducing new terms, equivalent, as it seems to us, to the "subgenera" and "sections" of other authors.

—Mr. J. G. BAKER has commenced a monograph on the species of BULBOUS IRIS, in the last number of the "Journal of Botany." These beautiful plants, including the Spanish and English Irises of our gardens, he refers to the genus XIPHION. The group, he observes, "taken as a whole, scarcely differs from Iris, except in the character of the rootstock, which in Xiphion is a bulb, and in Iris a rhizome." He writes a little paper for separation of the two. Mr. BAKER, however, doing good service by reviewing, as he is from time to time doing, various sections of the Monocotyledons, and it is to be hoped he may continue his researches in this group of plants, since no portion of the vegetable kingdom stands more in need of being revised and modernised, in order that it may no longer remain, as it evidently now is, the bogey of botanical writers.

—The weather has been unusually severe in Cornwall, and in consequence, it is said, the market gardeners in the neighbourhood of Penzance will be great sufferers. The BROCCOLI CROP having been much damaged by the frost; this may bring about a rise in the price of the early crops, which will bring the highest prices in the market. On the 26th and 27th ult. the thermometer registered 13 degrees of frost in the observatory of the Royal Institution of Cornwall.

—*The Maidstone and Kentish Journal* says that the DESTRUCTION OF SMALL BIRDS is producing fearful consequences, in the increase of insects, grubs, &c. The fruit of the year just passed away suffered much; and the cold weather has brought further calamities to the birds from sparrow catchers and the thousands of idle and thoughtless who at such a time as this kill anything in the shape of a bird for their wreathed sport. No, everybody who carries a gun has to pay a license, but will the police be on the alert in the cause of our fruit-growers?

New Garden Plants.

SOLANUM CINERIFOLIUM, Lam. ill. No. 2365; *Dunal in D. C. Prod.*, xiii. (Pt. 1, p. 241, No. 580.

Caulis suberectus; ramis teretibus viridibus aculeatis; foliis subcordatis sinuato-lobatis ciliatis utrinque longe mucilagineis, junioribus pilosis, adnatis glaberrimis; racemis brevibus paucifloris vel pedunculis unifloris solitariis gemmæ, lacinie glaucæ subsiccis.

Hab. in Brasilia.

Among the novelties for the year 1871 we may mention the above-named plant, fruits and seeds of which have been imported from Porto Rico by Messrs. Carter & Co. of Holborn, and of which they have succeeded in raising young plants. The great attraction of this species, from a horticultural point of view, will no doubt consist in the exceedingly beautiful berries, which are of a globular shape, depressed at the top, of the size of a Tangerine Orange, and of an intense pure scarlet colour, overlaid by a glaucous bloom. Nothing more brilliant can well be imagined.

The plant is described as a branched annual (sub-herbaceous), 12 to 18 inches high, generally covered with crisp, very sharp yellowish prickles, but sometimes destitute of them. The leaves are stalked, oblong, and irregularly-lobed. The flowers are solitary or borne in racemes. The calyx is saucer-shaped, pentagonal, 5-lobed, and increases in size as the fruit ripens. The corolla is three quarters of an inch in diameter, white, 5-parted, with acute, spreading, or reflexed lobes. The anthers are orange-coloured, aggregated in a cone-like mass. The ovary is globose, sub-lobed, furrowed, surmounted by a white style, which is terminated by a green, 2-lobed stigma. The fruit is greenish at first, marked with green lines, and becomes scarlet as it ripens. Some of the flowers, it appears, are sterile, and do not produce fruit.

We have ourselves only seen the fruits and the seedling plants, so that we are not in a position to say anything as to the habit of the plant, but from the great beauty of the fruit we imagine that the plant will prove to be a great acquisition. Probably, like

most of the annual Solanums, it will be found a plant of very easy culture, requiring to be kept growing on briskly in good soil, and to be kept free from insects, the red-spider especially.

DR. J. D. HOOKER, C.B., F.R.S.

WERE it only in virtue of his office as director of the most extensive and best organized Botanic Garden in the world, Dr. Hooker would naturally occupy the foremost position in the series of portraits of horticultural notabilities, which we hope from time to time to offer to our readers. But the manner in which he fills this arduous office, and the great value of the services which he, while neglecting no other subject within his range, has rendered to horticulture, induce us to believe that the present excellent likeness will be appreciated alike by our horticultural and our botanical friends.

The leading circumstances of Dr. Hooker's career are tolerably well known to our readers, and they afford an illustration of the magnitude of the results that may be obtained, when to the advantages of opportunity and position, are added those of no common ability and of unflinching energy.

Educated at the University of Glasgow, and thoroughly trained as a naturalist by his father, the late Sir William Hooker, an opportunity soon offered itself to Dr. Hooker to turn to account his faculties of observation and generalization. As a naturalist to the Antarctic Expedition, under the command of the late Sir James Ross, Dr. Hooker gave proof of his acumen and his diligence in the "Flora Antarctica," the "Flora of New Zealand," and other botanical publications, consequent on that voyage, and which are well known and appreciated. Less well known are the elaborate meteorological observations taken by him during the voyage above mentioned. But the travels which were most productive from a horticultural point of view, were those undertaken from 1848—1851 in various parts of India, and especially in the Sikkim Himalaya, where immense collections of plants were amassed, and where, in particular, that remarkable series of "Sikkim Rhododendrons" which have proved such valuable additions to our conservatories and gardens, and with which Dr. Hooker's name will always be honourably associated, was collected. The nature of this journey, partly undertaken in company with Dr. Thomson, is contained in a work called "Himalayan Journals," a delightful book of travel, brimful of information on the natural history, meteorology, and physical features of the country, as well as on the ethnological characteristics of the various races with whom the author came in contact.

On his return from India Dr. Hooker occupied himself with the examination and distribution of his stores, and with the preparation, in conjunction with Dr. Thomson, of a "Flora Indica," of which only one volume, containing an admirable account of the physical geography of India, was published, but which will, we have reason to hope, shortly be proceeded with in a somewhat different form. As our object at present is not so much to speak of Dr. Hooker's strictly botanical labours as of his services to horticulture, we confine ourselves to the mention of certain of his publications, and on which he would of itself have sufficed to establish his reputation, such as the "Genera Plantarum," undertaken in conjunction with Mr. Bentham, and still in progress; the splendid monograph on Welwitschia, those on Balanophoreæ, Nepenthes, &c.; the several publications on botanical geography, such as those relating to the distribution of plants in the Malay archipelago, and in tropical Africa; the

geographical relation of Australian and Arctic plants, the vegetation of Oceanic Islands, &c. The last mentioned subject, "Insular Floras," formed the staple of a lecture delivered before the British Association at Nottingham, and which was published in our own columns. The *Gardeners' Chronicle* has, indeed, frequently been enriched by the contributions of Dr. Hooker, as, for instance, by the elaborate analysis of Alphonse De Candolle's *Géographie Botanique*, by contributions relating to Mr. Darwin's experiments and hypotheses, as well as by numerous communications on various subjects, and by much valuable assistance afforded to the present as to the former Editors. Quite recently, the publication of the "Student's Flora of the British Islands"—which has at once assumed the position of the standard British Flora—has afforded evidence of Dr. Hooker's happy faculty of rendering available for the requirements of the present the stores of information accumulated in the past. As Editor of the "Botanical Magazine," Dr. Hooker has also successfully carried on that collection of illustrations of garden

Dr. Hooker's directorate. The arrangement of the plants in the Palm stove and the Terrarium house has been effected, so far as possible, with reference to geographical considerations, to the great advantage of the student; the alpine and herbaceous departments have been reorganized; a new range of houses, previously greatly wanted, has been erected; the heating of the Palm stove has been improved, the Arboretum extended, and at this moment considerable progress has been made with the formation of a new Pinetum. In all these works, as in others that might be mentioned, Dr. Hooker's efforts have been ably seconded by the curator, Mr. Smith.

The task of re-naming and labelling the plants, a vast undertaking indeed, has been steadily proceeded with; and this, together with the aid offered by the library and the unrivalled herbarium, offers facilities for the determination of doubtful plants such as no other establishment possesses, and of which we are glad to see our nurserymen are not slow to avail themselves, while we gladly embrace this opportunity of expressing our own sense of obligation to the director, and the members of his staff, for their valuable assistance on all occasions when we have sought it.

When the late Sir W. Hooker undertook the directorship at Kew he set out with the idea of making the garden the headquarters of European botany. He carried out his intention, and the prestige attaching to the establishment has even been raised by his successor.

Dr. Hooker's position as a man of science has been duly recognized by the learned bodies of our own country and of the Continent, while his public services have been acknowledged by his appointment as a Companion of the Most Honourable Order of the Bath; he is also a D.C.L. of the University of Oxford, an LL.D. of Cambridge; a Corresponding Member of the French Institute; and in 1868 was President of the British Association. We have only to add that our engraving has been taken, by permission, from an excellent photograph taken by Dr. Wallich, of Kensington, and published by Mr. Van Voorst in Dr. Wallich's "Eminent Men of the Day."



DR. J. D. HOOKER, C.B., F.R.S.

plants, now numbering in one unbroken series upwards of 5000 plates, and which, not in number alone, but in general accuracy and scientific value, have no rivals.

In 1860, Dr. Hooker visited Syria and Palestine, in company with his friends, the late Admiral Washington, Hydrographer to the Admiralty, and D. Hanbury, Esq., the principal result of which journey was, the discovery that the famous Cedar grove on the Lebanon occupies old moraines, several thousand feet below the level of perpetual snow, thus demonstrating the ancient extension of glaciers in that region. On his return, the Doctor enunciated his views on the specific identity of the Cedars of the Lebanon, Atlas, and Himalaya (Deodar), in a paper published in the "Natural History Review," and communicated a paper on the Oaks of Palestine to the "Linnean Transactions," and an article on the Botanical Geography of Palestine to "Smith's Bible Dictionary."

In his office capacity, Dr. Hooker has had the opportunity of carrying on those good works inaugurated by his father, and to which are due, in great measure, the successful introduction and culture in our numerous colonies and in India of various plants of economic value, and specially of the Cinchona. Great activity has also been manifested at Kew during the period of

them as are the rarest exotics by the wealthy. But it is flowers in pots as well as in a cut state of which I am about to speak. In England the uses to which these are applied are certainly on the increase. Button-hole flowers form a prominent feature of our day; in Covent Garden Market alone ladies' bouquets, consisting of materials "rich and rare," are manufactured by thousands; wreaths of white Camellias and crosses of Immortelles ornament even the most festive of the last resting-places of the departed; yet for all that, I doubt whether flowers are as extensively employed by us for decorative purposes as they are in America, and especially in New York. There careworn city merchants prize these "stars of earth," and the dust-covered weary mechanic takes "a world of interest in flowers." Weddings and funerals monopolise the bulk of the flower trade in that Transatlantic city, and the amount expended annually in floral decorations for these joyous and sad occasions is almost incredible. In New York, New Year's Day and Easter Monday are looked anxiously forward to by vendors and producers of flowers. The business is mainly done by the sale of plants in the floral markets during the months of April and May, but the demand for flowers for table decorations even at other seasons is constantly in-

CUT FLOWERS IN AMERICA.

In England all classes of the people are fond of flowers; Lilies, and other border plants which spring up around the cottages of the poor, are as much admired by

creasing. The kind of flowers usually to be found in the markets are Carnations, Chrysanthemums, Corsets, Tuberoses, Eucharis, Pelargoniums, of all kinds; Gladioli, Heliotropes, Lantanas, Paeonies, Pansies, Daisies, Petunias, both single and double; Roses, Verbenas, Camellias, Azaleas, and other flowers of a more miscellaneous character. Of these as many as 200,000 Tuberoses are sold in one season. To Roses and Camellias it is impossible to assign numbers, and the same may be said in reference to Verbenas, of which the sale is enormous; while some three millions of what may be termed "bunch bulbs" annually find their way into the floral market; Violets are also in great demand.

The suburbs of New York abound in greenhouses and conservatories. Near what is called Union Hill, New Jersey, is a little German colony of about 30 florists. Mr. Peter Henderson, of Jersey city, has one of the largest establishments in America; and at Astoria, Flushing, and other suburbs, there are also extensive nursery gardens. During Easter time churches are richly decorated with garlands of fragrant flowers; even the popularity of the preacher, like that of favourite actress with us, is known by the number of bouquets laid on his desk.

Floral "Bohemians" form quite a prominent feature in the American flower trade. They consist chiefly of young girls, who may be seen everywhere—at the opera, or theatre, on Broadway, or loitering around the brilliantly lighted entrance of some palatial mansion, where dancing or some other kind of merriment is in progress. They may be called the retail agents of large houses devoted to the sale of flowers; and inside the walls of a theatre they are the *employées* of some florist who has the monopoly in his line in that establishment. At the grand opera-house the demand for wreaths and baskets of flowers is a matter of astonishment to strangers. As much as 500. dols. have been known to be given for "a stand of flowers over 7 feet high for one favourite actress."

Frenchmen and Englishmen are the principal flower purchasers in the neighbourhood of New York, and to such great height has the trade in flowers risen, that orders are now being constantly received and executed which in the olden time would have stripped all the conservatories within 10 miles of that city. From 25 glasshouses in Long Island the average yearly cut of flowers is as follows:—Double Primroses, 120,000; white Stocks, 80,000; Carnations, 50,000; Violets, 40,000; Roses, 30,000; Tuberoses, 30,000; Eucharis, 25,000; "Eupatoriums," Begonias, 10,000; Ageratum, 10,000; Geranium leaves (scented Oak-leaf), 25,000; Azaleas, Jasmines, Pelargoniums, Heliotropes, and other flowers, 50,000; making altogether a total of 495,000 flowers.

From what has just been stated, some idea may be gleaned as to the character and extent of the flower trade in New York, which is increasing with a rapidity equal to that of no other town in which we are acquainted. Ten years ago it was in its infancy, and now everybody who has a few yards of ground to spare grows flowers either for sale or for home consumption. No more valued gift can be made by one friend to another than a plant in a pot or a bouquet of flowers; voyagers to Europe generally carry with them a basket of these sweet remembrances, which are tended with the greatest care as long as they last. Wreaths, red and white, Roses represent illustrious houses; in America, in like manner, flowers are employed to commemorate great events not less than to decorate the garden of the humblest cottager. Their cultivation affords work for thousands. Would that the same peaceful art were now followed on the Continent of Europe, instead of the fearful struggle which is being carried on under the very walls of one of the fairest cities in the world, which, until within the last few months, was the celebrated red for its floral ornamentations, and for the celebrated white for its promenades, gardens, and parks, with which it was decorated. *J. Newton, Oxford Terrace, Hyde Park.*

HORTICULTURAL EXHIBITIONS.*

SOME years ago we were told that our exhibitions were evidences of bad taste; that our horticulturists could appreciate nothing beyond masses of colour; and that we were far behind our Continental neighbours, who studied elegance and beauty in form as much or more than mere colour. To meet this objection the cultivation of Ferns was commenced in earnest. Everything in the shape of a Fern, from the tiny Hymenophyllum to the stately Dicksonias and Cyatheas, was to be met with everywhere. The whole of both hemispheres was ransacked for everything remarkable for the beauty of its foliage. For a time they were lauded up to the skies. Now we are told that these things require little skill in their cultivation, and that they have lost their novelty, and that they must give place to something else. And along with these consignments to oblivion must also go those splendid specimens of flowering plants, which a few years ago used to be pointed out as the highest examples of the gardener's skill—plants that require in their culture years of unremitting attention, and the closest study as to their requirements.

* A paper read at the Liverpool meeting of gardeners, Nov. 22, 1870, and communicated by the author.

What are we told to substitute for those things? As to the greater portion of the world likely to afford anything new in the vegetable kingdom has been already explored, and is consequently not likely to afford much more in the shape of novelties [question], we are told to revert—to turn back and grow things much smaller, in fact to produce them in a similar condition to that in which they were when their cultivation was in its infancy; that is, to produce them at about one-third their natural size. There once lived a man of whom the horticulturists of this kingdom may well be proud, a man who probably did more for horticulture than any one who preceded or followed him. I allude to the late J. C. Loudon. There was one maxim in gardening that he more persistently maintained than perhaps any other. It was this: That every cultivated plant, from the highest to the most insignificant, should be so treated as to allow of full development to its natural size. This is a principle I fully endorse in its general sense. Of course, I do not include such things as are used for special purposes of decoration, where small things are required, as in the case of soft-wooded plants, the greater portion of which can be produced in the highest state of excellence, even in limited sized pots.

I admit, that if the intention of horticultural exhibitions were simply to make an artistic display, and to attract the public with something ever-changing, after the way of a new panorama, then the views of those who advocate the change might be correct. But if horticultural exhibitions are to be of any high object, more than this, if the first motive in their existence be not to practically exemplify by the productions there displayed that which is essential in good cultivation—if, above all things, they are not intended to awaken a spirit of emulation, to keep alive that most necessary perseverance in those who may be termed the veterans in horticulture, and to arouse the rising generation of gardeners as to what they must accomplish if horticulture is not to deteriorate in their hands—say, if these are not the first and principal ends in holding horticultural exhibitions, then by all means give up those exhibitions, if the first and primary object be simply to get up a show that will draw the public. I would not by any means lose sight of all reasonable encouragement to the production of novelties, or to their varied and artistic arrangement at the places of exhibition; but, to make these things of the first importance is simply to perpetrate the mistake which the Continental societies have fallen into of making the general arrangement of their exhibitions the first consideration, and which, consequently, has supplanted the more essential principle of excellence in cultivation. I am also fully aware of the necessity of doing everything in reason to meet that most natural of human inclinations—a love of change. Consequently, it is essential to make these exhibitions as varied as possible, and to have the most active the public in general, without whose liberal support they could not exist.

It is simply in the advocacy of the radical changes of which I complain that the danger to horticultural exhibitions, and consequently to horticulture in itself, lies, since horticulture receives such an impulse through its exhibitions when carried out on sound principles.

In the cultivation of the different subjects seen at our exhibitions, be they plants, fruits, flowers, or, last but not least, culinary vegetables, the principal aim, I would say, should be to produce the best of what it constitutes this general excellence. In all cases, quality is the first essential. With plants, fruit, and cut flowers (excepting plants for special purposes of decoration), size is the next constituent that goes to produce this general excellence. Then, what comes of the arguments of those who advocate a general reduction in the size of plants for exhibition. Such practice, I maintain, would be to retrograde instead of to advance. These views are correct, it then becomes necessary for the promoters of these exhibitions to continue their encouragement of the different subjects they invite to those competitions, under similar conditions to those which have hitherto worked so well for the promotion and general extension of high-class culture in the different families of the vegetable kingdom throughout the country.

In conclusion, I would urge, as I always have done in horticultural exhibitions should, as far as practicable, be made comprehensive by ensuring the useful as well as the beautiful, namely, fruit, flowers, and culinary vegetables. To exhibitors I would say, whether your productions be one or all of these things, let them always well represent their respective kinds; and remember that there is more credit in being beaten with really good produce than in winning with inferior. *T. Baines, The Gardens, Southgate House, Southgate, N.*

THE PERSIMMON.

THIS tree, the *Diospyros virginiana*, is known only to us as an ornamental object. In its native country, however, where it grows to a height of 50 or 60 feet, it is valued for its numerous economic applications. Several varieties of trees exist in America, all of which are more or less valuable. First, with regard to their medicinal properties. The inner bark is used both in diarrhoea and cases of intermittent fever. Powdered it is used as an astringent generally, and with alum forms an ingredient in the

composition of gargles; it also yields a black dye. The wood is very close-grained, hard, and heavy, and being dark in colour, it might well be used for some kinds of furniture. The fruits, however, are the most valuable product of the tree; in an unripe state, they are very astringent, and have been found to contain tannin, sugar, malic acid, and woody fibre. They are used either fresh or dried in diarrhoea, chronic dysentery, and uterine hemorrhage. The juice of these unripe fruits is said to be preferred, even before Oak-bark, for tanning leather. When properly ripe the fruits are of a sweet and pleasant taste, and yield on distillation, after fermentation, a quantity of spirit.

"The best Persimmons ripe soft and sweet, having a clean, thin, levelled skin, without any other taste. Most animals fatten on them: the chicken, duck, turkey, goose, dog, hog, sheep, and cow, all eat them greedily. The fruit when mashed and strained through a coarse wire sieve, makes delightful bread, pies and puddings. When kneaded with wheat-bran, and well baked in an oven, the bread may be put away for winter use in making beer, and used when wanted."

"The following is one of the very best recipes for making the beer:—Sweet ripe Persimmons mashed and strained, 4 bushel; wheat-bran, 4 bushel. Mix well together, and bake in a brick oven for four or five days in a clean barrel, and add 12 gallons of water and 2 or 3 ounces of Hops. Keep the barrel in a warm room. As soon as fermentation subsides, bottle off the beer, having good cork larks, and place the bottles in a low temperature of about 50° Fahrenheit for a few days, and then in a cool place for a month. This beer, when properly made, in a warm room, is an exquisitely delightful beverage, containing no alcohol, and is to the connoisseur of temperate taste not inferior to the fermented juice of the Vine."

The above is quoted from an American publication. The fruits of most of the Ebenaceae are remarkable for their extreme astringency, in a green state, so that it is necessary to allow them to thoroughly ripen, even to the verge of decay, before they are fit for use.

Several other species of *Diospyros* produce edible fruits, the best perhaps being the Kaki, or Chinese Date Plum (*Diospyros Kaki*), a native of China and Japan, and cultivated in India. The fruit, when ripe, is of a bright red colour, about the size of an Apple, and is composed of a yellow fleshy pulp, somewhat like that of a Plum. The Chinese eat these fruits both in a fresh and dried state. *John R. Jackson, Kew.*

THE AMATEUR GARDENER.

Introductory.—In the month of October, 1845, a series of papers with the above title was commenced in the *Gardeners' Chronicle*. They were intended to be useful to the possessors of gardens whom inclination or necessity compelled to cultivate them themselves, and to whom the experience of another might be offered as a guide. The papers were received with favour, and it is believed that they accomplished their design, in fostering and directing the tastes, and aiding the operations of general gardening. Nearly a whole generation has passed away since that series of hints and directions was made public, but their writer is still an amateur gardener, with hardly less enthusiasm than he then possessed, and certainly with a more full and ripened experience. It is proposed that he shall resume his pen with the same objects as he contemplated in 1845, and he will now introduce the practical advice of one year's experience into his horticultural observations.

In a general sense, all who take an interest in horticulture are amateur gardeners, from the possessor of a large domain with all the appliances which wealth and skill can supply, down to the cultivator of a small plot before or behind the house, in a suburban neighbourhood. To the former it would be presumptuous to offer directions, since their gardens are presided over by persons of scientific knowledge and practical experience. Our aim is to be of service to that large class which does not employ a professional gardener, but merely calls in the occasional aid of a jobber, or employs a general man-servant to till the ground when not engaged in other more pressing duties. It need hardly be said that the number of the latter class far exceeds those of the former, as much, indeed, as the middle class exceeds the higher or more aristocratic one. In London alone there must be tens of thousands who have a small amount of vacant ground, and who do their best to cultivate them with little or no help from others. All these require advice, both as to principles and practice, and to these we tender our best efforts on their behalf.

It may be as well to detail here our own aims and opportunities of gaining the knowledge we wish to convey to others. The sphere of our operations is in a midland county rather tending to the east, and as favourable, perhaps, as any other for general horticultural purposes. Our garden is in an open situation, yet affected more than we like by the smoke of a small town, and, in dry weather, by the dust of a highroad. In these respects it is on a level with the greater number of suburban gardens. Its size is less than an acre; it is walled all round, and has the old-fashioned mixed character of being a flower, vegetable, and fruit garden. A long narrow border is edged with Avenues, all carefully and carefully selected seeds, and presenting in spring a sight which receives universal commendation. The great central path, about 80 yards long, is bordered on both sides with Snowdrops, Crocuses, Hyacinths, Tulips, thickly planted, with

clumps at intervals of Pheasant-eye Narcissus, furnishing a succession of cheerful beauty from February to the end of May. Behind these borders standard and dwarf Roses are planted; and when the bulbs come off their place is occupied with bedding-plants and annuals. Here are the small flowers of the green borders predominant. This garden is reached by crossing the road at the side of the house, behind which is a small flower garden proper, with an assortment of climbers on the walls, and a tolerably stocked fernery in a snug north-eastern aspect. In this small garden a White Sweetwater Vine grows luxuriantly on the back of the house, and in good seasons produces large crops of very fine Grapes.

Exotic or choice plants, and some hard-panes are the sole source of floricultural artificial helps; the greenhouse chiefly used for protecting bedding stock in winter and maintaining plants all the year round to fill two windows in the house,—a task at which we pride ourselves, and which has our constant attention.

The large garden was formed ten years ago, out of a piece of ground which had been a sort of dairy or farmyard for a century. This we had well rounded, and trenched a yard deep all round the wall of which is clearly seen to this day. An old clay cottage was pulled down, and the materials were carefully dug in, as the soil is rather lighter than is suitable for all purposes. The garden was stocked with dwarf fruit trees from the nursery of Messrs. Rivers, of Sawbridgeworth, and these were planted at regular distances round the compartments and on the walls. Of these we shall have to speak further on, and they are now only mentioned to give the reader an idea of the amount of ground over which we have to give instructions we propose to follow hereafter. Lastly, we must mention our *factotum*, a sharp labouring man, who knew a little of gardening in the rough, and whom, as a general servant, we have made tolerably skilful in most ordinary horticultural operations. Perhaps we have now written enough to make our readers feel they may wish in us, and be disposed to be ruled by the counsel which we propose to lay before them. *H. B.*

Home Correspondence.

Hybridism v. Mimicry.—Mr. Murray's article in the *Gardeners' Chronicle* (1870, p. 1639) touches on several points of much interest to me. He says, "after the second generation of hybrids, those which do not revert to the type break out into an overflow of irregular variation, which supplies many of the most remarkable spots to the horticulturist." I have a most remarkable illustration of the truth of the above remark, not after the second generation, but in the first generation of the hybrid. If you will be so good as turn to "Darwin's Animals and Plants," vol. 1, p. 400, you will find he does me the honour to cite two experiments of mine, the first of which related to the unnaturally large size of the seed-pods produced on *Rhododendron Dalhousie* by crossing it with *Rhododendron latifolium*, and the second that "We see here the effect of foreign pollen apparently confined to increasing the size of the ovarium; but (he adds) we must be cautious in assuming, as the following case shows, that in this instance size has been directly transferred from the male parent to the capsule of the female plant. Mr. Henry fertilised *Arabis blepharophylla* with pollen of *A. Soyeri*, and the pods thus produced, of which he was so kind as send me detailed measurements and sketches, were, as you will see, all of the same dimensions, though naturally produced by either of the male or female parent species." And, singularly enough, Mr. Darwin in his brief summary of these and kindred experiments, anticipates or forecasts the result I am now to communicate, when he adds:—"In a future chapter we shall see that the organs of vegetation in hybrid plants, independently of the character of either parent, are sometimes developed to a monstrous size, and the increased size of the pods in the present case may be an analogous fact." I may observe that there were just two seed pods of this latter cross (*Arabis blepharophylla* x *A. Soyeri*), both of which were one half larger than the natural pods of the latter, or seed-bearer. I may also observe that of the first, sown on June 27, 1867, only one seed was ripe, and of the second, sown on July 4 of the same year, there were seven seeds, of which only four were so ripe that the first pod, I find, no more had been pulled before it was fully ripe, and only one seed was perfect. I had three or four plants up from both. These bloomed this bygone summer. One was a perfect monster. Unlike either parent, in having an umbel or a flower-stem of about 3 or 4 inches high in one of the parents, and not above 6 inches in the other, it sent up a flower-spike (now before me) 18 inches high, bearing flowers, as it now has seed-pods, for half that height upon the stem, which were wholly different from either of the species from which it sprang. I may here notice a no less extraordinary departure from the normal condition which occurred to me in a *Draba*, a hybrid immediately from the crossed seed. I had received from the Rev. Mr. Ellacombe, of Bitton, a tiny *Draba*, named *D. incarnata*, of whose origin I know nothing, but it seems to be a species—and very like a *Greenland* one. I had got from imported seed an Andean *Draba*, a suffrutescent species,

by the name of *D. violacea*, and though from 14,000 feet above the sea, it is impatient of our climate. Desirous to incorporate it in my collection of purple white flowers of *D. incarnata*, I crossed it with the latter. From the seeds (three or four at most) I raised only two plants. These two, though looking a little more robust, were a reproduction of the mother in every feature; but last summer one sent up a flower-spike triple the thickness of that of the female parent, which also flowered, and nearly four times its height, being 14½ inches in the hybrid, and only 4 inches in the female parent. The second also flowered with a stem 9 inches high. Except in being a little more robust, the two plants were in every feature the mother, even to the colour of the blooms, being of an ashy white colour. I take these particulars from my note-book, as I have done in the case of the *Arabis*, both belonging to the same natural order; and I beg to repeat that in the one case, as in the other, I took the utmost care to prevent the possibility of failure. I should have mentioned that the *D. violacea* is a much taller plant, attaining to about 18 inches in its flowering condition, and that the figure of the seeds of Sir W. J. Hooker in the "Icones Plantarum," and it is figured and described by Dr. Hooker in the "Botanical Magazine." *I. Anderson-Henry.*

The Education of Gardeners.—It may seem presumption for a young journeyman to say anything on a subject which has so long attracted the attention of your clearest practical correspondents, but there is one great evil, which many young gardeners have to contend with, that has not been mentioned by any of your correspondents, *i.e.*, favoritism by nurserymen. How often are young men sent to situations when they are totally unqualified for them, because they have some friend that is a good customer to the nurseryman?—for it is a well known fact that some nurserymen will send a young man to a first-class situation, though they know him to be one of the greatest blockheads in existence, rather than lose a good customer. I will just give one example, which came under my own observation. A gardener wrote to a nurseryman for a plant foreman; that nurseryman had several young men in his nursery waiting for foremen's places. Some of them had held similar situations before, and were well qualified for a foreman's place; but, instead of sending one of them, a young man was sent who had only had 18 months' experience of market gardening, when nothing was grown but vegetables and hardy fruits. He had not been at the place long before the gardener offered him a journeyman's situation, or else he was to leave. In that case he was brought down to his proper level, but I am afraid the great majority manage to shuffle through for a twelvemonth, thereby keeping a good man out. I fancy I can hear some nurseryman saying, "How are we to tell what a young man is qualified for? But surely, if you do not send him to a situation whether he is fit for it or not, because one of your customers has written to them about him. I am afraid the evil will not cease until gardeners insist on having some proof of the abilities of young men before they engage them. *Fair Play.*

Bougainvillea glabra.—Referring to the remarks respecting this plant, which were made some time ago, by Mr. Burton, I have been expecting to see him refer to the matter again, but as he has not done so, I wish now to correct an error which he made respecting the size of our plant. Instead of its being 10 or 12 feet, our plant is 30 feet high, and has been flowering from top to bottom, from May to October. I consider the *Bougainvillea* to be the most useful greenhouse climber we have, either for cutting or exhibition purposes, and that exhibitors generally ought to be greatly indebted to Mr. Burton for endeavouring to settle such an important matter. *John Harrison, Tyntedale Gardens, Bristol.*

Hibiscus (p. 795).—In reply to your correspondent's inquiry (p. 795), I beg to inform him I have a plant of it, and till recently had several, and have had it in my collection upwards of 30 years. It will not do out-of-doors except for a short time in the summer months, nor will it thrive in a greenhouse, but seems to require an intermediate house. I believe it is a variety of *Hibiscus syriacus*; the foliage and general growth take after that variety more than after *H. sinensis*; and I am almost at a loss to know the best way to grow it, and will not do well, even in summer, in a greenhouse. The double white *Hibiscus* flowers freely in an intermediate house, and is very pretty; and this, as well as the beautiful variety of *H. sinensis*, deserves more general cultivation. I have never seen them exhibited at any of the shows; perhaps this arises from the liability of the flowers, which are very large and heavy, to snap off in carriage, and they cannot be relied on to bloom at the exact time wanted, though with the best management they may be had in flower nearly all the year round, and in plants from dwarfs in a 60 pot to shrubs 7 or 8 feet high. They strike easily from cuttings, and will bear the knife, and can be trained to almost any form, but it is rare to see a good collection of them. I some long time ago obtained all the known varieties I could, and have them now in my collection, namely, *rosa sinensis*, crimson, single and double; buff, double; brick red,

double; yellow, double; variegated, single; and Cooperi, single. I have several times purchased both, offered as single and flavo, but could never discover the difference, and believe they are the same, as too often happens, though under different names. The finest trees of *H. syriacus* I ever saw are growing before a gentleman's house in the market square at this place, the largest about 8 or 9 feet high; they bloom profusely every year, and ripen abundance of seed from which I have raised many plants, and find the flowers of the seedlings very much in colour. I am glad to have the opportunity of calling attention to this beautiful class of plants. *George Wood.*

Collections of Fruit.—At the forthcoming meeting of the Royal Horticultural Society, to be held at Nottingham, it is to be hoped that the Society will again repeat those generous offers of offering prizes for collections of fruit, to be laid out to show the best arrangement of a dessert on a dinner-table. Those who insist upon this sort of arrangement, and have it conveyed into the schedule, can have but a meagre idea of how a first-class dessert is put upon a first-class table, otherwise, in urging the prize, they would take better care that proper tables were provided. If the prize is again to be insisted upon, then let it be done in whole, and not in part. Let the prize be a tent for this special class, and let that tent be filled with suitable tables, divided again into sections of dinner-tables, representing desserts of 6, 8, 10, or 12 dishes, and by offering respectable prizes in each class, a greater number of gardeners would have an opportunity of participating in the honours of prize taking. For instance, a gardener who could show six good dishes might not be able to show eight dishes, and year after year we might be able to add to a high class table, and we might be able to try for a prize in the highest. I am not an advocate for a swamping number of dishes; if force of number is to be the merit, then we must return, as in the days of Fleming and McEwen, to dishes of kept Apples, Raspberries, Gooseberries, Currants, &c.; and at this stage we "leave the sublime and drop to the ridiculous," for such small fruits are more the representatives of a huxter's barrow than deserving a place amongst the more dignified class of fruit. Small fruit is a very wide and uninteresting class, but I place on a dinner-table, and I never have it there if I can help it. I have suggested the above, but I am not particularly an advocate for fruit to be exhibited at public exhibitions in forms of dessert—good fruit will always take care of itself. I should be rather inclined to say, let gardeners arrange their fruit according to their own taste, and the exhibition will be rather effective. At home the gardener and housekeeper will manage to arrange the dessert. This is not by any means the best method of arranging and serving fruit, but it is the best method. In discharging much depends upon fertility of idea, facility in effecting change. At a Yeomany dinner, the other evening, I saw three enormous bunches of Grapes suspended from a soldier's carbine; the effect was good, and it was acknowledged to be a happy idea for the occasion. The Royal Botanic Society, Regent's Park, has offered prizes for the best arrangement of dessert; and that preparation will make it more interesting. Now, the same old bench we find there year after year; and a more unsuitable form of table on which to exhibit fruit can scarcely be imagined. To prevent Peaches, Nectarines, Melons, and Pine-apples from rolling off the table, they must be bolstered up with packings of wool or any convenient material. Bunches of Grapes, too, must be moored to something to prevent their also having a header on to the floor. In a fashionable dining-room do we find the guests seated along the side of a table sloping bench? If this was the case, what would become of the soups, &c.? Why, fall on to the lap, and from the lap to the floor! Yet it is on a table of this form gardeners are asked to display and arrange their fruits, for the guidance of fashionable London. "Tell it not in Gath; publish it not in the streets of Askelon." To the above complaints I have yet one more to add, and that is the keeping of fruit exhibitions open for nearly a week. To the Royal Horticultural Society at Leicester I have sent a collection of fruit; and when I sent to remove it, with what dust and decomposition it was neither "fish, flesh, fowl, nor good red herring,"—neither fit to sell nor to give away to friends; and I maintain that unless our employers agree to such sacrifice year after year, if done on our own responsibility, it is very much like tampering with too good nature to persist in it. This sort of waste in the management of our fruit exhibitions represents, I may remark, anything but a good business affair. Others, perhaps, may view it differently, but since the meeting at Leicester I have not felt justified in following our Royal Society to any of her subsequent provincial meetings. Gardeners who love fruit, love also to grow it, love it still more after it is grown, love taking care of it, and love much dishing it up either as dessert or to place it upon an exhibition table; but to leave it there until it is neither fit to eat nor to look at, is certainly reaching a stage so truly it may be said of it that "Love's Labour's Lost." *W. Miller, Combe Abbey Gardens.*

Late Pears.—I received trees of the *Bezi* Mai, or, properly, *Bezi* de Mai, Pears (see 1870, p. 1733, fig. 300) from M. de Jonghe, of Brussels, in 1860—41, in 1863

they bore some fine handsome fruit, which ripened in April and May, 1864, and although not so good as Bergamotte d'Espéren, they were nearly melting, juicy, and sweet. I confess to have partaken of the enthusiasm of M. de Jonghe, who, I believe, then thought it incomparable. It is a curious fact that although the same trees bore the same large fruit in fruit annually, they have never since the above epoch ripened, or have become soft, but keeping quite sound till July, then being fit, as a humorous friend expressed it, for cricket balls. I have found the same quality in other late Pears: the Pear Madame Millet, as large and more handsome than Bezi de Mai, ripened here the first two seasons after importation, and has never ripened since; Prince Camille de Rohan, another large fruit, from the late M. de Jonghe, at first most promising, has never ripened its fruit; this, like the first-named, is a most abundant bearer. I may ask, Why is it that these late Pears should lose their ripening power after a year or two from their introduction? I have eaten to-day a fruit prematurely ripe of Passe Crassane. Last spring they did not ripen kindly, but this season they are fine, and will ripen in the next two months. One would think that this lack of ripening power was peculiar to wet summers; but in 1868 we had a tropical summer, still Madame Millet and Bezi de Mai remained hard till they rotted in July, then becoming, as the Parisian told the Yankee when he bought a Pear of Uvedale's St. Germain (Belle Angevine of the French) for 30 francs, melting, forgetting to add that it must rot first. It is curious to note, however, that some late kinds of Pears, after some years of culture in this country, become soft, as were, for instance, I will note one remarkably so, the Pear Fortunée. I introduced some 30 years since, from the late M. Parmentier, of Belgium. This Pear he was enraptured with, but it would not often ripen here, so I have lately placed it among baking Pears, on account of its brisk acidity. A tree of this kind, planted against a south wall in my son's garden, at Hendon, two miles hence, the soil light, resting on gravel, bears annually fine Pears, the size of the Cranbury, but the fruit is much more like Pears ripen generally in February and March (they are ripe now), and are always thoroughly melting, and of the most exquisite flavour, with a grateful, pleasant, refreshing acidity. I begin, therefore, to hope that some of our very late Pears may in time be worthy of culture. The way to bring this about would be to double graft them on early sorts on the Quince, and plant the trees against south walls. How much we have to learn in fruit culture! *Thos. Rivers.*

The Weather in Norfolk.—The snow is 12 inches deep. On Dec. 24, 1870, the thermometer fell to zero, and on the 25th to 4° below zero. All our vegetables are covered up with snow, and the evergreens seem to be much injured. The two nights mentioned were the coldest which have been registered here since Dec. 25, 1860, when so many plants perished: the thermometer then registered 8° below zero. *Wm. Smythe, The Gardens, Elmham, Jan. 3.*

Destroying Weeds on Lawns.—“A Lady” (p. 1734, 1870) is desirous of information with regard to an implement for destroying weeds, and she refers to one that a friend described to her as a walking-stick which he had made for that purpose, and asks for information whether, or where, such an instrument can be bought? I have a notion that my friend, Mr. Bailey Denton, of the inventor's name, is in error, and that he cannot have no doubt, but that he could give a satisfactory account both of its structure and performance. In the common practice of cutting up Plantains from lawns, I deem it best to put a pinch of salt in the holes made thereby, fearing lest any stumps or crowns should have been left behind, and which this substance instantly kills. I have, however, used a very handy implement, invented by a gentleman at Farington, which he called his “rotator,” and which is a scoop, of iron, with a sharp-cutting under-edge fixed in a kind of spade-handle, its shape being much like that with which the cook scoops out the cores of Apples in making that delicious sweet called “compote of Apples.” In using the implement I first take it to some good turf, it may be by the roadside, or on the downs, and from this I scoop out as many pellets as I suppose there are Plantains or other weeds to be removed. In removing the weeds they are simply scooped out like the aforesaid pellets, and a good grass pellet is pressed into each hole, and then the roller presses the whole together. I recollect that the inventor proposed even to make new turf very quickly by first well rolling the soil, and then putting in grass pellets into holes made with this ingenious tool. These appear to me to be excellent expedients for removing weeds, and renovating small patches of turf, but my experience leads me to conclude that the constant moving to which lawns are necessarily subjected, must ultimately so impoverish the soil that the growth of the better grasses is next to impossible. These then are supplemented by all kinds of weeds, which are at once discouraged by a top-dressing of ground bones, guano, and soot. If weeds or coarse grasses greatly prevail, I should not hesitate to apply a good top-dressing of salt, which will kill the weeds and rougher plants, and some say, “Yes, and the finer grasses will grow again.” My experience, however, goes to show that while the grasses soon come again, only the better sorts are

encouraged, because the coarser ones and the weeds have been turned into manure, and this effect is heightened by a light dressing of sifted decayed leaf-mould or any other fertiliser. In dealing with turf, it cannot be too often insisted upon that poverty, or a bad condition of soil, or both, will, by encouraging the growth of weeds or weedy grasses, discourage that of better sorts. *J. B.*

Fungophobia.—Mr. Miller says he has no intention to refute my arguments on this subject, but only to call attention to a few facts, and he then proceeds to show that with him plants, and particularly Strawberries, are benefited by old tan. As I believe I was the first who advocated the mulching of Strawberries with tan in your columns more than 20 years ago, this application of tan is not new to me, nor do I think any cultivator of plants requires to be told that most things grow vigorously when their roots get into an old tan bed. But does Mr. Miller intend to say that tan never gives life to Fungi? or that the roots of healthy plants are never attacked by Fungi? What is he trying to prove? I remember better what I have written than what he has advanced on this subject, but I think this argument first arose from Mr. Miller trying to show that there was no danger to be apprehended from sticks buried in Vine borders. I, on the contrary, showed that not only scientific men like Mr. Berkeley recognised the danger, but that it was acknowledged and guarded against by practical men. Surely Mr. Miller has not drawn the deduction that we, for no purpose and under no conditions, would use vegetable matter in cultivation. Has he never seen plants injured by Fungi?—never seen Cocoa-nut refuse in soil cause plants to die, attacked by Fungi? For the life of me I cannot make out what he is trying to prove. It is because Mr. Ingram, in Leicestershire, Mr. Speed, in Derbyshire, Mr. Berkeley, everywhere, have observed Fungi on the roots of cypripedium vegetable matter attacking living roots, that this proves the neighbourhood of Nottingham peculiarly liable to such attacks? This is, indeed, a strange deduction. Mr. E. G. Henderson told me he gave up the use of Cocoa refuse in Felargonium culture from this cause. I have in my garden now a Thuja gigantea growing, or rather dying, for it looks sickly, on a piece of land in which I know a quantity of leaves and sticks were buried some years since; and, though I have not looked out for it, I still would have been a victim to an attack of Fungi, and will take it up any day to prove it. Whatever Mr. Miller may say, he who buries sticks or undecayed vegetable matter in his soil will, if the soil be dry naturally, or become so in a hot season, be liable to injury. In a wet or strong clay soil there is perhaps little danger. Mr. Miller must not suppose every one is situated as he appears to be. The soil he advocates is very peculiar; it is not only very rich, but it is very strong and heavy, and it cracks in a very peculiar manner, forming “squares, trapeziums, and rhomboids,” as he says; such land may be, and probably, is very unwell to the growth of Fungi. *I. R. Pearson, Chilwell.*

Crassula lactea.—This charming winter-flowering plant, which has been discarded for so many years, must certainly regain its position in every place where flowers are appreciated at this season of the year. It is now in full bloom, and it must be acknowledged by every one acquainted with the plant, that it is one of the most attractive and useful in cultivation for greenhouse or conservatory decoration. It has been in flower for the past fortnight, and these same flowers will remain in perfection till the latter end of the month. It was introduced into this country from the Cape of Good Hope in 1774, but is now, like many more of these good old things, very rarely met with, except in collections of succulents. This plant is an evergreen succulent shrub, with large, thick, ovate entire leaves, dotted very regularly near the edge upon the upper surface; the leaves are placed very closely together, and the plant forms an irregular compact mass of foliage of a greyish green colour. From the end of every branch of a plant, which is before me, rises a compact branching panicle of numerous, pure white, star-shaped flowers, which have a very pleasing and striking appearance. It grows very freely, and is so simple to cultivate that no one can possibly fail. It will thrive in any ordinary greenhouse during the winter, and in the summer it should be either plunged out-of-doors in pots, or planted in the open border. I have tried some both ways during the past summer, and I find that the plants introduced upon those plants which were planted out; they were taken up in October and potted, and are now in full bloom. It is propagated very freely from cuttings, in light porous soil; these should be taken off some few hours before they are inserted in the pots, to allow them to dry; cuttings put in now would flower next season. *A. J. P.*

Asparagus Culture.—I differ in many points with your correspondent, Mr. Taylor (see p. 1734, 1870), in the culture of this vegetable. 1. The mode he practices in the preparation of his beds involves by far too much labour, to say nothing of the great eyecore which such a trench half full of rubbish would be in a well-kept kitchen garden. Kitchen gardens are not places for the growing of Asparagus, but for the growing of any kind of vegetable for a whole season, the gardener being often expected to produce as much from one acre of ground as the

majority of farmers do from five acres. I agree with the depth of Mr. Taylor's bed, as also with placing a good quantity of rough refuse at the bottom, and if a good sprinkling of sea sand could be had and worked in, it would be just what the Asparagus delights in. It should be remembered that contiguity to the sea very much favours the growth of this vegetable. 2. Mr. Miller greatly in regard to allowing the beds to carry an “abundant crop of seed.” I believe such an occurrence is the result of weakness, at any rate, I am convinced that a heavy crop of seed will contribute not a little to that end. My plan is to cut out all the seed-bearing stalks, and where that cannot be done, as in the case of one root throwing, say six heads, all of which prove to be seedlings, I would remove those of them, and with a coarse-toothed comb denude the remaining three of their seed. By this method beds will last in good bearing for a great number of years, provided all other circumstances are favourable. I cut the tops from my beds as early in the autumn as the haulm is sufficiently ripe and dry to burn, and could I procure it I would then give the beds a good coating of seaweed and sea sand in lieu of dung and salt, removing the greater part of it in early spring, when the beds receive their annual trimming. *Thos. Simpson, Broomfield.*

The Pyrus domestica, or “Witty Pear.”—Through the kindness of Mr. Forster, of Esher, my Thomas was desirous to see some of the fruit of this rare fruit—rare, that we doubt if even a finer strain of English Pear could be found more scarce at Christmas-tide. I was so fortunate as to receive a small box of the fruits with branches of the elegant pinnate foliage. It contained two varieties of fruits, labelled Nos. 1 and 2, which varied as follows:—No. 1 presented a completely pyriform fruit, both in shape and size, coming very near to the little Muscat Pear, except that it is a little more rounded towards the base. Its colour was a light tinge of gamboge, just tintured with green, with a bright carmine blush on the sunny side. No. 2 is of the same size, but more inclining to Apple-shaped. Its ground colour is the same as that of No. 1, but its sunny side is inclined to purple. Both forms were punctured with minute russet dots, the foliage of the two forms being exactly alike. That these were both referable to a single species was obvious, as they were as much varieties of the same different from usual Pears, or Apples. They ripened, too, at different times. No. 1 was bletted like a Medlar the first week in November, and it had the bristly taste of this fruit, which it greatly resembled. No. 2 was not in perfection until Christmas Day, and, like the prettier Apple, it had not the flavour of its less gaudy brother. We have, then, some reason to think that the Witty Pear tree might have been introduced into Weyre Forest at a distant period, by some recluse, probably from the Continent; and yet while its fruit was edible, and therefore superior to that of the Mountain Ash, its leaves might be supposed to possess superior charms to the commoner species. The fact that a couple of trees are found to offer such variations shows that the Pyrus domestica has the same propensity to run into varieties as the rest of the tribe. Without more evidence it would be useless to do more than to make an speculate as to the probability of the Witty Pear being, after all, a hybrid form, of which the Mountain Ash was one of the parents. I shall hope for future opportunities to examine the fine trees to which attention was some time ago directed by Mr. Forster, with the view of adding to the natural history of a most interesting plant. *J. B.*

Do Plants Absorb Moisture with their Leaves?—If Mr. Croucher does not understand me, I beg to inform him that he should read my statement thus:—“It is evident that the absorption of the nutritious fluid is almost exclusively performed by the leaves and stems,”—these two words having been put in by me in speculation as to the probability of the Witty Pear being, after all, a hybrid form, of which the Mountain Ash was one of the parents. I shall hope for future opportunities to examine the fine trees to which attention was some time ago directed by Mr. Forster, with the view of adding to the natural history of a most interesting plant. *J. B.*

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fluid; or why do we keep dry our cultivated Cacti, whether growing in prepared beds or in pots? And, again, how is it that we see sometimes such monster Cactuses in small pots and tubs? Mr. Croucher says that I seem to think sponges are the procurers for the plants, whilst he says, "they are only protectors of the tender point of the root." What does the name imply? Is it a beggar's life? It is from him that I know the fact that the extremities of the roots only are capable of absorbing gaseous or fluid matters from the soil. [This is not the whole truth. Eds.] Now let us see what Dr. Lindley says about them in his "Theory of Horticulture," p. 14, § 25:—"The absorbent power of the spongioles must be much greater than would have been supposed, if we consider that it is almost entirely through their action that the enormous waste of fluid which takes place in plants by perspiration is made good; and hence their importance to plants, and the danger of destroying them, become manifest." Whilst writing on this subject I should like to mention that at the conclusion of my former article, where I stated the French equivalent of our cubic yard, the words were accidentally transposed. Instead of reading it 1 cubic yard = 1.308 cubic metre, it should read 1.308 cubic yard = 1 metre, or 1 cubic yard = .7645 cubic metre. My critic seems to have overlooked this error, which, if he has noticed, I think should not have again encroached upon space that might perhaps have been better occupied, with the exception, however, of thanks due to him, which, nevertheless, I beg to append. *Gorge Naudin, Royal Nurseries, Stouff.*

I have been tempted to offer a few remarks on this subject through seeing the letter of Mr. Fish on the same matter. It is well to start with some opinion, and mine goes to negative the question. I believe it will be admitted that the cause of a plant flagging is excessive evaporation, and hence the loss of water at the roots, which, for the first instance, evaporates at a pace or too equal, for the roots, in the latter they cannot get enough to supply the demand; the remedy in the first instance is to shade or make the air moister, which will check evaporation, and so enable the roots to keep pace with the demand; in the second to give water, and the balance will be restored. My reason for this opinion is that, if you take cuttings of any but succulent plants, you must put them into a close frame or under a bell-glass, and keep them moist, and in the first instance, if you do not, if you allow cuttings to dry before they are put in, the chances are they will die (except in such plants as Coleus, which have large cells, capable of imbibing moisture at the base, though with them the sooner they are in the better), but when they are rooted they may soon be exposed, because the roots are sending supplies to repair the waste. In proof of this opinion, I have often taken newly struck plants before they were sufficiently rooted, and the consequence was they soon began to flag, the same as newly-potted seedlings, but if I put them into a frame again, or shaded, and so lessened evaporation, they soon recovered. I did this a few weeks ago, with two newly-potted plants (cuttings) of *Reidia glaucescens*, though they were well rooted; through the growing points of the roots being disturbed, and therefore not being able to keep pace with the extra evaporation, they soon became much distressed, when they were put into a close frame, and in a few days they were looking up again, but some of the pinnae at the top of the leaves turned yellow and fell off. Now, if plants imbibe water through their leaves, those near the point being the youngest, and therefore most active, ought to have recovered as soon as the others; but those nearest the roots getting the first chance of the sap, appropriated it all; whereas, if Mr. Fish's opinion be true, those at the top should have imbibed enough for themselves, and supplied those below with a little. It may be as well to mention that the pinnae at the apex were not shrivelled up, but were, as they flagging, as they had only been out one day. Again, I have taken out cuttings of *Nepenthes* after they had been in long enough to have struck, but finding them flagging much, I have examined them, and found they were not rooted. They were put back into a moist frame, but they never got erect again; though whenever roots ones have been taken out too soon they always recovered upon being put in the same way, as to check evaporation. I am of opinion that whenever water enters a plant by the leaves the result is decay. For instance, if the air of a house gets saturated, and the temperature becomes too low, the tender leaves damp off, and in the case of Orchids yellow spots appear on the leaves, caused through water getting into the epidermis and causing disorganisation, but if the air be dry a fall of temperature is not of so much consequence.

On p. 16, Mr. Fish says, "It will be admitted that the rate of growth, the addition of new parts, the enlargement and consolidation of the structure, are largely dependent upon the amount of sap elaborated in, and thrown off by the leaves." Now, I cannot see what that which is thrown off by the leaves of a plant can have to do with the enlargement or consolidation of the same! That plants grow fastest in a moist atmosphere, I think not. If our Peach trees were always in a moist atmosphere, when would you get fruit ripen, or the wood for next year's crop? Ireland has a moist climate, but it is a bad Wheat country, while grass is emerald green. A plant has first to grow wood, leaves, flowers, and fruit, for which pur-

poses it requires a moist atmosphere to check a too rapid evaporation, which would rob it (as an example of which, see the smallness of Apples this season on dry soils, and the scanty foliage of trees generally); after which, a dry air is required to ripen the wood and fruit, which is brought about by diminished water at the roots, and a stronger sun, causing rapid evaporation, and so stopping the formation of more leaves and shoots. Again, why it should be necessary for a plant's growth that it should either take from or give to a moist atmosphere I cannot see. If the roots supply a large quantity, and none is lost, the plant appropriating it must grow either more leaves, wood, or flowers, or all; and why it should take food with both mouth and lungs I cannot understand. Again, if a plant has one inlet and one outlet of equal proportions the result will be nil, but if the outlet be half blocked up by a moist atmosphere partially or entirely stopping evaporation, the result will be increase, and that I contend is what my experience teaches me is the case. With respect to mineral substances being found in epiphytes, are they not found in the trees they grow on? and the roots running into the crevices of the bark must find some of that decayed, with a few rotten leaves, Mosses, Lichens, &c.; these sources are aided by winds and the feet of birds: every little helps. *J. Croucher.*

Covering up Fig Trees.—There are several fine standards at Newton Park, Hants, which for years have never been either pruned or protected. One is in front of a shrubbery facing south-east; the other, years ago, had been nailed to the garden wall, but got neglected, and is now from 6 to 8 feet above the wall. They both make very short-jointed wood, and bear and ripen every year a fine crop of fruit. *T. C.*

Improving an Ice-house.—Can you or any of your correspondents suggest any means of improving an ice-house, which was built here about five years since at a great expense, and which has turned out a complete failure, the ice never keeping after the end of July. From the end of May until the ice is done the house stands open, the level is in general between 50° and 55°. The house stands on the side of a gravel bank, and it is only 3 feet below the ground level inside; height inside, 15 feet. The brickwork is well built 9-inch walls, with a hollow space between of 14 inches; roof the same. Should the hollow space between the walls be filled with sawdust or charcoal, as a non-conductor of heat, or left as they are? Any information on the above will be gratefully received. *A. McAndrew, Bromley Palace, Kent.*

Hardy Primulas.—In reference to Mr. Harpur-Crewe's notice of Primulas (p. 1673), I may observe that he omits P. palmirui, P. longifolia, P. monroana, P. sikimensis, and one or two others worth growing, though I find some of the species very untractable in these southern climates, in fact, I believe it is owing to this difficulty that many varieties are not to be produced. He will, I think, procure P. capitata from Messrs. Henderson, of St. John's Wood, and P. sikimensis from Mr. Stark, Edinburgh, but for P. Stuartii I have in vain looked for years. I have seen it only in one catalogue, and upon application received a not uncommon reply, "sold out." I question if P. imperialis is in the country. Growing on only one volcanic mountain in Java, amongst the scoria thrown up by eruptions, it is never likely to be common, and no doubt will be extremely difficult to keep. P. palmirui is perfectly hardy, though, as by one of your correspondents some time ago to require protection. *A. R., Bromley.*

Double White Hibiscus.—In reply to "F. P. B. M.," I beg to say that I have in my nursery several varieties of the Hibiscus—height, from 3 to 8 feet, and the flowers are about 2½ inches, and another almost pure white, with a semi-double flower. They bloom from August to September, are quite hardy, and deciduous. My nursery is situated on the southern coast of Devonshire; atmosphere mild. *E. Wilson Serpell, 21, Cornwall Street, Plymouth.*

—In answer to "F. P. B. M.," I can inform him that the double white Hibiscus is quite hardy here. My shrub is about 7 feet high, and is probably 40 years old. It is a very pretty flower, not quite pure white, as it has a tinge of purple in the centre. The variegated Hibiscus is also quite hardy, and from 2½ to 3½ shrub between 2 and 3 feet high; but none are so handsome as the old purple one, which is one of the handsomest shrubby flowers I know, though now seldom seen. It is perfectly hardy. *Henry N. Ellacombe, Bitton Vicarage, Gloucestershire.*

Earthing-up Vegetables.—The earthing-up of Potatoes has a special fitness in that case, because every bud on the stem is thus turned to account by production of enlarged stems, otherwise called tubers. The same principle occurs in the Wheat plant, which is induced to tiller by the practice of hoeing, &c., which converts the covered buds into ear-bearing stems; and the contrary mischief is experienced when frost or mismanaged husbandry causes the blade to spindle or be thrown above the surface. *G. H. V.*

Late Grapes.—I do not clearly understand what

your correspondent, "A Grape Grower," means by the statement that my new Grape, Waltham Cross, does not seem to have any peculiarity (?) of flavour to deprecate it. My I ask what "peculiarity of flavour" he considers desirable in a Grape? The Waltham Cross Grape has a sound, wholesome, and rich flavour, and the Grapes are now plump and good, in a house in which Black Hamburgs were cut in August last. Perhaps, like the one in the fable, "A Grape Grower" thinks these Grapes "sour" because inaccessible. *Wm. Paul, Waltham Cross, N.*

Catalogue Contradictions.—From a list of "novelties" issued by one of our large seed houses, I call the following:—"Dell's Dwarf Crimson Beet: the best ornamental variety for garden decoration;" "Perfection of Beets: the foliage is shining black." It should be borne in mind that other Beets, although of dark foliage, are not adapted for flower garden decoration, either from the coarse appearance of the foliage, &c. This little bit of "bunkum" is nearly equalled in its way by a little bull in another catalogue, where we are told that Haigh's Seedling, or Lapstone Kidney, is a first-class secondarily "round" variety. Oh for a censor of trade literature! *A. D.*

Foreign Correspondence.

COLLIOURE, PYRENEES ORIENTALES, FRANCE: *Variation as a Source of New Species.*—In one of your recent numbers (1870, p. 1631) you allude to the importance of variations perpetuated by hereditary descent, and thus forming what may be called initial species (*espèces concomitantes*), or subsidiary species (*petites espèces*), within the limits of a larger one. With reference to this subject, I desire to call attention to a fact which adds to those already observed by me in the "Cucurbitaceae," and which appears to me to be of great interest, botanically as well as horticulturally. This is a new kind of Pumpkin-Gourd (*Potiron, gallic*; Pumpkin, Anglorum = *Cucurbita maxima*). The seeds of this were sent to me last spring by Dr. Hooker, who received them from Sierra Leone. In the European varieties of that species the ovary is always glabrous, and the ripe fruit is almost always spheroidal, sometimes depressed, very rarely a little lengthened and conical. Now the variety from Sierra Leone (*C. maxima leonensis*) the ovary is cylindrical, and thickly beset with stiff hairs. The fruit is likewise cylindrical, as in many varieties of *C. moschata*, smooth, of a greenish grey colour, with longitudinal white stripes. The flesh is firm, floury (not melting), as in other Pumpkins, in which it becomes more or less deliquescent when cooked, indeed it may be said to be excellent for many culinary purposes. This variety of Pumpkin, in my acquisition to kitchen gardens, but to those of the South only, as it flowers late in the season. Before producing flowers its stems acquire a length at least three times greater than that of ordinary Pumpkins. The whole plant is covered with short hairs, which give it a greyish aspect, by which it may be recognised in a moment from other varieties. Its flowers, produced, as before said, late in the season, are only half the size of those of other Pumpkins, and of a pale yellow colour. This variety has succeeded well with me at Collioure, but the fruits were not fit for cooking till the end of November, three or four months after those of the ordinary kind.

I presume the Gourd shown by Rev. Dr. Thomson at the Horticultural Exhibition at Liverpool (see *Gardeners' Chronicle*, 1870, p. 1574), and of which I should be glad to receive seeds for trial at Collioure, belonged to a species of *Telfairia*, perhaps *T. pedata*.

The winter here is very severe, the thermometer on Dec. 24 was as low as 7° Cent. (= 45° Fahr.). The Lemon trees suffered slightly, but not the Palmy, among which latter *Phoenix Hanceana* (see p. 957, 1870) has shown itself perfectly hardy. This beautiful species, from Southern China, grows here with wonderful rapidity. *Charles Naudin, Rev. Memb. Linn. Soc. Lond.*

Societies.

LEEDS PROFESSIONAL GARDENERS' FRIENDLY SOCIETY: *December 26, 1870.*—The fourth annual dinner and meeting of the members of this flourishing Society was given on the above date, at the Black Lion Hotel, Leeds. The Secretary, Mr. Sunley, read the annual report for the current year—a very favourable one for the Society, which now consists of 34 honorary and 99 ordinary members. The mean age of the latter is at present under 35 years; this fact, together with the knowledge of the grounds already available by the Society, gives earnest promise of its future prosperity and stability. A letter was read, which the Society had received from Mr. R. Wilson Ker, Hon. Sec. Liverpool Horticultural Society, who, in the course of his remarks, alluding to the Leeds societies like the present. Speaking of his own locality (Liverpool) he said that the number of gardeners was enormous, but that much of the good they might do was lost on account of their being "scattered like sticks," and not bundled together by the social bonds which fitted so comfortably on the shoulders of their brethren at Leeds.

Notices of Books.

Charles Darwin et ses Precesseurs Français; *Étude sur le Transformisme*. Par A. de Quatrefages. Paris, 1870.

The celebrated naturalist whose work we have before us seeks, as he informs us in the introduction, to examine what the doctrine of Darwinism contains of truth and wherein it is inadmissible. The doctrine of Darwin, he says, resolves itself into a simple and clear notion, which may be represented in the following formula:—All the actual and present animal and vegetable species descend by way of successive transformations from three or four original types, and probably from one solitary primitive archetype.

Thus explained, he considers that Darwinism has in it nothing very new. He thinks that the admirers of Darwin have not done justice to those who have preceded him in this path of speculation. De Maillet, Robinet, Buffon, Geoffroy and Isidore Saint-Hilaire, Bory de Saint-Vincent, and M. Naudin, pass successively under his careful review, and (though more interesting to the French than to the English reader) the clear and lucid analysis of the views of each of these writers, with their points of opposition or of agreement, and also of the extraordinary vagaries of the human mind displayed by some of them, constitute an attractive and a valuable treatise.

The "general exposition of Darwinism" which follows is admitted on all hands to be a very fair and ably written development of the system of this celebrated writer. It is probably more in accord with the real views of Darwin, especially in reference to the doctrine of natural selection, than the writings of professed admirers and champions of the school. He sees a necessity for the irreconcilable contradictions of the author of the theory in his endeavours to make it fit with the facts as they are, and to account for the present state of things, whilst his followers only make matters worse by forcing an impracticable consistency.

Having given, as he believes, as faithful an exposition as possible of the doctrine of Darwinism, our author proceeds in the third chapter to demonstrate its accordance with certain general facts, and also in part with the doctrine of Lamarck.

M. Quatrefages then goes on to explain that he is in accord with Mr. Darwin on the subject of the transmutation of species, whilst he believes that the varieties are not in accordance with the views cherished by Lamarck with what we find around us. All Nature manifests correlation, and all the extinct species of animals range themselves side by side, or in the vicinity of species at present existing. In order to find place for all the fossil animals yet discovered, it has not been necessary to create one single additional class. The extinct and the living species appear as the integral parts of one system of creation. The embryonic structure of animals tends to the same conclusion. Our author acknowledges the fascination which, on the first reading of Mr. Darwin's book, the professed explanation which it afforded of this unity of creation exercised over his mind, but, like the views of Lamarck, this fell to pieces before more elaborate investigation.

Our author then takes notice, in the first place, of the nature of the fossils involved. He finds that in all the writers quoted personal conviction takes the place of logical argument. Maillet says, "I conceive that the fish changes itself into the bird as the caterpillar into the butterfly." Lamarck many times says, "Is it not possible that desire and will give rise to new organs in an animal?" Geoffroy St. Hilaire conceived the possibility of the sudden change of animal types, and declared evidently inadmissible the slow modifications alone conceivable, and possible, in the hypothesis of Lamarck. Darwin also only conceives these last, and he insists almost in every page on the possibility of these transformations. Modern science requires more than this, and only accepts as proofs well-defined facts, and such as have been subjected to vigorous criticism. Conjectures must not take the place of facts, nor be made the basis of theories; still less can any author attribute possibilities to possibilities. Everything proves that the general laws of the globe have been the same since the most ancient era, and every theory, the consequence of which violates these laws, must be judged inadmissible by the naturalist. When Darwin finds that his theory will not accord with facts, he says, "I have, nevertheless, the conviction that such objections have little weight, and that these difficulties are not insoluble." But is this conviction a proof, or even an argument? It is to the unknown that Darwin, in common with Maillet and Lamarck, makes his chief appeal. The unknown can alone open this vast field for speculation when the possible is substituted for the real, and when that which we know not is considered as the most powerful argument in favour of the doctrine we are called upon to receive. Our knowledge is thus made to rest on the basis of ignorance.

M. Quatrefages contends that the notions of Darwinism are opposed to the observed and ascertained facts of creation, and to the facts brought to our view by Paleontology. We will not lead our readers over this already travelled ground.

In the third chapter of this second part M. Quatrefages shows that Lamarck, in setting out for an assumption

tion of spontaneous generation has, at all events, a logical basis on which to rest his theory; but Darwin, in refusing this doctrine, and in leaving out of sight the origin of his primordial being, escapes on the one side from some difficulties, but subjects himself to others not less formidable.

He is obliged to admit that some unknown cause has played the part of a creative power on this globe, and that only for once, during a limited time, and in only one manner. This is an impossibility to any person who places himself exclusively in a scientific point of view. To produce for once an archetype, and to remain inoperative for ever after, is contrary to all human experience and belief. M. de Maillet, Royer, the translator of Darwin, feels this difficulty, but endeavours to supply an explanation by imagining this planet to have been at some period one vast womb, producing an immense number of germs. This conception appears to her critics equally a miracle with the notion to which she objects. Moreover, it appears that in endeavouring to supply the *lacune* of Mr. Darwin's system, she has damaged the whole, because there appears no cause, on the supposition of a multitude of germs, to account for the unity of the plan of Nature.

Mr. Darwin himself says that all speculation on this subject is vain and without foundation. It appears, then, that the whole system rests on the hypothesis of the existence of a prototype which the man of science cannot accept, and on laws of development which are under the dominion of accident, of chance.

In the fourth chapter, M. Quatrefages enters upon the questions of species and races of hybridation and cross-breeding (*mdisage*). In the first place he examines the contrast between the two first terms, species and race, which, he says, are often confounded. He quotes Scott-Hall's definition, after learned examination of the opinions of the most eminent botanists and geologists, says:—"Such is species and such is race, not only for the schools into which naturalists are divided, but for all; since the gravity of their differences respecting the origin and the anterior phases of the existence of species does not hinder them from proceeding in the same way to the distinction and determination of species and race. So long as the question is only concerning the actual facts of organized beings, all naturalists think the same, or at least act as if they thought the same."

M. Quatrefages thinks these words specially worthy of note as proceeding from the above source (the son of Geoffroy Stephen St. Hilaire), and apprehends that they exactly define the question. "They teach us that schools exist only when we take a position outside of time and place accessible to observation, and that they are effaced as soon as we enter on reality. In the presence of what is, it is no longer possible to argue about what might be." Our author cites the definitions of between twenty and thirty leading naturalists, from the times of Ray to the present, and finds that "when they would define species they have all been constrained to include in their formulas the two ideas of resemblance and of descent." "The idea of resemblance has been a complex one from the time even of Linnaeus and of Buffon. It must embrace the physiological family with its differences, which sex separates, and the difference of the number and diversity of forms comprised in one physiological family have become multiplied in a manner which it was impossible to foresee. Vogt first comprehended in his definition of species the notion of the phenomena *généneisis*; but more recent works, and especially those of Darwin, have shown the great importance of *polymorphism*."

These do but enlarge the idea of the physiological family, and however strange and foreign to our preconceptions, they may be, their importance must not be over-estimated. Thus, in the most complicated cases of geneaenesis, we always find at the commencement of a cycle of generations a father and a mother characterised by the presence of reproductive elements. So a female Medusa lays eggs which are fecundated by a male Medusa. From each of these eggs there proceeds a being like an infusory animal, the direct descendant of its parents. This fixes itself, and gives rise to a new generation of polyps, which produces by budding an infinite number of individuals without sex. In time, one of these individuals undergoes a metamorphosis, and becomes a Medusa, in which there reappear the elements necessary to a new foundation. It is evident that all the individuals that have proceeded from the same egg, whatever their forms, whatever the order in which they occur, are the immediate descendants of the mother that has laid the egg, and the little king that has fecundated it. They are equally the brothers of all produced from the same laying. The family has increased, but has fundamentally remained the same. Polymorphism changes nothing in this conclusion. In a hive, the neuters and the females, issues of the same queen fecundated by one father, belong to the same family. It is the same in a nest of ants, for the great kings and the great queens, "the little kings, the little queens," the workers and the soldiers, with wings or without.

Similar facts have been traced out in the vegetable kingdom, and all leading to the same result.

"The species," then, according to M. Quatrefages, "is the collective amount of individuals more or less resembling each other, which are descended, or can be

looked upon as descended, from one primitive pair by an uninterrupted and natural succession of families.

"The variety is an individual, or a collection of individuals, belonging to the same species, generation, which is distinguished from other representatives of the same species by one or more exceptional characteristics.

"The race is the totality of individuals belonging to a single species having received, and transmitting by way of generation, the characters of the same species."

"Thus the species is the point of departure. In the midst of the individuals which compose the species appears the variety, and when the characters of the variety become hereditary they form a race. These are the relations which for all naturalists reign between these three terms, and which it is necessary to have constantly before the mind in the study of the questions which occupy us."

From hence it follows that the notion of resemblance, which is very much attenuated in the species, becomes of absolute importance in the race.

The union of individuals of different species is very rarely productive. It is quite otherwise with the union of individuals of the same species but of different races. Here, however opposed the morphological characters may be, the union is easy, and always fruitful, and the result is a new type, and the transmission of the reproductive faculties which they themselves produce. These facts are admitted by Darwin, although opposed to his doctrines. H.

(To be Continued.)

— Dr. Ludwig Pfeiffer has issued recently the first half of a complete list of botanical synonyms of genera and subgenera up to the end of the year 1858. The title runs thus, *Synonymia Botanica locupletissima generum, sectionum, vel subgenerum, ad finem anni 1858 perductorum*. (Williams & Norgate. 6s.) There can be no question as to the utility of such a list to working botanists, but there are one or two circumstances which rather seriously impair the value of the present publication. In the first place it is only brought down to the end of the year 1858, a long while ago in view of the progress of science. This deficiency, however, can be remedied in due time, and hopes are held out in the preface that the work will ultimately be continued so as to bring it down to more recent times. Another very serious defect is the entire absence of any reference to the works where the synonyms, or names of subgenera, as the cases may be, are published. Thus, for instance, under the head of *Myrica*, Linnaeus is included 17 subgenera, with abbreviations appended, indicating the names of the authors, but without any indication whatever of the book in which the aforesaid subgenera were originally proposed and defined. A professed botanist, from his experience, might be able, with more or less facility, to know where to look for what he was in search of, but the ordinary student would lose much time in so doing, and perhaps after all not be successful. The genera are arranged according to the system of Endlicher, and there is an alphabetical index (of which only a portion is given in the present part), which will be very serviceable for reference.

— *Cassell's Technical Educator*, a publication on the plan of, and, indeed, supplementary to, their very useful "Popular Educator," deserves favourable notice at our hands. The articles, as in its prototype, are of unequal value, but in the main there can be no two opinions as to the merit of these publications.

Obituary.

DIED, on the 30th ult., after a long illness, Mr. GEORGE MOSES, for some years head gardener at Orchard Leigh Park, near Frome, aged 45 years.

Garden Memoranda.

EATON HALL, THE SEAT OF THE MARQUIS OF WESTMINSTER, and which is well known as one of the most princely residences in the country, is situated in a magnificent park, and commands views of the mountains of Wales, the Peckforton Hills, and the majestic rock on which stands Beeston Castle. At the present time the Hall itself is undergoing extensive alterations and improvements, under the direction of Mr. Alfred Waterhouse, architect of London. These alterations are greatly needed, for, judging from such portions of the old structure as are now left, the old building was designed and ornamented in the worst possible taste; the walls of the principal portions were overlaid with coarse, inappropriate Moorish ornament, painted over rich, but bad, and comparatively modern Gothic (?) stone work. A great deal of this elaborate but ill-conceived carving has been seen swept away, and plain and more appropriate work is taking its place. The chapel has been entirely taken down, and the hideous Albansesque painted and gilded work of the Hall is being entirely wiped out, and replaced by ornament of a proper character. For this purpose competent artists are engaged painting floral and other designs of a conventional character on the ceilings and walls. In one place the seasons of the year have been excellently painted on the ceiling of the dining-room, various exotic fruits and Orchids are now in course of execution in medallions and panels.

Eaton Hall is approached southwards from Chester by the Grosvenor Bridge, which spans the River

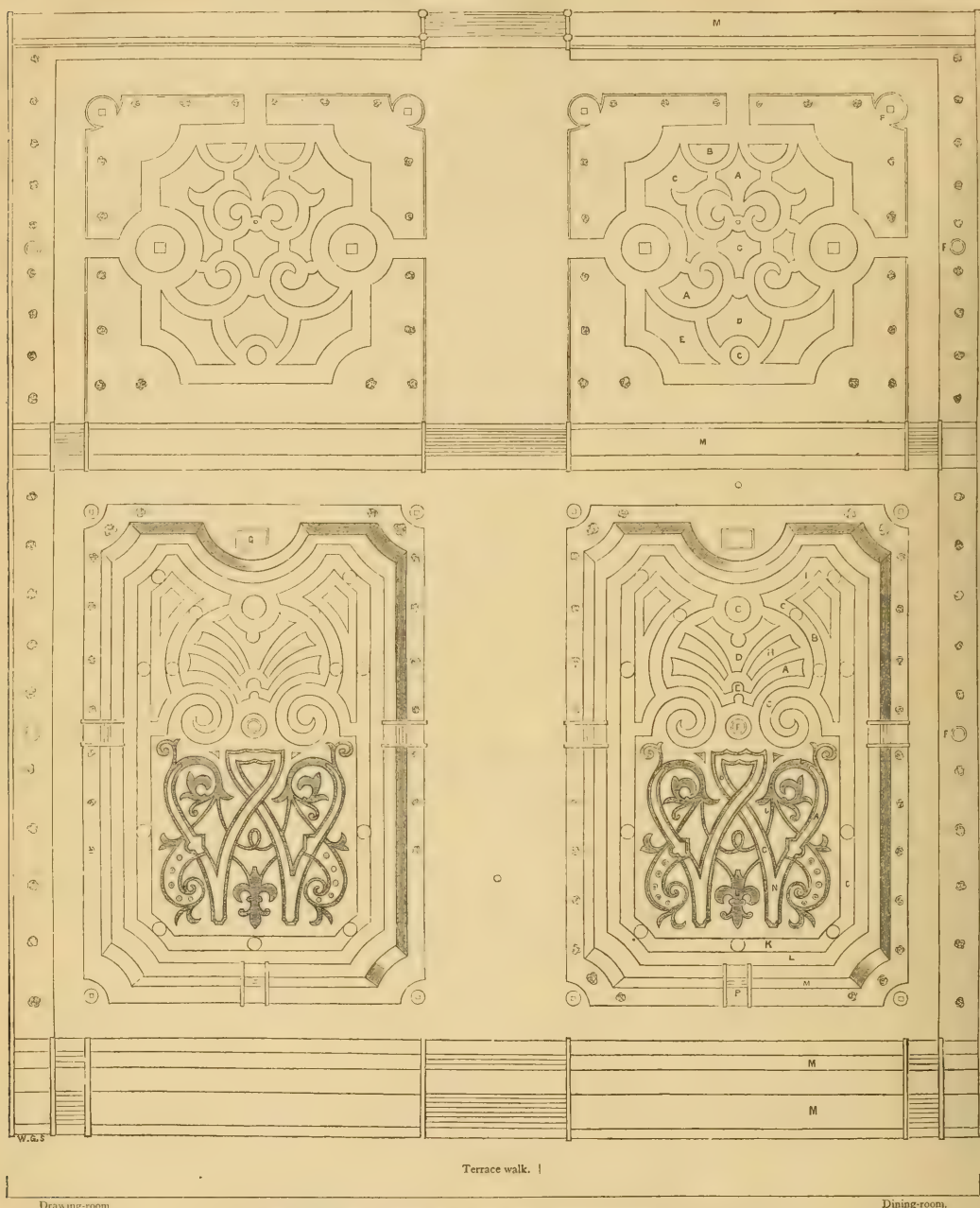


FIG. 2.—EAST GARDEN AT EATON HALL, THE SEAT OF THE MARQUIS OF WESTMINSTER.

EXPLANATION OF PLAN:—A, Purple Verbena; n, Alyssum; c, Scarlet Pelargonium; d, Pink Pelargonium; e, Scarlet Verbena; f, Vase; g, Group of Sculpture; h, Yellow Calceolaria; i, Tropaeolum; j, Box; k, Heliotrope; l, Path, 4 feet wide; m, Slope; n, Lobelia; o, Road, 42 feet wide, and more than 300 feet long; p, Stone steps down slope, 6 feet 2 inches wide; q, Path, 10 feet 2 inches wide.

Dee, and which is the largest stone arch in the world. A walk of three miles through the shady park brings the visitor to the Hall and gardens. The park is studded with magnificent trees of all sorts, the Fir tribe being well represented. In some places these trees grow in wild and irregular groups, in others they form grand leafy avenues, alive with deer, squirrels, and rabbits, and resounding with the songs of birds. Many of the Oaks are unusually fine, though the older ones begin to show unmistakable signs of decay in their profuse growth of *Polyporus sulfureus* and other Fungi. We looked in vain for the "vegetable beef-steak." Two

of these Oaks near the Hall measure 18 feet in circumference, at 5 feet from the ground. The bronze and copper Beeches are the finest we have ever seen, and the Roses growing round the lodges are wonders of colour and vigour.

The gardens and pleasure-grounds are on the east side of the Hall, and cover a space of 50 acres. They are intersected by walks, and adorned with groups of sculpture, and slope gradually down by terraces to a fine lake. This lake, however, has had such a strong attack of American weed, that it is now being drained, and the weed dried up and destroyed. During our

visit moorhens and fine fish were abundant enough in the deeper parts, and a fine pike was caught which weighed 10 lb.

Our illustration shows the general design of the flower-beds on the east side of the Hall (the north garden, with its flowers, statuary, and fountain-basin full of gold and silver fish, we had not time to sketch); these flower-beds are admirably and perfectly kept, not a sprig of Box, leaf, flower, or pebble, is out of its place; in some parts the borders are of stone, in others of Box, and the trees planted on or near the slopes, are generally Box or Yew.

The gardens, like the Hall, are undergoing extensive alterations and additions, so that one can hardly write of them as complete; still they are in such good order, and the plants so admirably kept, that a stroll through them is delightful at all times. The head gardener's kitchen garden, with its handsome piece of rockwork, is a model of itself, filled with healthy fruit trees, vegetables, and flowers. On the boundary walls are Peach and Cherry trees, which, at the time of our visit, were laden with fruit, and protected from the blackbirds by string nets. Near Mr. Collinson's garden is the so-called Melon ground, devoted to the growth of every class of Melons, Cucumbers, Pine-apples, and Figs; these plants, during the time of our visit, were just ready to have their portraits transferred to the medallions of the great dining-room. Two new green-houses, of large dimensions, are about to be erected near here. In the stove there is a small, but good and healthy collection of Orchids, the most noticeable being perhaps a fine variety of *Oncidium Kramerianum*, together with a few *Cypripediums*, and others, all alike in excellent condition. Amongst the general class may be mentioned an especially healthy and well-grown "Lace Plant," one or two specimens of the "Venus Fly-trap," a collection of *Caladiums*, and a good group of *Anthurium Scherzerianum*, with its scarlet flowers, resembling great red demurs with tongues lolling out.

There are two houses devoted to the growth of the Pine-apple, Vines in full bearing being trained over the roofs. In two adjoining houses are a number of Orange trees trained against the walls, with Fig trees in pots, and Grapes on the roof, as in the other houses.

The conservatory is a large and elegant building, filled with choice garden and greenhouse plants, and there is preserved an ancient marble altar brought from Delos by Lord Grosvenor.

In the pleasure grounds, amongst other ornamental trees, are a number of *Araucarias* of truly extraordinary size and beauty. They are perfect, in the full vigour of growth, and full of healthy branches from top to bottom. Some idea of the size of these plants may be gained from the statement of one of the gardeners, who said that owing to the alterations at the Hall last winter one of these plants had to be removed, and the mass of earth attached to the roots weighed from 10 to 20 tons.

In the centre of a stone alcove in the pleasure grounds stands an ancient Roman altar, discovered a hundred years ago near the old Abbot's well, in a street in Chester; it is in perfect preservation, and bears on both sides (carved in large Roman letters) the following inscription—*NYMPHIS ET FORTIDUS LEG. XX—V.V.* W. G. S.

THE WEATHER.

The following Table, showing the State of the Weather at Blackheath for the week ending December 28, was omitted last week, owing to its not having reached us in time for publication—

STATE OF THE WEATHER AT BLACKHEATH, LONDON.
FOR THE WEEK ENDING WEDNESDAY, DECEMBER 28, 1870.

1870. MONTH AND DAY.	At 9 A.M.									
	Readings of					Hygrometrical Deduction from Glaisher's Tables, 5th edition.				
	Barometer reduced to 32° Fahr.	Bar. Ther- mometer.	Wet Ther- mometer.	Dew Point.	Degrees of Humidity.	Weight of Vapour in a Cubic Foot of Air.	Direction of Wind.	Horizontal Movement.	Inches.	Feet.
December.										
22. Thurs.	30.78	28.1	23.3	18.6	78	1.3	N. E.	170	0.03	
23. Friday	30.81	27.1	22.3	17.6	82	1.2	N. E.	170	0.03	
24. Satur.	30.62	27.9	17.9	17.9	100	1.1	N. E.	170	0.03	
25. Sunday	30.57	15.4	15.4	15.4	100	1.1	N. E.	170	0.03	
26. Monday	30.70	21.0	17.9	17.9	100	1.1	N. E.	170	0.03	
27. Tues.	30.70	21.0	17.9	17.9	100	1.1	N. E.	170	0.03	
28. Wednes.	30.70	21.0	17.9	17.9	100	1.1	N. E.	170	0.03	
1870. MONTH AND DAY.	At 9 A.M.									
	Highest.	Lowest.	Range in Day.	Mean.	Direction.	Horizontal Movement.	Inches.	Feet.		
December.										
22. Thurs.	30.78	28.1	23.3	18.6	78	1.3	N. E.	170	0.03	
23. Friday	30.81	27.1	22.3	17.6	82	1.2	N. E.	170	0.03	
24. Satur.	30.62	27.9	17.9	17.9	100	1.1	N. E.	170	0.03	
25. Sunday	30.57	15.4	15.4	15.4	100	1.1	N. E.	170	0.03	
26. Monday	30.70	21.0	17.9	17.9	100	1.1	N. E.	170	0.03	
27. Tues.	30.70	21.0	17.9	17.9	100	1.1	N. E.	170	0.03	
28. Wednes.	30.70	21.0	17.9	17.9	100	1.1	N. E.	170	0.03	

- Dec. 22—Generally cloudy throughout the day, with occasional breaks. Snow fell occasionally.
- 23—Cloudy till the evening, then cloudless. Hoar-frost.
- 24—Generally cloudy; hoar-frost and slight fog in the morning. At midnight the temperature of the air was 8, being lower than any temperature in the month of December.
- 25—At 7 A.M. the temperature of the air was 9, being lower than any temperature in the month of December. On Christmas Day, 1860, when it was 8. Generally cloudless till the evening, then overcast. Fog in the morning.
- 26—Overcast in the morning, and variable afterwards. Snow fell occasionally in the afternoon and evening.
- 27—Generally overcast. Snow fell almost continuously, and very heavily in the evening.
- 28—Overcast in the morning and evening; fine in the middle of the day. Snow fell occasionally.

STATE OF THE WEATHER AT BLACKHEATH, LONDON. FOR THE WEEK ENDING WEDNESDAY, JANUARY 4, 1871.

1871. MONTH AND DAY.	At 9 A.M.									
	Readings of					Hygrometrical Deduction from Glaisher's Tables, 5th edition.				
	Barometer reduced to 32° Fahr.	Bar. Ther- mometer.	Wet Ther- mometer.	Dew Point.	Degrees of Humidity.	Weight of Vapour in a Cubic Foot of Air.	Direction of Wind.	Horizontal Movement.	Inches.	Feet.
January.										
29. Thurs.	30.84	28.1	23.3	18.6	78	1.3	N. E.	170	0.03	
30. Friday	30.81	27.1	22.3	17.6	82	1.2	N. E.	170	0.03	
31. Satur.	30.62	27.9	17.9	17.9	100	1.1	N. E.	170	0.03	
1. Sunday	30.57	15.4	15.4	15.4	100	1.1	N. E.	170	0.03	
2. Monday	30.70	21.0	17.9	17.9	100	1.1	N. E.	170	0.03	
3. Tues.	30.70	21.0	17.9	17.9	100	1.1	N. E.	170	0.03	
4. Wednes.	30.70	21.0	17.9	17.9	100	1.1	N. E.	170	0.03	

Dec. 29—Small amounts of cloud were prevalent till night, then overcast. Generally fine.

30—Generally cloudy. Snow fell during the afternoon.

31—Overcast throughout. Slight fog.

Jan. 1—Cloudless till night, then overcast. Fine day.

2—Overcast.

3—Overcast. A little very thin snow fell in the middle of the day.

4—Cloudy during the morning and evening. Cloudless in the middle of the day.

TEMPERATURE OF THE AIR AND FALL OF RAIN AT DIFFERENT STATIONS. DURING THE WEEK ENDING SATURDAY, DECEMBER 31, 1870.

NAMES OF STATIONS.	TEMPERATURE OF THE AIR.									
	Highest.	Lowest.	Range of Week.	Mean of all Highest.	Mean of all Lowest.	Mean of all Range.	Mean of all Daily Range.	Mean.	Fall of Rain.	Inches.
Portsmouth	30.7	18.0	12.7	24.3	19.5	11.4	25.7	0.2		
Blackheath	30.7	18.0	12.7	24.3	19.5	11.4	25.7	0.2		
Bristol	30.7	18.0	12.7	24.3	19.5	11.4	25.7	0.2		
Birmingham	30.7	18.0	12.7	24.3	19.5	11.4	25.7	0.2		
Wolverhampton	30.7	18.0	12.7	24.3	19.5	11.4	25.7	0.2		
Leicester	30.7	18.0	12.7	24.3	19.5	11.4	25.7	0.2		
Nottingham	30.7	18.0	12.7	24.3	19.5	11.4	25.7	0.2		
Sheffield	30.7	18.0	12.7	24.3	19.5	11.4	25.7	0.2		
Liverpool	30.7	18.0	12.7	24.3	19.5	11.4	25.7	0.2		
Manchester	30.7	18.0	12.7	24.3	19.5	11.4	25.7	0.2		
Salford	30.7	18.0	12.7	24.3	19.5	11.4	25.7	0.2		
Bradford	30.7	18.0	12.7	24.3	19.5	11.4	25.7	0.2		
Leeds	30.7	18.0	12.7	24.3	19.5	11.4	25.7	0.2		
Hull	30.7	18.0	12.7	24.3	19.5	11.4	25.7	0.2		
Newcastle	30.7	18.0	12.7	24.3	19.5	11.4	25.7	0.2		
Edinburgh	30.7	18.0	12.7	24.3	19.5	11.4	25.7	0.2		
Glasgow	30.7	18.0	12.7	24.3	19.5	11.4	25.7	0.2		
Dundee	30.7	18.0	12.7	24.3	19.5	11.4	25.7	0.2		
Aberdeen	30.7	18.0	12.7	24.3	19.5	11.4	25.7	0.2		
Paisley	30.7	18.0	12.7	24.3	19.5	11.4	25.7	0.2		
Greenock	30.7	18.0	12.7	24.3	19.5	11.4	25.7	0.2		
Leith	30.7	18.0	12.7	24.3	19.5	11.4	25.7	0.2		
Perth	30.7	18.0	12.7	24.3	19.5	11.4	25.7	0.2		
Dublin	30.7	18.0	12.7	24.3	19.5	11.4	25.7	0.2		

JAMES GLAISHER.

Miscellaneous.

SNAIL WATER.—The subjoined is a recipe, contained in the "Pharmacopoeia of St. Thomas' Hospital for 1718, and lately made the subject of comment by Dr. W. H. Stone, one of the medical officers of that establishment, who does not, however, tell us for what purpose the prescription was employed. It would seem to be of an excellent cordial nature, and, if any one feel inclined to make a trial of its virtues here is the prescription:—

"Aqua Limacum.
B. Garden snails, cleansed and bruised, 6 galls.
Earthearts, washed and bruised, 3 galls.
Common Wormwood, ground dry, and Carduus, each 1 lb.
Pennyroyal, Juniper berries, Fennel seeds, Aniseed, each 1 lb.
Cloves and Cubeb, bruised, each 3 oz.
Spirit of wine and spring water, each 8 galls.
Digest for 24 hours, and draw off in a common alembic."

This compound was said to be well combined for cheapness and efficacy, and for persons whose circumstances and manner of living have not habituated them to any delicacies it is as good a snail water as can be made. Another horticultural remedy was the Expressio Millepedum, or Expression of Woodlice, made of 3 oz. of woodlice in spirits and water.

THE TOBACCO CROP.—The crop of Tobacco grown in Kentucky in 1870, according to the best estimates, will amount to about 90,000 hds., the crop in Illinois to about 15,000 hds.; of Indiana to about 25,000 hds.; and of Missouri to North Carolina's crop will amount to about 50,000 hds. The Farmer.

Garden Operations.

(FOR THE ENSUING WEEK.)

PLANT HOUSES.

As many *Orchids* will shortly commence to form young leaf-buds at the base of the established pseudobulbs, it will be necessary to push forward the potting, or surfacing operations in connection with them as quickly as possible, because, with the least sign of movement in the matter of leaf-growth, young roots also commence to form; and if these operations are neglected until such time, a very unnecessary amount of risk of injuring them is incurred. The materials used should be such as will last as long as possible without rotting or getting much. For example, the roots delight in growing upon wood branches, and as these need not be in active growth, as they mostly are where *Orchids* grow upon trees in their native habitat, they require, nevertheless, to be somewhat lasting in their nature. For this reason *Orchid*-growers choose pieces of Cork tree, or slabs of manufactured Cork, Oak, Sweet Chestnut, &c., whereon a great many kinds are grown. Charcoal, not too much charred, is also much used, not only from the fact that it consists of carbon, but also because it is so durable, and supports the roots for a length of time after they have become attached. Charcoal, though useful in this way, should not, however, be used too freely, as it is a non-conductor of heat, and this might adversely influence such cool *Orchids* as are habitually wintered in low temperatures. Sphagnum Moss is one of those essential ingredients which cannot be dispensed with; it is very retentive of moisture, but does not become sour so soon as other sorts of Moss, when deprived of the action of growth. In it the roots of most *Orchids* root freely and do well. The time for potting many plants will again soon arrive, and a little progress may be made by preparing the soils and getting the pots and other materials to hand. Examine minutely all plants growing in cool houses, to ascertain if they are too wet at the ball, and, if so, have the drainage thoroughly examined and put right. Maintain as cool a temperature as possible around *Heaths* and New Holland plants, however severe the weather may be without. It would be better to let the temperature fall to a minimum of 34° than to have too high a mean temperature prevailing.

FORCING HOUSES.

If, as is probable, the snow should be laying some inches thick on the unprotected border of a *Vinery* which is shortly to undergo a course of forcing, let it be removed at the earliest moment possible. I have for some years advocated the plan of protecting ordinary or late *Vine* borders with a thick covering during the whole of the winter months—a far better procedure than letting such falls of snow, as we have lately experienced take full possession of the border. Those *Vines* which are now rapidly advancing to leaf should be syringed twice a day. Keep up a very moderate temperature for the present. Tan-beds in *Pine-pits*, &c., should now be freshly turned over if the heat is observed to decline materially, adding where practicable a little fresh tan, or other kind of material in use. If, however, a liberal supply of new tan is at hand, let it be placed as a layer on the top of the old bed. It is less likely to cause a violently irregular degree of heat, than when new tan in quantity is added to the old. Those who have proper conveniences should now be grown on for early work. Keep up a good maximum heat, averaging a mean of 74° or 76° in houses containing *Fruiting Cucumbers*, maintaining at the same time a brisk, wholesome bottom heat. Push forward gradually the several successional batches of *Strawberry* plants which are being forced. Commence, as I have frequently suggested, with a low temperature, and gradually attain a proper one as the season is attained. Successional batches of all kinds of shrubs suitable for forcing should now be introduced by degrees into a good brick house.

HARDY FRUIT GARDEN.

Little can be added to former suggestions in this department, unless it be this, that all pruning operations should be pushed forward during mild periods. Ordinarily severe weather tends to place all garden work in the background; hence it is the more necessary to proceed vigorously as opportunity offers with the different works in hand. As the weather continues as severe as it is at present, it may be advisable to get as much manure as possible on to all vacant ground, whether wanted for immediate use or not.

HARDY FLOWER GARDEN.

The snow has assisted in protecting such *Hyacinths*, *Tulips*, &c., as were already through the ground, from having the tips of the young growth so much injured as they might have been. It may be well, if further frost sets in after the snow melts away, to place some light litter loosely over them. When the snow thaws, the soil will have become so moist as to aid the frost in its injurious effects.

KITCHEN GARDEN.

Prepare additional materials to make up successional hot-beds, on which to force *Asparagus*, as when the frost breaks up the crowns will push more readily

than heretofore. Immediately the frost gives way, and a mild period can be looked for, let all kinds of coverings be removed from *Celery, Broccoli, Parsley*, and all such outdoor products. Let the walks be well swept and rolled, and, by removing all forms of decay caused by the frost, secure the cheerful aspect which a garden should possess, but which, however, has for weeks been wanting. *W. E.*

TOWN GARDENING.

As we are starting on a new year, I think it will not be out of place to give a list of *Trees and Shrubs* that will succeed well in town, provided fresh soil in sufficient quantity be obtained to plant them in. The trees and shrubs should have been previously transplanted once or twice in the nursery before moving, as they will then remove with plenty of fibrous roots. The following is a list of trees calculated to answer the purpose in view:—*Alantus glandulosa*, Mountain Ash, *Almonds*, *Clethra*, *Catalpa*, *syriacalis*, double-flowered Cherry, Elm, Fig, Lime, Laburnum, Maple, Mulberry, Oriental Plane (this tree is quite at home, growing most luxuriantly in the most confined spots), Poplar (particularly the Balsam, which does well anywhere), the Sycamore, and most of the Thorns. Of *Evergreens and Deciduous Shrubs* the following will be found to answer if they have the required attention in planting:—*Aucuba japonica*, *Althaea frutex*, broad-leaved *Lataneum*, common Box, *Bladder Fern*, *Euonymus japonica*, the *Lilacs*, particularly the *Persian*; *Ligustrum ovalifolium*, or broad-leaved Privet, one of the very best free-growing shrubs for town, nearly evergreen; *Gueldris Rose*, *Hollies*, *Daphne Mezereum*, *Ribes sanguineum*, *St. John's Wort*, *Irish Ivy*, *Rhododendron ponticum*. *Viburnum Lantana*, the *Wayfaring Tree*, wants to be better known to be more grown in towns. For covering wirework, *Irish Ivy*, white *Jasmine*, and *J. nudiflorum*, *Virginian Creeper*, white *Cobaea scandens*, and the hardy *Passion-flowers*, grow very rapidly, and make excellent cover for summer. *G. D.*

Notices to Correspondents.

EUONYMUS JAPONICA VARIEGATA: A Correspondent. In our experience, both the golden and the silver kinds are as hardy as the green; but in very severe winters all are liable to be cut down to the roots.

HOLLIES: Subscriber. You may prune them after the first leaves out.

MAW'S LABELS: An old correspondent wishes to know how to drill a hole through those labels.

NAMES OF PLANTS: F. H. B. *Asplenium maculatum*, generally regarded as a blunt-pinnuled variety of *A. urticum*.—*A. D. B.* *Dendrobium cucullatum*.

VARNISHING HOT-WATER PIPES: C. H. F. states as follows, in reference to the varnish referred to in p. 1642 (1896):—"The pipes on which the black varnish was used in a plant stove, and which had been treated in the way used, and we therefore shifted the plants out for a night, and took them in again the next day. They did not suffer in the least. He would, however, be glad to learn, in reference to the varnish, whether it would harm the plants if they were not taken out while it was drying. The smell, he observes, was very strong for a short time after it was applied."

ZERO: A Constant Reader. The zero of the Centigrade thermometer is the freezing-point of water. Zero of Fahrenheit's scale is 32° below freezing-point.

CATALOGUES RECEIVED.—Child & Lorimer, General Seed Catalogue and Garden Guide.—Wheeler & Sons, Little Book, or Select Seed List.—J. May, Catalogue of Flower Garden and Farm Seeds, and General Garden Requisites.—P. J. R. & Co., Catalogue of Vegetable, Agricultural, and Flower seeds, Garden Requisites, and Horticultural Decorations.—Arthur Henderson & Co., Catalogue of Kitchen Garden, Farm, and Flower Seeds.

COMMUNICATIONS RECEIVED.—R. M. M.—J. N.—Flinter.—H. Smith.—J. A.—A. B. D.—H. D.—C. T. F.

Markets.

COVENT GARDEN, Jan. 6.

Markets are dull, and scarcely any alteration worth notice has taken place during the week. Choice vegetables comprise Asparagus, Sea-kale, French Beans, and frame Potatoes. Amongst flowers we have Orchids, Chrysanthemums, Heaths, Cyclamens, Primulas, Hyacinths, Tulips, Camellias, and Feliargiums, and a large supply of dwarf evergreens.

FRUIT.

Apples, p. sieve	10 to 20	Oranges, per 100	6 to 10 to 10
Grapes, per lb.	8 to 10	Pears, per doz.	10 to 10
Lemons, per 100	6 to 10	Pine-apples, per lb.	4 to 6
Melons, each	10 to 30		

VEGETABLES.

Artichokes, Jerusalem, per lb.	2 to 4	Herbs, per bunch	10 to 10
Beet, per doz.	3 to 6	Horse Radish, per bunch	3 to 5
Brussel Sprouts, p. sieve	10 to 10	Lettuces, per score	6 to 30
Cabbages, p. doz.	10 to 10	Mint, per bunch	10 to 10
Carrots, p. bunch	4 to 8	Mushrooms, p. pot.	10 to 10
Cauliflowers, p. doz.	10 to 10	Onions, per bunch	4 to 10
Celery, red, p. bun.	10 to 20	Peas, p. bunch	10 to 10
Chicory, white, do.	10 to 10	Salad, per bunch	10 to 10
Cucumber, each	10 to 10	Seakale, per basket	10 to 10
French Beans, p. 100	30 to 40	Spinach, per bush	10 to 10
Garlic, per lb.	10 to 10	Tomatoes, per dozen	10 to 10

Potatoes, Regents, per ton, 60s. to 80s.; Kidneys, 80s. to 130s.; Rocks, 50s. to 60s.

POTATOS.—Southwark, Jan. 2. During the past week the arrivals coastwise have been larger than for some time past. The trade was very dull, owing to the Christmas holidays, and the streets blocked with heavy falls of snow. The following are this day's quotations:—Yorkshire Regents, per ton, 70s. to 85s.; Lincolnshire do., 65s. to 75s.; Dunbar and East Lothian do., 70s. to 85s.; Perth, Forfar, and Fifehire do., 65s. to 70s.; Kent and Essex do., 55s. to 65s.; do. Rocks, 55s. to 60s.

Great Reduction in Prices for 1897, of GREEN'S PATENT SILENS MESSORS, or NOISELESS SAWING, CUTTING, and COLLECTING MACHINES.

THOMAS GREEN AND SON, Smithfield Iron Works, Leeds; and 54 and 56, Blackfriars Road, London W.C.

SIR J. PANTON'S HOTHOUSES for the MILLION. Price Lists free. A Pamphlet, with Views of these and other Glass Roofs, for two stamps.—HERMAN AND MORTON, 14, Titchborne Street, Regent's Square, London W.

HOT-WATER APPARATUS of every description, fitted complete in any part of the country, for Warming Greenhouses, Conservatories, Corridors, &c.

Plans and Estimates on application.

J. JONES AND SONS, 35, King Street, Chancery, London, E.C.

JAMES BOYD AND SONS, HORTICULTURAL BUILDERS and HEATING ENGINEERS, Paisley, N.B. CONSULTANTS FOR THE CONSTRUCTION OF FORCING HOUSES, PITS, and every description of Horticultural Building, manufactured in Wood or Iron by Steam-power Machinery, and erected in any part of the Kingdom. Estimates, Plans, and Patent Apparatus for Heating Churches, Mansions, Warehouses, &c.

HOT-WATER PIPES, BOILERS, &c., &c., of superior quality.

	2-inch	3-inch	4-inch
HOT-WATER PIPES, Nos. 6 and 7—per c.	1	1	1
ELBOWS, No. 12	each	1	1
SYPHONS	1	1	1
VALVES	1	1	1

Delivered, neat, cash prices, delivered at London, Liverpool, Bristol, or equivalent.

GEORGE ROBINSON, 66, South Wharf, Paddington Basin; and at the same place, 10, Abchurch Lane, London, E.C.

SMOKY CHIMNEYS.—The best cure is the **PATENT ALBERT CHIMNEY CAP.** Three hundred on Buckingham Palace; and hundreds also on the halls and mansions of the nobility and gentry. Price, painted, 10s. each; unpainted, 5s. each.

LAM & RYAN, 10, Abchurch Lane, London, E.C.

THE ACME GARDEN FIRM and GROUND VINERY.

The most perfect and effective, as well as the cheapest Farm and Vineyard. Price List, which gives the size of the best of their **BENJAMIN LOOKER**, Inventor, Patentee, and Sole Manufacturer, Kingston-on-Thames.

P. TALLIES, commended by the Royal Horticultural Society. The above can be had, of all sizes, wholesale or retail.

CHARP PAYING TILES. A manufacturing Firm which has considerable stock of **PLAIN and ENCAUSTIC TILES**, more or less damaged in the process of manufacturing, that they would be glad to dispose of at a price below the cost of the commonest description of Paving Material. To Landlords, Gardeners, &c., are invaluable for the floors of Cottages, Farmhouses, &c., and can be supplied at a very low price.

E. F. Post Office, Brocksley, Salop.

M. I. T. AND CO. Beg to inform their public that they have taken over the business of **ENAMELLED and MAJOLICA Tiles**. At the China and Earthenware Manufactory, 48, Walbrook, Mansion House, London.

They have no connection with the name of the same name. Please to note the address.

RUSSIA MATS, for Covering Garden Frames.—ANDERSON'S TAGANROG MATS are the cheapest and most durable. Price List, which gives the size of the mats, forwarded post free on application.

RUSSIA MATS.—A large stock of Archangel and Petersburg, for Covering and Packing. Second class Archangel, rope: Petersburg, 60 and 80; superior close mat, 45s. 50s.; Archangel, 45s. 50s.; and 60s. per 100; and every other description of Mats at equally low prices, at—

A. W. BLAIR & SONS, 30, Russia Mat and Sack Warehouse, 4, Abchurch Lane, London, E.C.

E. T. ARCHER'S "FRIGI DOMO."—Patronised by the architects for Promotors and Kew Gardens. It is made entirely of prepared wool, and a perfect non-conductor of heat or cold where it is applied.

PROTECTION AGAINST Frost.—**WOOL TREATING**, 2 yards wide and 64 feet long yard.

Three yards wide	10 to 10	40 to 40
Two yards wide	10 to 10	20 to 20
Four yards wide	10 to 10	30 to 30
SCISSOR CANVAS, 21 inches wide, 70 yards to 100	10 to 10	30 to 30
HEMLOCK CANVAS, do. do. 54 and 72 inches wide, 60 and 100	10 to 10	30 to 30

ELISHA T. ARCHER, Only Maker of "Frige Domo," 3, Cannon Street, City, E.C., and of all Seals from London to the Country.

CAUTION TO GARDENERS.—When you ask for SAYNOR and COOK'S WARRANTED PRIZE

SHARPENED and BUILDING KNIVES, see that you get them. Observe the mark SAYNOR, and the Corporation Stamp. OFFER WARRANTED, without which none are genuine.

PRIZE BIDDING KNIVES and others, but are compelled to do so, in consequence of an imitation, of common quality, having been sold for the genuine one, and which has caused many of our customers to be made of knives of inferior quality, and their make, all of which are warranted both by Sellers and Makers.

POWER PATENT STEAM PLOUGH and CULTIVATOR may be SEEN at WORK in every Agricultural County in England.

For particulars send to JOHN FOWLER and CO., 77, Cornhill, London, E.C.; and Steam Plough Works, Leeds; or

FOR SALE, several Second-hand SELF-MOVING and FRESHING ENGINES, also suitable for Steam Cultivation on the Farm.

OXFORD FIRST PRIZE CHURN, suited for small occupations.

RADFORD'S PATENT COUNTER CURRENT. (See Report.) Sir B. Radford's Patent Counter Current Churn does excellent work, and the ease with which the inside of the churn, combined with the superior quality of butter, is produced, clearly entitled it to the First Prize.

THOMAS BRADFORD and CO., 63, Fleet Street, London, E.C.; Cathedral Steps, Manchester.

WANTED, a steady Man, as SHOPMAN.—Thoroughly acquainted with the Wholesale and Retail Trade. References required. State your age, as to experience, age, salary, &c. G. AND J. C. BOOTHBY, Market Place, Stockport.

WANTED, a PORTER in a Seed Warehouse.—One who has been bred in the trade, and is experienced in the work. Apply by letter, stating last employment and wages, to P. S. Gardner's Chronicle Office, W.C.

WANTED, as APPRENTICE, a strong, active, intelligent young man, to learn the business of a nurseryman, applying, excepting a promising young individual.—Apply by letter, or personally, to ROBERT MACKELLAR, Elvaston Castle gardens, Derby.

Herdman and Dairymaid.

WANTED, an active married MAN (without incommensurable desirable), to Manage a Herd of Alderney Cows. He must have been bred in the trade, and be experienced in the treatment and management. He must also understand Pig Breeding, and be able to Kill and Dress Porks for the London market. The Wife must be thoroughly conversant with Dairy and Poltry, and will have to attend the Lodge Gates. Wages, 10s. weekly and lodge, and some allowances for pig, and poultry, &c.—Apply by letter, stating age and all particulars of last place, to: ANDERSON, Esq., Wraybury, Staines. None need apply who cannot have a personal character.

WANT PLACES. Letters to be Post Paid.

EXPERIENCED GARDENERS (or as GARDENER and BALIFF), of various qualifications, recommended to Gentlemen—Further particulars given on application to Messrs E. & J. W. ROBERTSON, 10, Abchurch Lane, London, E.C.

To Gardeners and Baliffs (Head, Foreman, or Under). JAMES CARTER and CO., having many applications will ADVISE any GARDENERS or BALIFFS who are desirous of ENTRY in their FREE REGISTER. Only those who can send unquestionable references need apply.

Any and all of the above GARDENERS or BALIFFS may rely upon J. CARTER & CO. adopting the most stringent regulations in reference to testimonials, pay, honesty, &c.

Gardeners.

B. S. WILLIAMS has much pleasure in stating that he has upon his GARDENERS' REGISTER many Men of the highest merit, and thoroughly qualified to undertake the duties of HEAD GARDENER, GARDENER and BALIFF, or UNDER GARDENER. Ladies or Gentlemen requiring such may rely upon B. S. W. recommending such persons, and all abilities are worthy of their trust.

Johnsons and Hease Nurseries, Upper Holloway, London, N.W.

GARDENER (HEAD).—Age 29, married; thorough knowledge of the profession in all its branches. Disengaged in a fortnight. First-class references.—10, Ivy Cottage, Langport.

GARDENER (HEAD).—Married; thoroughly practical in the Culture of all Fruits, Flowers, and Vegetables, Cucumbers, Mushrooms, Stove and Greenhouse Plants, and Flower and Kitchen Gardening. Highest testimonials to character and ability.—J. K. J., 10, Abchurch Lane, London, E.C.

GARDENER (HEAD).—Age 40, married, from the South; is thoroughly practical in all branches of modern Gardening, including Forcing all kinds of Fruits, Flowers, and Vegetables, Kitchen and Stove Plants, and Flower and Kitchen Plants, Dinner-table Decorations, &c. Can be highly recommended. B. S. W., 10, Abchurch Lane, London, E.C.

GARDENER (HEAD), to any Lady or Gentleman requiring a thorough practical Gardener.—Has a superior knowledge of the Management and Growth of Vegetables, Fruits, and Flowers. Has been many years Agent to an English Nobleman. Has a total of 20 years. Testimonials first-class.—C. H. S., 10, Abchurch Lane, London, E.C.

GARDENER (HEAD).—Age 30, married, from the Nurseryman, Salisbury, is in a position to recommend a first-rate Gardener, at a fair salary. Has been in his last situation, and is leaving on account of ill health, and is up by his employer.—Full particulars given on application to the above.

GARDENER, where two or three are kept.—Age 36; an experienced Man, who has a practical knowledge of Horticulture, Buildings, &c. Has been many years in the service of a woman. Five and a half years' character from last situation.—A. D. J., 10, Abchurch Lane, Terrace, Stoke Newington Road, London, N.

GARDENER (UNDER), or would take a small Single-handed place. Age 30, married, from the Nurseryman. Good character.—A. R. J., 10, Warrington Street, Oakley Square, N.W.

GARDENER (UNDER).—Age 21; six years' experience in present and other situations. Good character.—T. S., The Gardens, 10, Abchurch Lane, London, E.C.

FOREMAN, in a good Establishment.—Two and a half years' good character from present employer.—C. GOODE, Hylands Park, Chelmsford, Essex.

PROPAGATOR of HARDWOOD. Inside or Out.—Two testimonials from present situation.—L. W., Post Office, Newbury, Berks.

AGENT (ASSISTANT), or BALIFF, for an large Estate and Home Farm.—Age 35, Scotch, trained in England under his father, who has been many years Agent to an English Nobleman. The Advertiser is thoroughly conversant with Practical Farming, the Management of all sorts of Live Stock, Cattle, Sheep, Poultry, and all other matters connected with the Farm. Has been many years in the service of a nobleman, and has a practical knowledge of all the various branches of the Farm, and is thoroughly conversant with the various duties of Estate Management.

TO Nurserymen.—The Advertiser will shortly be open to accept an engagement as above; has a thorough knowledge of the Trade, both wholesale and retail, also well acquainted with the various duties of a Nurseryman, and is up by present and previous employers.—A. S. J., 10, Abchurch Lane, London, E.C.

To Nurserymen and Seedsmen.—A young Man (age 20) has been many years in the service of a nurseryman, and has a first-class knowledge of Seeds and Plants, Book-keeping, &c. Has had experience in the Wholesale as well as the Retail Trade.—J. K. J., 10, Abchurch Lane, London, E.C.

To the London Wholesale and Retail Trade.—SHOPMAN, or CORRESPONDENT and CASHIER.

—A classically educated young Man (age 30), with good address, his father is a nurseryman, and has been many years in the service of a nurseryman, and has a first-class knowledge of all the various branches of the Trade, both wholesale and retail, also well acquainted with the various duties of a Nurseryman, and is up by present and previous employers.—A. S. J., 10, Abchurch Lane, London, E.C.

SHOPMAN, in a Florist and Seed Business.—An energetic young Man, with three years' good character.—G. H. J., Castle Nursery, Lower Norwood, S.E.

tions. What capital speeches are heard at their meetings! What excellent papers are read! Take them as reported week by week in the agricultural journals, and one is most favourably impressed by the knowledge and ability displayed. There is no better essay anywhere—not even in the pages of our annual volumes of Society Transactions, where everything is the result of laborious care and thought—that will excel the three speeches on that most important agricultural subject at this season of the year, and especially at this season of this year—the provision of winter food for stock—which are reported from the East Lothian Agricultural Society to-day, as having been spoken on the occasion of a recent meeting by three farmers of that county; and elsewhere in our pages the same truth is well illustrated this week.

What a constant freshness, too, there seems to be in the proceedings of these societies. Every year fresh lists of questions for discussion indicate the enormous extent of the agricultural field. The London Farmers' Club, although its surviving original members are now all grey-haired men, is still never at a loss for new subjects on which to direct its attention. Its last year's list is full of practical and scientific interest—grass land management—sewage farming—land exhaustion—English tenant-right—local agricultural difficulties and successes—the principles by which the size of farms should be regulated—there is a touch here and there all over the field for agricultural discussion; and this year's list is just as good.

If criticism were wanted anywhere it would, we think, apply rather to the topics on which the Chambers of Agriculture are engaged. They seem taken up with the tithe of mint and cummin, to the comparative neglect of the weightier matters of the law. All England of a certain class has been lately roused by them about the "average clause" in our fire insurance policies; a matter in theory insignificant, and in practice—seeing that agricultural insurances are at present barely profitable for the companies—really altogether undeserving of attention, the whole thing affecting not more than a few farthings per acre. Or take the subject of weights and measures, and the introduction of the decimal system into agricultural dealings of which a good deal is being made! And even the great question of the incidence of local rating which has of late almost monopolised the public efforts of so many distinguished men, acting through these Chambers, and of which we would not dispute the importance, is yet, with great diffidence be it spoken, not of such direct, immediate, or practical, influence or urgency as many another subject affecting the interest of the tenant-farmer, on which not a tithe of the attention is bestowed that it deserves. The miserable effects of game preservation to excess—the utter selfishness of *batuees*—the need of better agricultural education—the necessity of absolute security for the tenant's capital:—these do not excite nearly so much attention as topics of doubtful, or even fanciful importance. We may, indeed, almost take the three leading chairmen of our great institutions—Chambers, Clubs, Societies—as fairly representing their respective contributions to the work of agricultural progress—Lord VERNON interesting himself in agricultural education, in agricultural co-operation, in agricultural safety from imported dangers, and now in agricultural benevolence and philanthropy—Mr. JAMES HOWARD, M.P., Chairman of the London Farmers' Club, bringing to bear an unusually wide acquaintance with the agriculture of other countries upon the improvement of the agriculture of this country, and now again directing the efforts of English agriculturists for the relief of those of France, and Colonel TOMLINE, M.P., Chairman of the Central Chamber of Agriculture, known to agriculturists and others chiefly by his whimsical dispute with the Master of the Mint!

The Farmers' Clubs are, we believe, practically more useful than the Chambers. Touching the labourers through their ploughing matches, and other rivalries in technical skill, touching the landlords also, but dependent mainly on the mutual interest of the tenant-farmer class, which they deal with almost exclusively by the help of the farmers themselves, they are, we think, the more practical and better institution of the two.

It is not, however, till we come right away from Clubs and from Associations, and follow the farmer home, that we touch the real source of

agricultural improvement. The nearer you get to the individual occupant of the land, the more directly do you witness the operation of those influences to which this improvement is due. The great annual gatherings of societies, with their gala days of show and of excitement, have far less to do with agricultural progress than the spectator fancies. It is the anxiety of the tenant to make a prosperous living, the care he takes, in the interest of his property and his family, which is the paramount and efficient cause of all the efforts that he makes.

The following is the very utmost that a great Society can say of its proceedings:—

"At the first anniversary meeting of the English Agricultural Society, held 31 years ago, it was stated that the prizes offered for stock to be shown at the then approaching Oxford meeting would amount altogether to £740, besides £50 for extra stock, implements, roots, and seeds, £50 for a draining plough, and two prizes of 50 sovereigns each for the best specimens of white and of red seed Wheat. At the forthcoming Oxford meeting, the prizes to be competed for amount to £3130 for live stock, and £395, in addition to silver medals, for implements. A contrast of these figures will enable the members to realise the growth of the Society's operations during the interval, and to estimate the nature and extent of their influence on the progress of British agriculture."*

But what are £3000 a-year as a contribution to the motive force of agricultural energy in this country, compared with the millions sterling representing the annual income of the tenant-farmer class and the possibility of its increase, which is the real agency urging them along? The authorities and officebearers of a great national society are very apt to say, See what immense progress we have directed and produced—they have very little right, indeed, to say more than, See what immense progress we have witnessed! It is the Potato growing of East Lothian, and the consequent high rents which are offered for leases of East Lothian land, and not even the good speeches or good shows of East Lothian farmers, that has raised East Lothian to its undoubted pre-eminence for good cultivation among all our Scotch and English counties. In the earlier volumes of the English Agricultural Society's Journal there are records of agriculture as energetic, and as enterprising, and as successful as any that has been witnessed since; and these, as well as those, have been promoted, and we may say effected, not by Societies or Chambers, not even by Farmers' Clubs, but by the simple expedient of giving ample security to farm capital. It is this which is the great source of agricultural improvement—not premiums for stock or implements, or even prizes for good farming. Such premiums have that sort of usefulness which belongs to the publicity they create. They make known merit and demerit, failure, and success, and thus direct attention. It is the hope of increasing profit that is the real professional impeller in agriculture, as in all other occupations.

The last great example of a premium may be quoted as a capital illustration of this point. Ashgrove has been decorated and Kirtlington condemned. The usefulness of a prize has nevertheless been perfect and complete even here. These farms have, in consequence of it, been well examined and discussed, and agricultural readers now know nearly all about them everywhere, and that is the purpose which a premium serves.

It has not defined good farming—it will not, except incidentally, promote agricultural improvement. The real agency for the promotion of agricultural improvement is the farmer's profit; and the publicity of a premium has in this case brought out the fact that it is the farm that has been condemned, and not the farmer that has been praised, on which the largest profit is being legitimately made.

And what says a competent, dispassionate, and landowning critic, of the two?—"I have not had the advantage of seeing either Ashgrove or Kirtlington, but judging from what one reads of these two occupations, and working out the results to the best of one's ability, if I were asked to embark my capital in either, I should without hesitation declare for Kirtlington."†

Let us, therefore, once more say—our agricultural societies accompany and witness, publish, decorate, and enliven agricultural progress—but they do not create it, and only indirectly do they accelerate it—they sometimes even rather help to check it or mislead it. The real agency at work is the self-interest of the farmer; and the

only way to ensure the full activity of this great influence is to confer absolute security on the capital which in English agriculture one man spends upon another man's land.

—PRICES have advanced both in the corn and meat markets during the past week. In Mark Lane on Monday, such sales as were made commanded 1s. a quarter more money; and on Wednesday the grain trade was again firm.—On Monday, at the Metropolitan Cattle Market, the supply was short, and meat advanced in price. And these prices were fairly maintained on Thursday.

—A meeting of the general committee of the FRENCH PEASANT FARMERS' SEED FUND was held at the Salisbury Hotel, Salisbury Square, on Thursday afternoon at 2 o'clock, the Right Hon. Lord VERNON in the chair.—The motion of JAMES WARD, Esq., C.B., seconded by JAMES HOWARD, Esq., M.P., the Right Hon. Lord VERNON was unanimously elected chairman of the general committee.—An executive committee of 12 gentlemen, including the President, Treasurer, and the Honorary Secretaries, was nominated—their functions being confined to organising proceedings, collecting donations, and obtaining information as to French requirements, the general committee to be summoned previous to any distribution being commenced.—A very hearty and suggestive letter from M. DROUYN DE LUYVS was read, and referred to the executive committee.—The President was requested to communicate with the Ambassadors of France and the North German Confederation, with a view of ascertaining what assistance can be given by their respective Governments to ensure that the seeds sent to the distressed peasant farmers shall be used only for sowing the land.—The secretaries were instructed to communicate with the law and canal companies, with a view of obtaining free conveyance of donations to the French Peasant Farmers' Seed Fund.—The following among other additional subscriptions, were announced:—

James Duncan, Esq., Lavenham	..	£	100	0	0
Right Hon. Earl of Powis	..	..	50	0	0
S. Morley, Esq., M.P.	..	..	50	0	0
James Odier, Esq.	..	..	50	0	0
Miss. Olney	..	..	31	11	6
W. Taylor, Esq.	..	..	25	0	0
A. McCulloch, Esq.	..	..	21	0	0
Miss. Golding	..	..	10	10	0
Right Hon. Lord Walsingham	..	..	10	10	0
<i>Agricultural Gazette</i>	..	..	10	10	0
R. A. Heath, Esq.	..	..	5	0	0
Webb & Buck	..	..	5	0	0
P. Dudgeon	..	..	5	0	0
Vinia Lodge of Freemasons	..	..	5	0	0
H. F. Meynell Ingram	..	..	10	0	0
The Mackintosh	..	..	10	10	0
<i>Bell's Weekly Messenger</i>	..	..	5	0	0
W. Bull Miller	..	..	5	0	0
Dr. Bisset Hawkins	..	..	5	0	0
Right Hon. Lord Northwick	..	..	10	0	0

A number of gifts of seeds were also announced, among others 20 bushels of seed from Bayley, and 2 bushels of Sweden seed, from C. S. REAR, Esq., M.P.—A vote of thanks was unanimously passed by Mr. ODAMS for placing a warehouse at his wharf at the disposal of the committee for the receipt of donations in grain. It was announced that the London and County Bank would receive donations at all their branches to the account of the "French Peasant Farmers' Seed Fund." It was also stated that £430 2s. 6d., money subscriptions, had already been paid.

—We have not yet received the card announcing the subjects for discussion before the LONDON FARMERS' CLUB this year, but we understand that among them are—the establishment of cheese factories—the supply of English cavalry horses—the growth of Cabbages and kindred crops—how to hire and let a farm—the agricultural labourer—and live stock breeding, facts and principles. A good practical list.

—The following is an American account of what is called a "HAND CHEESE" FACTORY:—MESSRS. MENDE BROTHERS, of Philadelphia, purchase from the farmers of Chester and Delaware, Bucks and Montgomery counties, curdled milk, commonly known as cottage cheese, "smashed" or brought to them twice a week in cans, for which they pay about 20 cents per gallon, and by weight in winter 3 to 3½ cents per pound. They consume in this way the milk of about 2000 cows annually. The curds, on being received at the factory, fresh from the dairy, are placed in bags holding perhaps a couple of bushels, and are allowed to drain entirely dry. They are then emptied into large wooden troughs, and manipulated with wooden staves, a certain amount of salt and some saw-dust being mixed through the mass. It is then thoroughly ground up by machinery, before passing into their principal machine, which moulds and delivers the cheese on sliding shelves, in three straight rows, automatically pressed into the shape of small cakes, about 2 inches wide by half an inch thick, which is found the most convenient size and shape for sale and shipment. This is done with the regularity of clock-work, and continues six days in every week in the year, at all seasons. The after process consists simply of these sliding shelves passing and repassing each other, through the hatchways up to the large and well ventilated drying rooms above, where they are arranged on racks. The tem-

* Report of the Council of the Royal Agricultural Society of England, in May, 1870.
† See p. 1713, 1870, "W. G. D.," on the Price Farms.

perature of these rooms is accurately regulated; in cold weather, hot air or hot steam conveyed in iron pipes being used, according to circumstances. The whole process of making the "German hand cheese," from the time the curds are received till finally packed in boxes for shipment, occupies about 12 days. The most scrupulous cleanliness and neatness is observed about the establishment in every part, and to secure entirely against danger from dust and flies, the cakes before the final shipment all go to the basement, where they are washed in great tubs of water, and again dried. Messrs. MENDE BROTHERS commenced on a small scale six years ago, and the process by which they now manufacture the hand cheese is one of their own invention and improvement, for which they hold several patents. Their factory is a massive brick building, 40 by 100 feet, five storeys high, with basement; and it has a variety of very ingenious machinery, all of which is propelled by steam-power, and is capable of making 50,000 of the hand cheeses per day of 10 hours, or 15,000,000 per year; doing the work of at least 50 hands.

— There is published at "the Agricultural Library," 200, Fleet Street, a "Record and Historical Map of the War between France and Germany," showing the routes of the armies and the localities of the battles; together with a diary or abstract of events, which will enable the purchaser at once to realise the situation far better than any other map we have seen. The map, published originally in skeleton, is provided with printed wafers, on which the several events are recorded, and by which each record is affixed to the spot to which it belongs. The sheet, accordingly, is now full of memoranda, and no one desirous of understanding the misery for which our own particular branch of the Relief Fund, for example, is required, can better satisfy himself than by the purchase of one of Mr. ALL-NUTT's maps. The author, who is a most industrious observer of the current history, provides, month by month, a fresh supply of wafers, which the purchaser can affix for himself. And in addition to this he has published, also at "the Agricultural Library," a little book,* in which a full record of the past year's history of the war appears — which also it is advisable that the student of the map should procure. The two together are a capital journal, at once pictorial and descriptive, of the miserable history of the past six months.

— We have before us a complete set of farm account books, filled up with a written record of an actual year's transactions on a small farm. JEMMETT'S "Farm Account Book" is a thin quarto, of about 80 pages, 12 inches square, bound in boards. On these pages, in the specimen before us, are given, first, 48 pages of monthly labour account, cash account, stock account, corn account, with history of every day's doings by each of the labourers on the farm—six or eight pages of ledger with balance-sheet—plenty of room for field and stock and granary records, and separate pages for a journal of the doings in every separate field. The whole is a very complete and satisfactory history, both of the cash transactions, and of the stock and labour of the farm. And Mr. JEMMETT, whose work in this much-needed department of agricultural improvement has been praised in all the journals

of the day, from the *Times* downwards, may be congratulated on a publication which with really very little labour (less writing than a quarter of a page a day!) gives the farmer a satisfactory account at all times of how the farm, its live stock, and its tenant, are prospering, or otherwise.

NOTEWORTHY AGRICULTURISTS.

MR. WREN HOSKYNs, M.P.

MR. HOSKYNs is known as an authority on many agricultural subjects by all our readers. There are, however, probably not very many of them who know how constantly, from the very outset of the *Agricultural Gazette*, he has addressed them through its columns. Commencing in our earliest volume (1844) with a very amusing series of articles on the Anomalies of Agriculture, he followed this up by chapters contain-

In other quarters, too, he has seized on every opportunity of informing or directing public opinion where the interests of agriculture were concerned. In the "Cyclopedia of Agriculture," published by Messrs. Blackie, the introductory essay, and those on Education and on the Landlord, are by him. So, to the Journal of the English Agricultural Society, he has more than once made elaborate contributions. His services on the Council of the Royal Agricultural Society, both as a steward at its annual meetings and as an active committee man in matters especially connected with the scientific or the literary department of its work, must not be forgotten; nor those on the Council of the Society of Arts, where he has always worthily represented and directed the efforts of that Society for the promotion of agricultural improvement. His "Lectures on the History of Agriculture," in 1849, at the Manchester Athenaeum, were a capital illustration of literary power usefully exerted: the interested attention

of a city audience being thus directed to country subjects at a time when political estrangement had intervened, to mutual injury.

Mr. Hoskyns is the second son of the late Sir Hungerford Hoskyns (7th Bart.), of Harewood, Herefordshire; and he has sat in Parliament for the City of Hereford since March, 1869. It will not be inappropriate to reproduce here what was said in the *Agricultural Gazette* at that time of his fitness for Parliamentary life:—

"The City of Hereford is to elect its representatives next Tuesday, and one of the candidates is Mr. C. Wren Hoskyns, well known to the readers of the *Agricultural Gazette*—well known, indeed, to agricultural readers everywhere. No one has done more than Mr. Hoskyns to illustrate the influence of English history, and especially of English legislation, on the condition of English agriculture; no other English writer has done so much to illustrate the charm and extend the interest now generally felt in even the commonest details of land-owning and of farming—no one, we may add, did more than he to revive the steam cultivation problem, whose achievement has been at length such a great and pregnant agricultural success. And as having already often been the exponent of agricultural influences and relations, and of agricultural history, before citizens and city audiences, we can hardly imagine a more appropriate representative in Parliament of the chief city so purely agricultural. And one with so long an experience as a farmer and a landowner, and with such a lively and personal appreciation of the difficulties—due to custom, law, and prejudice—amongst which agricultural progress has yet to win its way, would be welcomed to a place in Parliament by all intelligent men, however he might vote on party questions. And, speaking for the agricultural interest especially, we venture to express the earnest hope that there is a majority of the Hereford electors sufficiently alive to the intimate relations of town and country to choose a man of their own country (most unlikely, therefore, to lose sight of local interests), who is so capable of representing both."

OUR LIVE STOCK. CATTLE.

THE career of the 7TH DUKE OF YORK (17,754) has ended. He was killed a few days ago, being quite unable to perform his functions, and, in fact, to rise from the ground. This bull has been one of the most successful sires of recent years, and his progeny have always commanded a high price. He was bred by Captain Gunter, from whom he was purchased for



CHANDOS WREN HOSKYNs, M.P.

ing the well-known and already classic "Chronicles of a Clay Farm"—and this by a second series, under the head of "Tales of a Landlord," in which, the material and practical side of agriculture having been previously illustrated, the relations of landlord to property, tenant, and labourer were discussed. Arguing, illustrating, urging, with penetrating and most serviceable power, whatever may have been the subject which from time to time engrossed agricultural attention to Mr. Hoskyns must be attributed very much of whatever credit this journal, on the agricultural side of it, has earned during the twenty-seven years of its career.

Its services during the gradual growth of Free Trade opinion amongst agriculturists, and during what may be called the germinal period of the history of steam cultivation, are those of Mr. Hoskyns' suggestive, witty, facile pen. Its sympathy with every new phase of agricultural progress—its advocacy of the freedom and independence of the tenant—its urgency on the policy of publishing annual agricultural statistics—its criticisms of public men and things in the interest of the agriculturist—have been very much either due to Mr. Hoskyns' influence, or actually the result of his personal labour; and for this our hearty thanks are due.

* "Historical Diary of the War between France and Germany, 1870." Part I. By H. Allnutt, 200, Fleet Street.

500 ggs. by Messrs. Bowly, of Siddington, and Rich, of Didmorton. He finally became the exclusive property of Mr. Bowly, in whose hands he remained until about a year ago, when he was purchased by Mr. Cheney, of Gaddesby. Although in a precarious condition for long even before he left Siddington, he has left several calves at Gaddesby, and 16 cows in calf to him.

— We hear that Mr. Cheney proposes to sell about 60 head of stock on April 5, chiefly of the Wild Eys, Blanche, Princess, Cherry Duchess, Surmise, and Foggathorpe tribes.

— The following prices were obtained on Friday week at Mr. Preece's great sale of Christmas fat stock at Shrewsbury. The first two prizes were awarded to a pair belonging to Mr. R. Groves, of Berrington, afterwards sold for 55 ggs.; Mr. R. Eversall sold a 3-year-old Hereford steer for 57 ggs.; Mr. Shepherd, Whetleton, sold a 3-year-old steer for 56½ ggs.; Messrs. Ibsa, a 20 months' old sucker for 31 ggs.; Mr. Jones, Lea, a 22 months' old heifer, 41½ ggs.; Mr. Dickinson, Great Nees, a 21 months' old sucker, 34½ ggs.; W. B. Lloyd, Esq., 33 months' old Short-horn steer, 48 ggs.; Messrs. Ibsa, Shorthorn ox, 52½ ggs.; Mr. Wall, Dorrington, a 3-year-old cross-bred, 55 ggs. A large number of animals of first-rate quality were disposed of, at from 24 to 30 ggs.

— On Thursday week Messrs. Rosseter and Rowden sold thirty pedigreed Shorthorns, the property of the Rev. R. D. Lloyd, four of the females were of a good old tribe, tracing back to MILTON (8375), MERLIN (2302), and MIDAS (435); and two was descended from EARL OF DARLINGTON (21,636), and more remotely from MONZANI (6222). There was also an Oxford bull by OXFORD DUKE (27,019), out of a cow by EARL OF DARLINGTON (21,636), bred by Lord Penrhyn. Prices did not range higher than 32½ ggs., given by Mr. R. Fookes, of Milton Abbey, for *Norgay* by EARL OF DARLINGTON.

— A selection from the celebrated herd of pure-bred Shorthorns, the property of R. Jefferson, Esq., of Weston House, Whitehaven, comprising between 40 and 50 head, will be sold at an unreserved auction during the spring; also a number of pure-bred Shorthorns, belonging to D. Nesham, Esq., The Hall, Gainford, Darlington, will shortly be offered. Further particulars will be announced in due time.

— Mr. W. W. Slye has made an important addition to his herd at Beaumont Grange, by the purchase of *Grand Duchess 20th* from Mr. J. N. Beasley, of Pitsford Hall, for 1000 ggs. This cow was purchased by Earl Spencer at the Preston Hall sale for 430 ggs. She is by 4TH DUKE OF THORNDALE from *Grand Duchess 8th*, and is six months gone in calf to Colonel Kingscote's GENERAL CLARENCE, a son of 3RD DUKE OF CLARENCE, which was purchased when a calf by Colonel Kingscote from Captain Gunter.

PIGS.

WHAT Mr. Stearn says about pigs is well worth attention. He gives the results of a 30 years' successful experience, and speaks to the point. We have therefore perused with special interest the paper, reported for in another page, upon the "breeding and management of pigs." Mr. Stearn has been a member of the Stowmarket Farmers' Club. In it he has directed attention to the importance of keeping a good sort of swine, and treating them well and liberally from their birth. Piggeries, too, as usually constructed, he stigmatised as "not fit to put a pig into." Warmth, dryness, and cleanliness, are all insisted upon and provided for, by good roofing, asphalted floors, false lattices for the pigs to lie on, and a liquid manure tank. With reference to the best breed of pigs, Mr. Stearn said "that when he read a paper on 'swine' a few years since, he did not like black pigs as well as white, but by judicious crossing they had become equal to the white, and he now had scarcely a preference."

The following case, which came under Mr. Stearn's observation, is *à propos* of remarks made in these columns a fortnight since upon in-breeding—"It is well to cross as far distant as possible, occasionally, so to strengthen the constitution. Some time since he purchased sows from a gentleman, one of whom had bred in for more than 30 years, and the other was 60. The first farrows they produced with him (Mr. Stearn) were full of ulcers, the legs of most were crooked, with large spavins, and many turned out good for nothing." In the next place, Mr. Stearn re-asserts his theory as to why sows eat their offspring. He does so in the identical words in which he communicated it to the farmers—"Ib nine or ten years since, viz., that the sow is irritated by some one or other of the youngsters, having laid side teeth, inflicting wounds on her teats as they suck." "This sends the sow mad with rage: she throws one way, and one another, and if she once draws blood will eat all the pigs." Although such an occurrence may have happened, we do not believe in its being even a common cause of sows eating their young. Injudicious interference with the sow at the time of farrowing, and a peculiarly irritable condition of brain at the same period, not uncommon in the case of other animals, are more satisfactory explanations of this lamentable fact.

With reference to feeding, when the pigs are about three days old, and when the sow is feeding, he gives them some new milk, warm from the cow,

sweetened with a little sugar. In three or four days he mixes half-skimmed milk and some oatmeal or sharps, leaving out the new milk by degrees, as well as the sugar, and replacing them by Indian Corn or Barley, whole. Such is the careful manner in which Mr. Stearn, even during the first few days of existence, supplements the natural food of the mother. The paper concludes with a confession of inability on the lecturer's part to solve the question as to why little pigs' tails drop off. "I have made up my mind," says he, "that it is neither breeding, feeding, hot weather, cold weather, nor easterly wind which is the cause, nor does it signify whether the pigs are black or white; therefore I must leave it to some one with a wiser head than I have to solve."

POULTRY.

LAST week we gave some account of *cranning* as a quick means of fattening poultry, and described the *oculoperant* as practised by hand. In accordance with the inventive genius of the age a machine has been brought out for accomplishing the work of administering the food at the rate of 250 chickens per hour. This instrument is on the principle of the machine long used for filling skins with sausage-meat, and consists of a hollow cylinder, into which the prepared food is placed, terminated by a smooth flexible pipe of India-rubber cloth. The open end receives a piston, by which the food is forced out at the end of this flexible tube, and from thence into the crop of the fowl. This is a veritable fact, and the machine was exhibited at the Crystal Palace by the Messrs. Crook, of Carnaby Street.

NOTES OF 1870.

[A very excellent paper, this entitled, was lately read by Mr. A. H. Crook, of the Chessington Farmers' Club, and we now lay the substance of it before our readers.]

1. THE past year has been remarkable for a great deficiency in our rainfall, and a high mean temperature. In contrasting it with 1868, which was in many respects similar to it, the drought has been of longer duration, although not quite so intense, and it has had even a worse effect. In 1868 the Wheat crop was above the average, while this year it is generally considered to be scarcely up to that standard. Oats in this district have been below an average, and the hay crop has been perhaps the lightest ever known. It is stated by some authorities that the Turnip crop in general over England is not so bad as it was in 1868, but I am inclined to think that in this immediate district it is even worse. The Barley crop is the only one which may be said to have been above an average. With such results, profitable arable farming at the present time will be the exception.

2. About the half of an average crop of Turnips has been the general maximum result attained in Turnip growing in this district this season; but in the majority of cases it has been much below that, and in not a few next to an entire failure. The crop had not only been in its growth and ripening, but it was in the early period of its growth, but it was not yet reached that stage when it has usually been considered past all danger, a plague of flies, like the Egyptian locusts, invaded our fields, and in many cases devoured every green thing therein, transforming them, from being the pride of our landscape, into a bare, brown, and latterly, a putrescent mass. The Turnip plant, being the native of a colder climate than ours, it had, owing to the high mean temperature of this summer, received a check in its growth, and was therefore at least to the nursery for generating insect life, at least to its attack, which may lie in something like the spores of the parasite Fungi adhering to the unhealthy plant or stem, producing rot or blight. Some people say that the Turnip is degenerating, and I have no doubt that favourite free-growing sorts have been brought to great perfection in size and symmetry at the sacrifice of their constitutional hardiness. Swedes stand out peculiar seasons better than yellow and white varieties; and perhaps we shall be obliged to give up the attempt to the harder green-top Swede than to the more favourite purple-top. Others again blame over-stimulating manures, as applied to the Turnip crop, for its frequent failure; but, if they are of the right sort, capable not only of giving a vigorous start to the plant, but also of giving it continuous support during the whole period of its growth, I think little harm will be done. Others, again, think that the land is becoming Turnip sick, and we may show some of reason, when we think how closely that crop continues to follow its predecessor in some rotations. But even with alternations of cropping, and heavy dressings of manure applied, and even on land where Turnips have seldom been grown before, the failure of that crop is now too frequent. The great lesson taught us by such seasons as 1868 and 1870 is the fallacy of too rigidly adhering to fixed rotations of cropping. The Turnip is a crop which I think it was some years ago; and if we are likely to have a recurrence of these dry seasons, it will be better policy to have a less average under that crop, and grow something else in its stead.

3. Hardly any subject, in a season like the present, possesses more interest to the farmer of stable land, than how to tide over the winter in the management of his live stock, at the least expense and to the best

advantage. Much can be done in the way of economising a deficient crop of Turnips by using the straw and chaff-cutter. It has been proved over and over again that fully one-third more stock can be kept on a given quantity of Turnips, by using these machines, than by giving roots, &c., in the old way. It has also been proved that stock not only do as well on pulped roots and steamed chaff as on a full allowance of sliced Turnips and hay or straw uncut, but in some cases better. A full supply of watery food, like Turnips, given to poor-conditioned cattle when first put up in the autumn, generally produces scouring and a further loss of condition. Now, with cut straw or chaff thoroughly intermixed with the pulped roots, this scouring tendency is counteracted, and the animals make steady progress from the very outset. The large stomach of the ox has been intended to receive a quantity of bulky food, and unless it is filled he will not be satisfied. Thus, how obviously it is the interest of the feeder to give cheap and bulky food which will do good, instead of the more expensive which does harm. When fed upon pulped food the animals require very little dry hay or straw for fodder, and, consequently, have the less occasion to waste any. Another recommendation of pulping is that when we have inferior hay or straw, it can be chopped and used with the roots, and, by being slightly fermented, it is rendered palatable to stock when it would otherwise be rejected by them. I have used the pulper for the last few years, and am more and more convinced that I must do use it. I kept it going all last winter, when we had a good crop of Turnips, giving the pulped roots and chaff to both cattle and sheep, and they did well upon it, and enabled me to feed more stock for the size of the place, and the acreage of Turnips.

Another means of economising a deficient root crop, is to cook and steam various mixtures, whereby comparatively in nutritious food is not only rendered more palatable to stock, but increased in feeding value. Opinions, I am aware, are very much divided upon the merits of cooked food; some asserting that the benefits derived from the process are scarcely commensurate with the trouble and expense in carrying it out; others, again, not only affirming that it increases the feeding value of some articles of food, rendering them more easily assimilated by the animal; and from the fact that they pursue the practice systematically, and are successful feeders of stock, as well as from personal experience, I am inclined to support the latter view. I am scarcely an advocate for cooking or steaming the whole of the food given to cattle; like ourselves, they prefer a change in the kind of food supplied to them, and also a change occasionally in the form of serving it, and they do the better with a change. Last year, when we had plenty of Turnips, I did not cook any food for stock. This, however, was merely to save labour. But in 1868 I did so largely, and the result was, I am forced to admit it to extend I am doing more from necessity than choice. I am convinced that it is as cheap a way of keeping cattle on few or no Turnips as any I have yet been able to find out. With not a few farmers in this district this season the Turnip crop has been so much a failure, that instead of its being as usual the staple article to feed with, it has merely been a supplementary produce. Although in ordinary seasons, when the root crop is about an average one, it may be better policy to sell a great part of the Turnips, and use the other feeding stuffs to a moderate extent, in a season like this it has been a question with me whether our own Barley crop may not be used in feeding, and to as much advantage as anything else we can produce. It is a misfortune that it takes the lion's share of the grain crop to supply the place of the deficient Turnip one. I began feeding this season by boiling Turnips, Potatoes, and Barley together, mixing the boiled mess with cut straw and the chaff, and giving the whole meal and a little water in separate layers. This compound I gave night and morning, and a feed of pulped Turnips, mixed with chaff, in the middle of the day. Along with these I gave at first a dry meal twice a day, and afterwards twice meal and once oilcake. But from the fact that, however well the Barley might be boiled, there was proof by the droppings that the animals were not getting the full benefit of it, I gave the best instructed assistance I could to the Barley meal, and with better results. We also gave them a little old land hay, uncut. The stock have hitherto done, and are now doing, well, but with a very deficient crop of Turnips we are not able to feed our usual number. The meal which we give dry is a mixture of various sorts, made from all the kinds of grain grown on the farm, and Indian Corn, &c. When the horses are not hard-worked, as the present, we give them oat sheaves passed through the chaff-cutter. When any one of the cows does not take readily, a handful of meal shaken over it generally has the desired effect. In addition to this, they have a feed of boiled Barley every night. The sheep get the same chop as the horses, with a little corn and cake in addition, the quantity regulated in due proportions to breeding and feeding stock respectively.

In 1868 I tried the keeping of store cattle with pure linseed oil and treacle poured over cut straw, which the animals ate very well, but I found no economy in using them in preference to other purchased food, such as the various cakes and Indian Corn.

A mixture of different kinds of food, in such proportions as the objects we have in view warrant, generally answers the purpose best. Young growing cattle require food richer in gluten than in oil or fat, in order to form muscle, whilst feeding or fattening cattle require, in addition to gluten, a larger proportion of starch and oily matter. The starch and oil, however, are not to be mixed in any system, but make the fat more easily assimilated. It is a great mistake to give more of a concentrated food, such as meal or cake, than the animal can assimilate, for it just passes off in the manure, which is thus enriched at a questionable cost. As there is generally a great waste of food in feeding stock in a good Turpin year, the lessons of economy taught us by the two years of scarcity which we have lately experienced, are not to be forgotten. There is too frequently a great waste of valuable food in attempting to feed cattle in cold and exposed foldyards, and in draughty dilapidated buildings. This waste is occasioned by respiration in maintaining the natural heat of the animal's body when exposed to a low temperature. Mr. Lawes says that direct experiments have proved that the expenditure by respiration in a good year is equal to the weight of the animal, and in a bad year is as much as twice as great, and in winter much greater than in exercise than when at rest.

rest. Inferences to be deduced are, that in addition to suitable food, the animal has to be kept comfortable and undisturbed.

4. In these seasons of Turnip failure I have attempted the growing of one or two kinds of "catch crops," or "stolen crops," as they are sometimes called. The system is very generally followed in the south of England. In 1868, when the Turnip crop was going off, I was advised by a friend to sow a field of Oat stubble immediately after harvest with St. John's Day Rye. I drilled in the seed at the rate of 2½ bush. to the acre over a 9-acre field, and had it sown by the end of September. The winter was open and mild, so much so that I put a few ewes upon a portion of it, about the middle of February, and they had a fairly good bite. They had a run upon it daily till the grass was ready in the spring. We cut about the half of it and gave it to horses and cattle, upon which they did well. It was never better cut than when I first cut it. In my experiment I made 12 loads. Last year I sowed a field of 11 acres with it, but it did not do half so well as that of the previous winter, from the weather being too severe. This year I have between 15 and 16 acres sown, and it looks very well. Sheep do well upon it, especially ewes nursing lambs, as they milk so well. There are many objectors to this plan, on the ground that Rye is an exhausting crop; but I cannot see the force of their reasoning, when it is either depastured or cut in a green state, as the manure made from soiling with it is apparently rich. My analysis fails to prove that it is more exhausting than a Wheat crop. Last year, the Turnip crop which followed the Rye was about an average, and would have been better if they had been got in a little earlier. This year, after the Rye, the Turnips came away as promising as anything could, but they shared the almost general fate, and proved a failure. For three years I have sown winter Tares, and though they have never been an entire failure, I have not been so successful with them. They do not come to maturity so early as the Turnips, and I have never seen them sown Rye with Tares as a catch crop; but as it has always been dead ripe before the Tares were ready, I have sown a few winter Oats with them this year. I have also tried *Trifolium incarnatum*, but it did not do so well with me.

THREE GOOD SPEECHES.

[We extract from a published report the following capital addresses on the important subject, SUBSTITUTES FOR A DEFICIENT TURNIP CROP, which was lately discussed before the East Lothian Farmers' Club.]

1. MR. SC. SKIRVING said: The subject is, in my opinion, as important as any that can occupy the attention of East Lothian farmers. Much useful information has been given by the various speakers, and we were particularly indebted to the chairman, Mr. Harper, for the useful hints he gave as to the winter keep of sheep upon their farms. (See p. 1741, 1870.) Still, it seemed to me that the question of the best way to keep sheep upon their farms, when a Turnip crop failed, the way to supplement it was to draw on your bank account and fetch food from America, Europe, and Egypt; in other words, to feed with cakes and such like commodities. This is too truly what we are obliged to do in practice. I know it too well, as that very day I had paid an enormous sum of £500 for a quantity of such of which I charge against the great drought of the present year. But by such means sheep might be fed on the High Street of Haddington without Turnips at all.

Now, as I understand, the inquiry proposed by the subject of discussion was to see what the farm could be made to do in the way of helping itself when the disaster of a deficient crop has actually come upon us. On this head only two suggestions were made, so far as I remember, one being to use Potatoes, the other, to use hay. I hear that sheep eat Potatoes freely, but I have not tried the experiment; but as regards cattle, their feeding power is universally known. Much difference of opinion was expressed, however, as to

that value would be charged for Potatoes so used. Some members thought it would not pay to use Potatoes at more than 6s. per bush, while one member at least thought 10s. not too high. Now, it seems to me it is all a question as to the length of crop required. To begin lean cattle with Potatoes, I think 5s. a bush is high enough; but if one had cattle nearly ready, 10s. or even more per bush might be prudent to finish the beasts, and prevent them being thrown prematurely on the market. As to the cost of the Potatoes, this is an important element in the case. There is no doubt to be said in favour of the Potatoes, that droughts, which almost cause the destruction of the Turnip crop, scarcely injury the Potato; and this year, for example, the yield per acre of Potatoes is above the average.

As regards the other product suggested—viz., hay—the speakers seemed to forget that the same drought which hurts the Turnips diminishes the hay. It is in July that one sees that the hope of a full crop of Turnips is gone, and by that time it is out of your power to add a ton weight to the hay crop. Its extent is fixed, and the ton weight is fixed. The latter is the dress if a shower came. The advice to use hay is serviceable only to those who are in the habit of growing it for sale, and these form but a small percentage of East Lothian farmers. For my part, I have bought much hay, and never sold astone in my life; but I may say I entirely agree with its being a most useful help to the feeding of sheep. Cattle are often fed on it, but I have an idea that it does not pay in their use. If cut and given mixed with other substances, it may pay, but not given uncut. I believe, however, that the cost of cutting is not worth the extra feeding power for cattle that I would much rather recommend it for long keep than hay in the cattle courts. Of course the quantity of oat-straw is much diminished by great droughts, as well as hay. A famous Frenchman has said that men are never so fortunate or so unfortunate as they imagine themselves to be. For my part, I thought this year that the part of Scotland hardest hit by drought was East Lothian, and the part of East Lothian hardest hit was the portion of it I occupy; and I do deliberately believe that the worst surrounding the Garlton Hills and about the driest in the country is the portion as much as any from drought. Those of you who are in the habit of passing that quarter of the country must have given us some commiseration when you saw the bare fields that were supposed to be Turnips in July and August. The earliest sown braided well, and were eaten up by fly; soon a second time, they braided again, and were eaten up by fly; sown a third time, they did not braird till quickened by rain on the last day of June; they thrrove well, and after being singed, still promised a fair crop. I felt them growing promising when I was in the country on a visit, and I was in the Highland Society there, when I came back a week after I saw from the railway that the fields were nearly bare again; the Turnips were this time destroyed by the brown grub, the produce of the crane fly. This was the last day of July,

What, then, caused me to say about the hay? I suppose I was, of course, sealed, and the pastures like the life of a newly-singed horse. Well, with little hope, I practised what I would now wish to preach, as the one single expedient I can suggest, by which to supplement from the farm what remains of a Turnip crop at so advanced a period of the season. I sowed three or four of five Turnip fields right across with Rape seed. I knew it could not vegetate till rain came, but it was at least ready to start when it did come. Where there were absolutely no Turnips the seed was harrowed in, but where there was a sprinkling of Turnips the Rape was left to take its chance. It was sown with a hand machine. Drought continued, and the seed lay dry and ungerminated, while the length came and set it in motion. We were out of Rape seed, and I borrow apology for a good stock of Turnips, but it is useful for sheep, particularly where a stock of breeding ewes is kept, and is certainly much better than nothing. I now show you average specimens of the plants. You see the blade is now 15 inches long, and where there are no Turnips it covers the ground in a dense mass. In summer when I frequently passed from Camptown to Edinburgh by rail, I used to transgress the great law by envying my neighbour, when I saw the splendid fields of Turnips about Portobello. I saw them growing day by day, as showers were frequent in Mid Lothian, and always stopped as they reached our county, and by the time you got to Tranent Station the dust was on the ground. But the green aphid, if not green-eyed jealousy, rested on the Portobello Turnip fields, and they melted away; they seemed as if fire had been kindled, and made my miserable acres put on quite a flourishing appearance. That, however, when not too curiously inspected, as if they were capital crop, and had intended it all along. That, unfortunately, all I have to suggest in answer to the question we discuss to-day.

I may say, however, as regards Rape, never sow it in drills, if it were for nothing else than the wood-pigeons. In drills it stands up above the snow, and is devoured in a week by stock for which it was not sown. On the other hand, when Rape grows in a dense mass, like red Clover, it is almost always wet in winter, and the pigeons do not like to settle among it. This subject suggests two others—one of

them at least more practically important than the subject itself. I allude, first, to the frequent recurrence of these droughts; and, second, to the question, Can we in any way set our house in order so as to be in a better position to contend with the drought when it does come. If I have not already occupied too much time, I would make a few remarks on both. To take the last first,—It would be more platitudinous to say about the thorough and deep cultivation of the soil, but do we not know that it is to be done in spring, and so make it artificially dry. And are we right, with only 10 to 20 inches of rainfall, to sow Turnips on the top of a ridge? It is done for convenience when being hoed, but I should like to see some bold member try the experiment of sowing on the flat, or nearly on the flat. Then as substitutes for the Turnip—crops that might serve for green food, and which might contend better than it with drought,—the first of these is, in my opinion, the clover, which is a good deal of it in the Eastern States. I have seen it in the West, and it is so much of it ran to seed, its growth being arrested by frosts at night in early summer. But I think, in all unfavorable localities, a few acres of Mangels should be grown. It is almost free from insect attacks, and this year it has done well, as witness a field of Sir George Suttie's, near Prestons Park Station. I may mention a fact with regard to Mangels, though I have both told it and published it before. I have not less than 30 acres of Sir George Suttie's, and the year of the great frost I was caught by early autumn frosts, which, I thought, reached almost to zero. I thought it destroyed, but it was pitted to take its chance. The roots became a mass of blackened pulp, and to my astonishment the cattle ate it preference to every other food,—devoured it, I may say, and I never had cattle that did better than those fed on the rotten Mangels. I may just say, parenthetically, that there are instances where chemistry cannot help us, and even reason has to give way to experience. I will before now drawn attention to the fact that the rotten Turnip which is so disgusting, and which no animal will look at, is, according to chemical analysis, a better feeding article than a sound Turnip. I sometimes think of this, when a man borrows me as to the excellence of the cake he wants to sell—it may be perfect, but the cattle don't believe it

As supplements for the Turnip crop, I invite members to give us their experience of Cabbage, the marse varieties of Potatos, or any other vegetable. Vetches and Rye may also fill up gaps in the season, and I shall conclude this part of the subject by saying, that this season Beans and Vetches resisted the drought, and grew to an extent that astonished me. Let me say a word in conclusion as to these droughts. They are becoming alarmingly frequent. I don't believe they were as frequent long ago, or we should not hear so much of 1826. At that time, too, there was not so much to hurt. There was relatively more Wheat, much less Turnips, and there were bare fallows.

Bare fallows would improve the red Clover, no doubt, but I fear, if the land is to be rested, there must be a rest in the paying of present rents as well. Are we in any way to blame for the lessened quantity of rain? Are we to any extent responsible for the weather? "What a preposterous question!" I suspect some of you may say. I am not so sure of that. If you drain every marsh and every pool, you gain some surface, but you must interfere with the rainfall. You have done more and much worse.

You have cut down every tree you could lay your hands on. The first thing a man does, as it seems to me, on taking a farm, is to get his landlord to let him hew down whatever trees his predecessor may have spared, and a large number of country are bare as the sands of a Shagreen Island; and having been robbed of beauty, the fields are most certainly robbed of a portion of that rainfall they were intended to receive. I could tell you of two great districts—one on the western coast of America and one in India—which have been changed from fertile plains to arid deserts simply by cutting down trees; and I could show you two rain-gauges in England, not more than two miles apart, where the trees' absence made a difference of 100 in the rainfall. It was Turpin that was the making of East Lothian husbandry, and if we are to lose them I think you had better all go and farm somewhere where labour, capital, skill, and patience are not shattered against such a rock as the droughts of East Lothian. As to the persecution of the trees planted by our fathers, if I had an estate, and my tenants came to me and said, "We have cut down the trees, and wish to knock out my teeth, I will hear what you have to say; but if you want to cut down the trees, you need not open your mouths."

2. Mr. HORT, Fentonbarn, said: It depended on the description of stock to be fed what substitute was best to supplement a deficient Turnip crop. Last winter he had used the refuse of Indian Corn meal from the starch-works, mixed with Wheat chaff or cut straw, which kept the ewes in lamb in excellent health and condition, and they had abundance of milk for their lambs, and that without any Turnip. The meal and chaff were steeped in water, with a portion of salt, for 12 hours, and the stock ate it greedily. One pound of meal was allowed per day for each ewe, the expense being only 5d. per week, and, curiously enough, the

analysis of this meal showed it to be better for feeding than the other corn. He had also tried the same mixture with young cattle, and found them to grow and improve in condition. This season he was giving all his cattle 5 lb. of this meal, mixed with chaff, to begin with. To the most forward in condition he was also giving 3 lb. of linseed cake and a few small Potatoes, besides what Turnips they could consume. He had no doubt if cattle were judiciously bought, they could be made ready for the butcher on corn and cake in ordinary seasons at little risk of loss, at least if the value of the manure left by them is taken into account. But this can only be done when the cattle are fed at first for a considerable time on cheap meal and the less expensive cakes, and ultimately supplied with the best linseed cakes. Nothing is better than bean meal or ground Oats and Barley for feeding young cattle; it enables them to grow and fatten, and it pays better to feed old stock with linseed cake; indeed, all stock should be furnished with it. Potatoes are excellent feeding. I have fed both cattle and sheep with them; from 2 to 3 stones per day, along with Turnips, fatten cattle rapidly, but I have not found it suitable to feed sheep with them beyond eight or ten weeks, as it affects their kidneys in a way ultimately to destroy them. I certainly would not be at the trouble of driving Potatoes off the farm at the price of 16s. a ton if I could not eat them. I have sown, and call it a few Cabbages and 3 or 4 acres of Mangel. Cabbages are excellent food for cows and ewes, and ewes and lambs, while Mangel is valuable late in spring, but I have rarely had the weight of Mangel per acre that I have had of Turnip. They are apt in Scotland to run to seed in autumn, and they require to be early sown to save them from frost. They are much grown in the south of England, where the climate is warmer, and, I think, more suitable for the whole. They are annually sold to the extent of 250,000 cwt. while the Turnip crop exceeds 1,600,000 acres. On the whole, our climate is better suited for the growth of Turnips, and I think we should persevere with them, sowing them later, perhaps, than we have been lately doing, and also trying them on the flat, which I intend to do. I may mention that, turning over some old papers a few months ago, I came on a recipe for 2 tons of linseed cake, described as so many hundred cwt. weighing 2 tons, and a letter from the seller to my father, dated March 1823, saying he had a ton remaining which might be got at the same price, or such part as remained unsold when he should require it; since then linseed cakes have been always on Fentonbarns. I have for years used upwards of 10 tons annually, and I know no better or cheaper way of increasing the condition of a farm.

3. Mr. PATON (Standingstone) said: Substitutes for the Turnips are naturally of two kinds—viz., the natural products of the farm, and the substances in the market, well styled artificial foods. I think we ought first to see how much we can do at home in the shape of producing food for stock; and on this I would venture to say (and at present I refer to the heavier and secondary class of soils), curtail the breadth of the Turnip crop. I am quite convinced that for several years many have been trying to grow too many Turnips, and, what with manure, and mangel, and the weight of the seed, have been very small indeed. But we will be told that food has been very hard for stock; to which I say, after your rotation to a certain extent, and more food will be produced. But I will again be told, we are bound to a certain rotation. Well, that is certainly a sad mistake in many cases, and one that ought to be altered as soon as possible. Instead of going on in the usual six rotation, as most of the county is farmed, I think a modification in many cases might be profitably substituted. And, first, I would presume to say, that giving up the good old-fashioned plan of following a proportion every year has been a mistake on all secondary soils situated a distance from a town. I am convinced that where they were revived, we would begin to see very much better crops of red Clover; and what a capital substitute for Turnips, and for keeping the land in condition. But after fallow on the better class of soils, I propose two white crops, viz., Wheat, followed by Barley and grass; of course the one crop would be damaged, and the other would be a good dose of light manures. By this rotation the chances of red Clover are very great; and I remember being told by a Neighbour of mine in Fife—who had farmed, for two 19 years' leases, a farm of rather a stiffish nature, yet in a good climate for Turnips—that during the first lease he pursued the practice I have mentioned, and he farmed profitably. Next lease he got his farm well drained, and commenced to grow large breadths of Turnips, and, well as he was watered, he called a high system of farming. After the better half of the lease had been run, he found out his mistake. He found that he had never the fine sample of Wheat he used to have after the fallow; that his Barley, after the Turnips, was very much darker in colour; that the fine crops of red Clover had disappeared; that his labour bill was almost doubled; and that his bill for manures had trebled. He again had recourse to the fallow, and the two years' practice of the first lease returned. Now here is the practice of a very practical man, who farmed for two leases. His practice led him to the conclusion that it was always unprofitable to grow two large breadths of Turnips, but rather to winter more stock on cake, and finish them off in spring

and summer by green food—as Clover, Tares, and such like. For myself I have been always best paid by keeping cattle on a moderate supply of Turnips in winter, and finishing off in spring and summer. I have seldom seen any payment in getting lean cattle in October, giving them Turnips *ad libitum*, and cake, and selling them in the months of March and April. I think we can do well to mangel a substitute for the Turnip crop, as the climate here is too cold. As for the Potato, it won't pay to grow them to feed cattle. The condition of the farm can also be kept up by pasturing for two or even three years, and then taking Potatoes with light manure only. I have little faith in Oats after two or three years' pasture in the county, but one is sure of Potatoes, and the land is in excellent order for Wheat, and much cleaner than if Oats had been taken. I dare say some factors may object to the idea of two white crops, but, after land which has been well fallowed, they need have no hesitation in allowing it. I remember being asked by a factor in the county, who is generally present at our meetings, why I did not put a green crop between the white crops. To that I say that it has been found by practice that the Barley was better, the Clover very much more certain, and that both soil and climate, in many cases in the county, were much better adapted for growing Wheat, Barley, and Clover, than Turnips. Then, for the artificial assistance, I have seen a great deal of manure, and mixtures without end, only they come to be pretty expensive; and I quite agree with Mr. C. S. Read, M.P. for Norfolk, who I have all along thought one of the most practical of men, that rather than lavishly use cakes merely for the sake of manure, it is better to apply part of guanos and bones in order to give the plants a start. When cake and meal are judiciously applied, I am convinced it is the cheapest manure we can get, but it is also expensive, and it does not pay the farmer to feed the staple. A great deal can also be done by the straw-cutter and pulper. I have no doubt, to make the Turnip crop go further; but not having any experience, I should like to hear particulars from those who have tried. I am told that it is a capital thing for wintering young cattle, and I intend to try it this winter; but the advantages derived from it by feeding cattle are not so great. A neighbour of mine this summer, whose grass failed, and everybody else in the country, put his cattle into the court, and gave them straw chaffed, and half-crown's worth of cake per week, and he says they did quite as well as they would have done had they been grazed on ordinary quality of pasture; here is certainly a cheap way of obtaining manure. Now, seeing that we have peculiar seasons to contend with, that we have plenty of artificial manures and cakes, and that butchers' meat is selling at extravagant prices, I don't see why we should go on in the old system of rotation, if we can grow crops that are much more certain than others, that are much better adapted for the soil and climate, and that generally leave a margin of profit. I say it is for the interest of the landlords as well as the tenants to look to these things, and not put into leases absurd and impracticable clauses.

AGRICULTURAL NOTES.

FROM BRITISH CONSULS' REPORTS.

FRANCE: The department of the *Dordogne*.—The cattle in this department are sold in high condition, and the price and the quality of the meat are very superior. Large quantities are sent to Bordeaux and the southern departments. The price of cattle, and consequently of meat, has risen considerably of late years, but the demand appears to be increasing the supply, and a lucrative trade is now carried on. Cattle proprietors are strongly opposed to *vet* duties in towns, as interfering with the freedom of the trade, and unnecessarily enhancing the price of meat.

THE HAGUE.—The export trade in cattle, sheep, and pigs, is hardly of less interest to England than it is to Holland. It is from the meadows and the ports of Holland that we draw a considerable portion of the animal food of our metropolitan population, and we cannot but view with satisfaction the growing proportions of the national wealth, or, to forget that there is an abundant supply at Rotterdam, to see to what extent synonymous with low prices at Smithfield.

The years 1866, 1867, and 1868, were years of murrain, during which not only was Dutch live stock excluded from other markets by legislative measures, but this country itself suffered frightfully from the ravages of the disease; whole flocks of luxuriant pasturage were left empty—whole farmyards were left desolate. But, referring to the healthy years, we see that Great Britain, during the 1869 and 1868, and just four-fifths of the sheep, increased its demands during each of the three following years, and now that the supply has resumed its normal proportions, is the purchaser of six-sevenths of the whole number exported. Belgium, on the other hand, is the principal purchaser in cattle, drawing a steady supply of about 40,000 head a year. In veal, however, Great Britain is again decidedly the largest and most valuable market. Great Britain, during the last year, sold over 100,000 pigs, but has since been surpassed by England.

The export of meat of all descriptions, whether fresh, salted, or smoked, is but small, consequent on the facilities for the transport of the live stock; thus during the years of the cattle disease it rose to over

8,000,000 kilos., while the average in other years has not been more than about a quarter of that amount. Though Great Britain is no longer so dependant on Holland for her supply of animal food as she was a few years ago, Holland still furnishes 30 per cent. of the horned cattle, and 43 per cent. of the sheep imported.

MOROCCO: *Tangiers*.—Notwithstanding the hopes of an abundant harvest that were entertained at the commencement of the year, the grain crops again proved to be very deficient throughout the empire. In some districts the scarcity was so great that grain was not to be found in sufficient quantity to supply the wants of the population, and the people were compelled, in the south-western districts, to have recourse to grain that had been kept for years in underground stores, and had become putrid. The use of this wholesome grain produced a fatal sickness during the summer months, which had all the character of Asiatic cholera, and which carried off a considerable number of persons. The distress among the agricultural classes, who had already suffered severely from a series of short harvests during three successive years, was very great. To add to the general misery, a fearful mortality prevailed at the close of the year amongst the sheep and horned cattle, whole flocks and herds being in certain parts of the country swept away by the plague. The mortality was prolonged by prolonged drought, followed by heavy and continued rains, and the cattle, reduced and out of condition from want of pasturage, died in great numbers when exposed to damp and severe weather. It is calculated that in the districts between Mazagan and Morocco, from 50 to 75 per cent. of the cattle have perished. In consequence of these combined misfortunes the farmers and peasants are, for the most part, without the means to purchase the seed and bullocks requisite for carrying on their agricultural operations; and on this account comparatively little land has this year been brought under cultivation.

Rabat.—Bullocks, cows, sheep, and goats, are very abundant in the provinces surrounding the districts of Rabat and Salée. The first-named, to the amount of over 2000, are purchased in these parts annually for the supply of our troops in the garrison of Gibraltar, which are sent overland to Tangier for shipment to the colonies. In general it is remarked that the cattle are not large-sized or in good condition, but on being properly fed and taken care of produce excellent beef. Horned cattle and sheep constitute the riches of the Arabs in the neighbouring districts. Horses are not numerous in these parts, but the markets every Sunday morning, in the summer months, are thronged with them, arriving from the southern provinces for sale at Rabat. Wild animals abound, they are the jaguar or leopard, wild boar, wild fox, porcupine, otter, wild cat, weasel, and weasel. The hills and plains swarm with hares and rabbits; and of the feathered tribe, the eagle, vulture, large and small bustard, hawk and owl are found; and the sportsman's gun would find employment amongst the red-legged and grey partridge, wild duck, woodcock, snipe, quail, wild pigeon, and numerous other small game. *J. R. J.*

Home Correspondence.

Devons and Shorthorns.—In an article in your impression of the 17th December, on the comparative average ages and weights of the leading breeds of cattle exhibited at the Smithfield show, you say, referring to the difference in the weight of the Devons and Shorthorns, "It must not be forgotten that in the case of pure Shorthorn herds' all first-class animals are kept for breeding purposes, and comparatively few find their way to the butchers' stalls." This annual apology for the shortcomings of the Shorthorns has been so frequently made that I begin to believe they must be very slow, uncertain, and indifferent breeders, or the implied great demand for Shorthorn bulls would long since (to a great extent, at least) have been supplied; for I suppose the Shorthorns produce as many male calves in proportion to female calves as any other breed. There is a much larger demand for bulls of this breed than for Devons or Herefords for cross-bred herds." Well, suppose there is, which does not appear certain, if you are correct in saying the Shorthorns "are thirty-fold as many" as the Devons, the supply ought to be more than equal to the demand, for the animals purchased for this purpose are in most cases of a very inferior description, comparatively speaking, fetching not much more than butchers' price, and some one lots add to the merits of the Shorthorn classes at the fat stock shows, where they are prepared for that purpose. Considering the great number of Devon, Hereford, Sussex, South Devon, Welsh, Channel Island, various Scotch and cross-bred herds there are in this country, where Shorthorn bulls have never been used, the drain on the breeders for those animals cannot be sufficiently great to account for the inferiority in quality, and even in quantity, of the Shorthorn exhibited at the late sale, to the other breeds at Birmingham. Most of the animals of the Shorthorn breed sent for exhibition to these places come from the very best herds in Great Britain, and are descended from some of the best animals in these herds, as may be seen by reference to the Herd Book. Indeed, this conclusion

may be arrived at from your own remarks—that “all first-class animals are kept for breeding purposes,” the inferior ones therefore finding “their way to the butchers’ stalls.” How is it, then, may I ask, that these “first-class animals” produce such a lot of second and third-rate steers and oxen, the best of which being those recently exhibited at Islington and other places?

As when we may hope to see the old maxim that “like produces like” in the case of these sheep, paper-cracked-up-first-class Shorthorns? If, sir, you had called attention to the relative cost of feeding a Devon and a Shorthorn, to the unrivalled fulness and thick covering of flesh of the ribs, as well as to the wide back, with the greatest quantity of the very best quality of meat massed thereon, as compared with the lightness of the inferior joints and offal which characterise a Devon, your interesting article would have had the appearance of more impartiality than I think it now possesses. Surely the cost and quality of what is produced is not to be ignored! As regards the quality of the Devons, it is an indisputable fact that it is unsurpassed; and as to the cost of keeping them, the breeders and graziers justly maintain they far excel any other breed for inferior situations, are easier kept than either Hereford or Shorthorn, and will mass a larger amount of meat on the superior parts in a shorter time with a smaller quantity of food than any other breed in existence. The fact of the Devons in the hands of small tenant-farmers, without aid and support of landed proprietors and the opulent, and the encouragement of the press given to their more fortunate rivals, being able to more than hold their own, is an unerring proof of their rent-paying capacities. Every discouragement is given to the supporters of the Devons, while the admirers of Shorthorns receive nothing but support from the agricultural press, and many young beginners have thereby been induced to give their preference to the latter breed. And as much fuss is always made by one or other of the agricultural papers about the coming to light of a roan Duke, or a white Duchess as is possible to make about the birth of an heir to the throne; but the blood-reds are not only on similar occasions treated with silent contempt, but they are abused when unsuccessful at Birmingham and London, and when successful the public are informed, “The extreme beauty of the breed saves it from being utterly swamped by the more useful breeds of Herefords and Shorthorns, and judges are constrained by it not unfrequently to place them in the very front ranks of merit. Thus, Mr. McNiven’s Devon cow is not only first in her class, but pronounced the best cow or heifer of any breed in the yard, carrying off the gold medal.” And again, after the cups for the best male and the best female in all the classes in the Agricultural Hall were both won by the same breed, it is stated “the Devon breed is likely to decrease rather than increase.” Sir, with all deference, I beg to question the accuracy of the conclusions you have come to. *A Devon Breeder.*

Kill-calf: Quarter-evil: Quarter-ill.—These are convertible terms. The first denotes the sure issue, the last two denote the position, of the malady. I have had two cases of it among my 14 Hereford calves. The first case occurred in the torrid heat of summer; the last occurred two days before the eclipse of the sun, after a very wet night and previous wet days. On the eclipse of the sun—that great phenomenon of Nature—we can account for it, but I cannot account for the mysterious phenomenon of “Kill-calf!” I have read a great deal about it, but the last calf that died upon the theories of diseased kidneys, liver, stomach, rumen, lungs, heart, and pleura. I never saw a healthier calf internally. The butcher who skinned and opened her said he never saw a healthier animal internally, that he had skinned hundreds of calves that died from the malady, and that in all cases the animals were high provers, and not low in condition. The suddenness and rapidity of the disease is very remarkable. The calf was perfectly well over-night, to all appearance, and was brought home in a cart next morning at ten o’clock in a dozing and evidently dying state; so I ordered the butcher to put her out of her misery. I observed the following appearances before skinning: the off hind thigh to the hip was much greatly well swollen, and about the flesh was very good, the skin looked as if it had been under the skin; after the skin was off, the flesh appeared as if a strong man had battered the thigh with the back of an axe for an hour; there was over the whole inflamed space much bloody coagulum, and copious humour flowing from the blood, like greasy water. The inflammation had proceeded some way over the off loin, but not up to the seat of the kidneys, which was covered with fat, lily-white, and perfectly healthy in all respects. This “non-plussed” me, as my wife says, that it proceeded from the kidneys, which in the former calf were much inflamed, as, indeed, also was the anile gut, and both lumbar regions. I tried to cure that calf by bleeding, enemas, and other things, such as gruel and nitre, and Epsom salts; but

“Physicians was in vain!”

Excepting the bull calf previously described, descended from BATTENHALL, SIR BENJAMIN, and SIR THOMAS, and which is a perfect and most beautiful animal, the two deceased calves were the highest provers, and looked, when opened, like fat stock. The last was eating four pounds of oilcake per day, with hay, and

shortish grass. I cannot account for the death otherwise than by sudden congestion of the blood vessels, and instantaneous mortification. The butcher said, “If I were not to skin it at once, to-morrow it would be so offensive that I should not be able to do it.” When the first calf died, they were eating excellent grass, and one pound of oilcake per diem; they have been better summered than even my friend Mr. James’s calves. Mr. John Ford, at my suggestion, bought the cow and last calf here this spring, as she did not milk, and I took it; but the kill-calf has deprived me of it—

“All bloody, congested instantaneously.
Enough to make the boldest farmer cry.”

I wrote to my friend Mr. Ford, who replied to me as follows:—“I lost some calves in the same complaint in the Rushton meadows some years ago; since that, I have had them home at night to dry food and dry lying, and for ten years have had no other case of it.” Still, I cannot account for the death of the first calf, as the earth and food were both dry enough. I fancy the complaint is venous congestion from thickened blood, and I advised the gentleman, leading to rapid mortification. I shall, in future, give them sulphur once or twice a week. *W. F. Radcliffe, Okeford Fitzpaine.*

Co-operative Societies.—In a recent report of the Romsey Agricultural Society, I am erroneously reported to have said, “they should not co-operate too much.” Now, I said nothing of the sort; indeed, I added that the great success of the society and the present show as the result of the co-operation of all classes, and an example of what can be done by local energy, local influence, and local funds, without the aid of any co-operative society in London or elsewhere. The chairman, who I am sure no one can more highly estimate than myself for his excellent intentions and benevolent acts, having in his speech, which immediately preceded mine, advised farmers to purchase their commodities through these London co-operative societies, I felt that I should be a traitor to my own convictions and a participant in erroneous teaching were I not to avail myself of the opportunity to oppose a theory which, if thoroughly carried out, would, in my opinion, ruin the trade of Romsey and every other inland town connected with agriculture. I fancied that Mr. Cowper-Temple had not sufficiently reflected on the results to which the principles he advocated must tend, for it is in vain to say you must stop short and not go on, when you are giving a new and short the others to exist on sufferance. If the landowner or the farmer buys his seeds and manures through a co-operative society, why should he not also purchase his wine and grocery, his clothes, and his boots? However much disposed to waive my opinion in deference to the chairman on many matters coming before him as a legislator, yet on commercial affairs the experience of more than a quarter of a century forbid me to do so. I would respectfully ask him to weigh in his mind the truth of the following proposition: Supposing that in the locality of the society over which he presided there is a capital of £100,000 invested in the trades his advice would destroy (which supposition would certainly not exceed the truth),—this hundred thousand pounds is as much invested in agriculture, and serves as much to increase its productions, and to benefit the owners of land, as if it were in the farmers’ pockets or at their credit in the bank. Remove this capital, which would be done by purchasing only through these co-operative societies, who have no capital or next to none, and who give no credit, and you impoverish the land to the extent above-mentioned. The first Buonaparte taunted us with being a nation of shopkeepers. The instinct of the country accepted the reproach and converted it into a trophy; for what did it show? Not only that we were the biggest manufacturers in the world, but by the aid of our commerce, &c., the wealthy landowners also, but that in our capacities of merchants and shopkeepers we stored up for the world’s use the food of the million, the products of all climes, and the emblems of civilisation, the fruits of the earth and the means of its fertilisation,—not with the blood of our enemies, but as the results of industry, enterprise, and skill. Let us not, then, be ashamed of the term, and let us not, then, be ashamed of the co-operative societies, for we seek to destroy; for we may well ask, if our houses are to be empty and our shops to be shut up, “How are the taxes to be paid?” and, in the words of the old Duke, “How is the Queen’s Government to be carried on?” *W. C. Spooner.*

Societies.

ROYAL AGRICULTURAL OF IRELAND.

At the recent monthly meeting of the Council in Dublin, the Chairman, SIR GEORGE HODSON, Bart., announced that, at the solicitation of the Council, the Prince of Wales had accepted the office of President of the Society for the ensuing year. The Council indulged in the hope that the arrangements of his Royal Highness would admit of his being present to take part in the proceedings of the Society in August.

The half-yearly meeting was held on the same day, when the chair was taken by the Marquis of Kildare.

THE SECRETARY read the report, as follows:—On

the occasion of presenting the usual half-yearly report of the Society’s transactions, your Council are strongly impressed with the necessity for your Council are strongly in securing an accession of members, thereby affording means of more successfully promoting the objects for which the Society was formed. The annual exhibition of stock and farming implements, held in August last at Ballinasloe, did not realise the anticipations which had been entertained of its success. This result was not reasonably to be expected, taking into account the advantages at present existing in that locality, compared with the condition of this district 25 years since, when the Society’s operations took place there. Among the causes which have contributed to this comparative failure may be noted the alarm proceeding from apprehended disease in cattle, which caused many of the entries to be incomplete. The thanks of the Society are eminently due to the gentlemen forming the local committee, for their valuable services in carrying out the showyard arrangements. The provision of Leinster being next in rotation as the district in which the Society’s exhibition for 1871 ought to be held, and the guarantors for 1870—viz., the Right Hon. the Lord Mayor, with Messrs. Walshe and Robertson—having kindly consented to continue the guarantee for 1871, the show will be held next year in Dublin. A local committee has been formed, and is occupied in organising the undertaking. It is expected that the present show of similar importance to those recently held in the city will form an attractive feature in the display. The local farming societies in connection with the parent one continue to lend their endeavour in promoting improved systems of tillage and production of stock, and a fair amount of emulation has taken place for the prizes offered for drainage. Your Council have, however, to express their concern that, notwithstanding the valuable inducement offered by his Grace the Duke of Devonshire’s challenge cup for new and improved labouring collages, the number of competitors in this department has been very limited; nor has any notice been sent to the secretary of any competition for Lord Talbot de Malahide’s cup for most approved farmhouses and buildings during the past year. This being the time when the President of the Society for the ensuing year is appointed, your Council have the pleasure to inform you that an application has been made to the Prince of Wales to the effect that his Royal Highness would honour the Society by allowing himself to be named as President for 1871, and that his assent to this proposition has been received. The Council indulge the hope that his Royal Highness will be enabled to take part in the Society’s proceedings in August next. Annexed is a statement of the receipts and expenditure connected with the late show at Ballinasloe:—

NATIONAL CATTLE AND HORSE SHOW, BALLINASLOE, 1870.

Receipts.		
By amount received from the local committee	£	500 0 0
Balance to debit	“	421 16 6
	£	128 16 6
Disbursements.		
To cash premiums awarded	“	£685 5 0
Medals	“	8 0 0
Judges’ expenses	“	139 0 0
Directors’ and stewards’ do.	“	21 0 0
Clerk of the yard	“	30 17 0
Secretary’s travelling expenses	“	9 6 6
Accountant’s do.	“	5 0 0
Veterinary surgeon’s do.	“	3 0 0
Printing, &c., do.	“	32 8 0
	£	1201 16 6

Sir George Hodson, Bart., moved the adoption of the report, and Major Borrowes seconded the motion, which was adopted.

A vote of thanks was passed to the Marquis of Kildare.

The local committee has appointed Mr. Richard Morgan its paid secretary.

HERTFORDSHIRE.

The Game Laws.—At a recent meeting, the total repeal of the Game Laws as injurious to the farmer and demoralising to the people was warmly advocated by Mr. F. A. McGeachy, whose views upon the subject are well known. Mr. Brandram moved an amendment, which was ultimately carried by 26 to 12, to the effect that a total repeal of the Game Laws was not desirable, but that “if the ground game were given up to the occupier, it would tend materially to promote good feeling between the landlord and tenant.” After an interesting discussion, in which the Hon. H. Cowper, Mr. Abel Smith, Mr. Brand, and others took part, Earl Cowper addressed the Chamber as follows:—

As a landed proprietor in this neighbourhood, and, I confess, a game preserver—a preserver of pheasants and partridges—it would not look well for me to attend a meeting of this sort and to shrink the question, but I ought fairly to say what I think on this subject. I am sorry not to see more tenant-farmers present, but I do see here some of the most sensible and thinking of that class. I think this is a good opportunity for us landlords and tenants to talk over the matter together. This meeting may be useful to the country at large, informing them of what our opinions are; but the object for which this Chamber was really established, was that landlords and tenants

* In addition, five cups, value £250, were offered in prizes.

may have the opportunity of communicating with each other. The immediate subject before us is the repeal of the Game Laws. I do not mean by abolishing the Game Laws, who will remedy the evils complained of, and especially the wrong being done to you by your land being over-run by game. As Mr. Ransom very properly said, one of the greatest grievances you have to complain of is where a man farms round a wood he does not hold, and which does not belong to his landlord. I do not see how the abolition of the Game Laws will prevent a man preserving in that wood, unless, indeed, the Game Laws will have the effect of exterminating game altogether; some think it would have this effect, and I am inclined to think so too. I am inclined to look with favour upon the principle of compulsory compensation. I think that where so much damage is done to crops by game, the man whose game does the damage ought to be compelled by law to pay for it. The fault of the Government measure was, as Mr. Meachey pointed out, that it would cause an immense amount of litigation and difficulty. The simpler the remedy the better will be the result. I think it would be the right thing. I therefore think we ought not to consider so much what changes in law ought to be made, but rather, so long as the law remains what it is, how we may endeavour to settle the matter between ourselves. Well, gentlemen, the first thing that ought to be done is, that ground game should be kept down. We are all agreed on that point. I am acquainted with a number of game preservers, and I am happy to say that that public discussion has had much to do with it. Another reason is, that tenant-farmers are much more intelligent and educated than they were fifty years ago. A landlord knows the advantage of a good tenant, and knows that unless he keeps down the rabbits, a good tenant will not continue to farm under him, and a good farmer will not take a farm unless the rabbits are kept down. It has been said that the landlords ought to let their tenants have the shooting on their farms; but I do not think that plan practically answers, except in very few cases. I have known many cases in other countries where farmers have turned down pheasants into the hedges, or into a little bit of wood, and allowed them to take their chance, with the hope of having a little shooting without the expense of having them looked after. As they do not employ a keeper, they put a strong temptation in the way of poor persons to go and take a bird when one is looking after them. The offender is occasionally caught, and very properly punished for a crime he is almost induced to commit. It is a mistake, except in certain circumstances, to let the game to the tenant. There is one other question to which I wish to allude. I do not think that landlords ought to let their game to strangers. I know this has been done very much in this county, and I regret it exceedingly. I have made a firm resolution that I will never do anything of the kind. I need not tell you that there are difficulties arising from this resolve—some places might be let more advantageously than others, but I think so strongly on this matter that I will never let the shooting over my property to any strangers. When everything is right between landlord and tenant, with the smallest amount of trouble on the part of the landlord he is able to keep a moderate amount of game without any annoyance arising from it; but when a man goes into a neighbourhood where he is not known and hires the shooting, he and the farmer are almost certain to fall foul of each other, he has no reason to expect that. I have long wished to have an opportunity of saying what I have now said, and before I sit down, I will only express a hope that more of the tenant-farmers in this room will honestly and truly tell me what their opinions are with regard to the different points I have mentioned.

COGGESHALL.

"Mr. Mechi."—At the last annual meeting of this Society, this toast was given by Mr. Dennis. Mr. W. G. DENNIS said he rose to propose the health of a gentleman well known amongst them both as a practical and scientific farmer, one from whom, let the world say what it would, they had learnt a great deal: he meant his worthy friend, Mr. Mechi. Mr. Mechi had attended these annual meetings for many years, and he thought had always said he breathed freely there because he came amongst friends. Some farmers thought that Mr. Mechi said he grew very great crops he rather than the hatchet. But he (Mr. Dennis) thought that, after a little consideration, it would be found that, for a good reason why Mr. Mechi grew more corn than many farmers. In the first place, his lands were well drained, there were no fences, very few ditches, and he had no game. The CHAIRMAN: Oh, hasn't he, though?

MR. DENNIS: I never heard he had.

MR. MOSS: No ground game?

MR. DENNIS: No ground game he had mentioned, and from which Mr. Mechi was at least comparatively free, many farmers lost from 15 to 20 per cent. Therefore, it was impossible for them to compete with him. Moreover, his farming was of very high character. He "sugared" almost every crop, and if other farmers did not grow quite so much corn, they did not go to quite so much expense. At all events, be that as it might, they always listened to Mr. Mechi's remarks with a

great deal of pleasure, and he trusted to get sufficient information from the audience that evening to pay him for his day's work, dinner, wine, and all expenses into the bargain. There was one subject he would throw out for discussion, and as Mr. Mechi would lead that discussion, he would perhaps be good enough to tell them his opinion upon it. Farmers of this district were in the habit,—he was at least, and many others he could name,—of grazing 40 or 50 bullocks a year, and they found that, by the time they had paid for artificial food, or the corn the animals consumed, there was nothing left to pay for the root crops; whereas, if the land was fed by sheep, there was left a wide margin for other things. He should like to hear Mr. Mechi's opinion of the most economical way of converting straw into manure for the land. As to the labourers, his opinion was, they were not paid so well for their work as they ought to be; and whilst they saw that lands were letting for from 30 to 40 per cent. more than they did thirty or forty years ago, he thought it was a hard thing the labourer was in no better position to afford, and in no more, than he was not so good. MR. CATCHPOLE: That is the reason.

MR. MECHE, who was received in an enthusiastic manner, said he was very much obliged for the cordial manner in which his health had been drunk. It had been remarked that evening that theirs was a very successful and continuously prospering institution, and there were many reasons why that was so. Perhaps one of the most important of them was, that although he had been in this position for many years, he had never seen in any single instance, either to himself or to any other member, any personal ill-feeling. They had had discussions, and very properly scrutinised, and some had even condemned principles, but they had never descended to personalities, and so long as they continued that course, they might be satisfied they would so long continue prosperous, whereas personalities had destroyed many similar institutions. Leaving that disagreeable portion of the subject he would say he had been pleased with many things that night. He had been pleased to hear of the enormous straw stacks Mr. Moss had told them of, because he felt very much for the stomach of the British people, and he had been afraid they would come to short commons. He was glad, therefore, to hear that the farmers had taken so much care for the British people. With regard to the question of education it was a very important one, because they were all agreed in their opinion that the only way that agriculture was to be improved and could only be improved by the application of science; and in order to understand science, both in regard to machinery and manures, and so on, both labourers and employers must be educated. He did not think it was a new theory, the application of science to agriculture, because he had 28 volumes of the Royal Agricultural Society's Journal, annual volumes, and in each, in the title page, he saw inscribed "Practice and Theory." He was very glad to hear that as the first agricultural institution of England and the world, they were bound to acknowledge the fact that science must be considered useful and necessary in connection with agriculture, and they must obtain science by education. Science had done wonders for their comforts. They might trace it from the old tinder box compared with the present lucifer matches, and might carry it through until they got railway communication at the speed of 50 miles an hour, as also in all the machinery that was used in agriculture, and might then make a long speech, but there was one particular subject he wished to revert to. There was likely soon to come before them an agricultural production in a new form. What did they think of going to market and buying mangel cake the same as they did rape cake? That was not theory. It was the idea of a gentleman who had recommended drying after pulping. Mr. Colman, of Norwich, the late sheriff of that city, a very intelligent and respectable man, was going to market the Mangel after it was dried into cake and send it to several friends, as well as offer some of it for sale in the market. Messrs. Colman had proper pressing machines, and it was likely to become a part of their regular business. It was well known that cattle and other animals were liable to become scoured or otherwise injured by an overdose of Mangels, not from the essential qualities of the Mangel, but from the condition and time at which it was administered. It was well known that when Mangel was so dried and converted as he had mentioned, it might be immediately given in any reasonable quantity in the same way as they would give cake to animals, without danger of its disagreeing with them, and with the happiest results as to their fattening. Experiments had also been tried that taught them much as farmers. As many were aware, there had been established a sugar manufactory at Lavenham, and there men were employed day and night to convert sugar beets into sugar. They might ask why? Because they knew, and the same principle applied to Mangels, that when the Beetroot ripened and the shoots came out, the sugar was gone, and it would not answer or pay them to allow sprouting to take place. They, too, knew practically well as farmers, that if they kept Mangels until July there was a great deal of sprouting and a great deal of emptying of farmers' pockets. The conversion of Mangel into cake as proposed was with a view to

render the food more agreeable to the animal, and if at a moderate price they could obtain the same thing they might stack or otherwise keep the food for two or three years, and it would be good within that time. The proposal was feasible, and he believed would be practically carried out. It became then a question whether they should get 7s. a ton for their Mangel, or 15s. or 20s. a ton, and if they could multiply their value by 20 or 30 per cent. it would be a great benefit to the farmer. With regard to Mr. Dennis's question to him, he could only say that they must make up their minds to invest more capital per acre in the soil, and rather have a little land and farm it well than a great deal of land and farm indifferently; and as to stock, if they were to make bullocks pay as well as sheep it must be by an improved system of action. They must have them under cover, prepare all their food, and allow none of it to be wasted, and then a bullockfold would be to them as good as a sheepfold. He spoke practically upon the point, because, as a rule, he found that after paying all cost of food, &c., according to the price of meat was the return per acre. The feeding was from £3 to £7 per acre—probably an average of £5 for each of the green crops that followed.

The CHAIRMAN asked Mr. Mechi's opinion upon the double-furrow plough, what his calculations were upon the use of steam machinery, and last, not least, what expense he thought would be saved by farmers generally cultivating the soil by means of such machinery?

MR. MECHE said his experience of double-furrow ploughs was not enough to enable him to form an opinion. He was induced to think that any ploughs encumbered with wheels on sticky, tenacious clays would, in certain seasons, be practically unavailable. As to the other questions of the Chairman, they were very large and could not well be dealt with that evening. Respecting cultivation, all he would say was, as a general rule never use a man when they could use a horse for the same cost no more to keep, and was eight times stronger.

The CHAIRMAN asked Mr. Mechi, as he had lately had under consideration the question of holdings, to state his opinion as to the proper size of farms, and whether he was in favour of the large or small system?

MR. MECHE: I shall merely say, as this is a very difficult question, that you should fit your farm to your capital. In conclusion, Mr. Mechi said he had the pleasure of placing on the table a list of the names of one of the worthiest men he knew, his friend Mr. F. Hills, who was almost the soul of the Society, and without whom, and the care and trouble he bestowed on it, the institution would never prosper.

CIRENCESTER.

At the annual meeting of the Cirencester Chamber of Agriculture the other day, many good speeches were made. We report from the columns of the *Wills and Gloucester Standard* what was said in them of the toasts which were honoured:—

1. "The Cirencester Chamber of Agriculture."—MR. W. J. EDMONDS, the Chairman, said:—The number of members has increased during the last year, our finances are in a tolerably satisfactory condition, and although I am unable to say that the agriculturists of this neighbourhood are such a successful body, the Chamber as they should do, yet I sincerely hope they will see the necessity of joining us. I think all who have farms in this neighbourhood should join the Chamber, in order that our interests may be looked after as they ought to be. We remember very well the story of the old man with the bundle of sticks,—when the bundle was tied together, his sons could not break them, but when they were parted they could be broken by one of them. Now, this is the same principle as the combining of our interests. One plan we must succeed, but if one goes one way, and another the other way, we cannot possibly get on. It is very different to what it used to be; every interest is represented in Parliament, and the agricultural interest must not be behindhand. It is impossible for agricultural members always to have agricultural interests at their finger ends. As a counsel is instructed in a case, so should the members be instructed in the subjects on which they are required to assist. We have had one or two agricultural subjects discussed at our meetings; the first I refer to is the question of Beetroot growth in this country, as regards the production of sugar. Nothing should take the place of Wheat where it is possible for it to be grown; but if we can grow a root which will make another productive import, namely sugar, I think it is quite time we should endeavour to find out the advantages of doing so. I think it has been ascertained within the last year or two that the percentage of sugar in the Beetroot as grown in this country is satisfactory. It has been done in France and Belgium with great success, and why not here? There is another question, and that is the continued growth of corn on clay land by the use of artificial manures. I think we must not keep too much in the old track. I was introduced to a gentleman the other day who took a farm about twelve years ago, and he has been successful, and was a poor man. Many farmers and gentlemen hunting know a similar place not far from here. It is now a

flourishing farm, and it used to be clay land. The gentleman himself told me that it had formerly been very badly farmed; and now what did he do to it? He drained it, and the first year or two put upon it a quantity of farmyard manure, but found it was expensive to make farmyard manure, so he left it off. He then took the horse and a donkey. Since that time, in 1866, the Royal Agricultural Society sent down to obtain a report upon the farm, and their report was adverse to it. They said the crops were certainly there, but could not be continued. We passed another four years, and what has been the result? Each year the farm has increased in produce, and Mr. Prout told me it made more this year than before. He put upon it artificial manures to the extent of £2 per acre. But you say it would have deep cultivation. If then you have in that soil sufficient food for plants by the use of artificial manures to grow corn year after year, it seems to me we ought not to make a puff of it. If it is true of Prout's, why not of other places? As regards both points, I think the Experimental Committee will do well to take small pieces of land, cultivate it with steam, and put upon it certain quantities of manure and grow corn, and in the course of a few years it will be seen whether it is a fact that clay land can produce corn year after year without being injured by it, and if so, it will be an advantage to the landlord, the tenant-farmer, and the agricultural community at large. That is a point which we may laugh at, but I don't see why it should be impossible in one place if done in others. I think that is one of the things this Chamber should take up. With regard to the Beetroot question, I think the best way will be for the farmers to grow perhaps acre or two of the plant, and then when they have the Beet analysed and find what they contain, it will be time to turn round and say to the landlords—build us some manufactory, and we will sell to you the Beetroot we have grown.

2. "The Health of the Tenants."—Sir MICHAEL BEACH: As a landlord myself, I am quite sure it would be difficult to find enough to say in praise of the present tenants. I think that the health of any landlord in any way to get on without them; in fact, the whole system of agriculture in this country depends upon the tenantry. It is very often the fashion to regret the loss of the old English yeomanry, who used to hold their farms of 200 or 300 acres each, and were perhaps a useful lot of men, but I venture to say the present tenantry of England replace them in every particular, and in some points to advantage, because under our present system of land tenure we find some men with as large a capital as their landlords. Men also with considerable knowledge of agriculture are willing to cultivate land belonging to other men to the best possible advantage, thus replacing the miserable plan of small owner-ships, where there is no money to be spent in improving the land, because it is all spent in paying the interest on the mortgage, under which I believe land cannot be properly farmed, and improved as it should be. But under our system there is not only the capital of the tenant employed in proper agricultural improvements, but there is also the capital of the landlord ready to be called upon for more permanent improvements, such as building, draining, and so on. Therefore, in England, we have an amount of capital applied to the cultivation of the soil which I believe is without a parallel in any other country in the world, and it is owing to that fact that the conditions of our climate are such as to give us a more abundant crop, and a better result than any other country can show. This, then, I think we owe to our system of tenantry, and I believe as a class they are not surpassed in patient energy and industry by any other class of men in business. They do not get—at least, so I think—100 per cent. for their money; they are content, as a rule, with slow returns, and I am afraid has been the case this year, but they have a very little interest at all, but nevertheless they go on spending their capital and their energies, and somehow or other we find that the farmer makes a good thing of it in the end. I do not say that every tenant has a great deal of energy, that cannot be said of any class of industry; and I am afraid that one hindrance to agriculture, which has not been mentioned, is that some men will not lay out 1s. when they might have 2s. 6d. returned for it, while others there are who have not the 1s. to lay out. But I believe that the strength of the country is in the tenantry, and I think we may drink their health with every honour this night, for without them I am satisfied agriculture would not be in the position it is at present. I beg to couple with the toast the names of Mr. Edmund Ruck and Mr. Charles Hobbs.

Mr. E. RUCK: I am quite sure I am returning you the thanks of every tenant not only in this room but every one who comes to our market for the handsome money you have received for the toast proposed by Sir Michael Beach. It seems to me there has been a very misunderstanding in this agricultural question—which Sir Michael has tried to bring out, about this 100 per cent. But I do not know how that is to be made at present. I think we must quietly walk up to the question, as our respected chairman has mentioned, either by growing Beet, or by some new mode of farming. I do not mean to say by some unearthy move, but something which will be to the good of the com-

munity at large. I do not know anything equal to Beetroot growing, whether to sell it to the sugar or spirit manufacturers. If we can get the consent of our landlords to be allowed to sell off the Beet we may do well in agriculture after a bit. I am sure that those who believe in the strength in your land you will not walk away with it, and it is to your interest to get good crops, and to do so you leave so much more goodness on the land. But we want to know a system to keep on with from generation to generation; we do not want to leave it, but have it continually. I can say that I have been acquainted with agriculture from my infancy, and I can recollect that I read from a good old book, about 40 years ago, that injudicious agriculturists went on blundering in the footsteps of their ancestors, being in some cases perfectly right, and not knowing why they were so, and in other cases egregiously wrong, without being able to detect their error. Now, I am glad to say that this is not the case at Cirencester, having the College and its professors to assist us; besides, the tenants not being so strictly tied by leases, I believe we have a new era before us, and if we do not yet obtain the 100 per cent., we may have a chance of getting 50 per cent.

Mr. C. HOBBS: I must thank the chairman and the other gentlemen for drinking my health in connection with the toast of the tenant-farmers, and I only wish we had more of them present. As far as my idea goes, I must still stick to the old system—Wheat and Turnips, beef and mutton. (Laughter!)

3. "The Royal Agricultural College."—Major BATHURST: We have most of us watched with interest the career during many years; we have seen it in various stages—seen it, I may say, almost at a painful crisis of its existence; and we may now happily believe that we have every reason for rejoicing that that crisis is passed, and that it has before it a beautiful prospect. Gentlemen, amongst those around us at this table this evening, we see one to whose energy and activity, aided by the talents of the various professors, we may in great part attribute this hopeful change. I beg to propose the toast of the Rev. Mr. Constable.

The Rev. JOHN CONSTABLE said: We are all of us apt to forget in the midst of our work the origin of our success and those to whom we owe so much in life. We are all aware that it is not at every moment we think of the parental care which has been bestowed upon us in our youth, or the labours expended by our tutors, and thus it may be with me and the College. It is only on occasions like the present, when I come into this room and hear my name coupled with the College, that I am forcibly made to remember that it is to you, gentlemen, the agriculturists of Gloucestershire, we are indebted for the origination of the College. As regards myself and the staff, with respect to the encomium passed upon us, I would say we are but the working machinery, each probably fitted for his labours, and feeling yet it is an honour to be told the College is doing its work. I have great pleasure in assuring you that the College is doing good work, not only in this country, but I may say all over the world. Here in this country we have not only a large and increasing number of agents, tenants, and owners occupying or managing land to the extent of nearly one million of acres, but we have colonists in all parts of the globe, who not only were educated at Cirencester, but are glad to acknowledge that their greatest success has accrued from the knowledge they secured at our College. In saying this I would not praise the middle class of the country, but I would credit for all this, if credit there be for our present ever-increasing reputation; we are fully sensible that much of it is due to those who preceded us in our labours. Our fruits we look for in time to come; we cast our bread upon the waters in the hope that it will be found after many days. To you, as interested in our progress, I would find one earnest suggestion, and that is, that you would do something to preserve middle-class education. We saw in the good schools for the preparation of those who join us. You may meet me with the assertion that you did once establish a middle-class school, and that the governors of the College have taken it from you, by removing the Agricultural College, on account of its expense, out of your reach. We are not in a position to dispute this; at the same time we are able to defend it. The College under its old system was a failure. Where, then, is the wrong of saving such an institution, and rendering what was intended to be a class greatly advantageous to another, especially when the Council has had, and continues to have, a regard for the circumstances of the founders, by the establishment of scholarships, the possession of which enables earnest and good students to secure the advantages of the College at a price within the reach of the tenant-farmers of the country? We at the College sadly want better article on which we may expend our labours. Our students are not only to be trained in agriculture as applied science, and when the day comes when the College is filled by students fitted to benefit by pure technical knowledge, the College will have entered on its proper legitimate course, and its career of success must in proportion be great. The remarks of former speakers have led me to this. Have they not pointed out how agriculture is only bursting from its infancy, and how more and more essential it will

become for a sound teaching in technical education? Gentlemen, put your shoulders to the wheel, and establish good middle-class schools for your own and our sakes. My heart is in the work of the College, and therefore I claim indulgence; if I speak too earnestly, I sincerely thank the agriculturists of this district for the very kind way in which they now receive us all, staff and students, opening their farms for our study, joining with us in investigations, encouraging discussion with them, and so impress on the pupils that they are truly students of agriculture, and that we at the College are teaching them that act practically.

4. "The Experimental Committee."—Professor WRIGHT: This is the third session that the Experimental Committee has been at work, and I think most practical farmers will bear me out in saying we have had three rather bad seasons. We commenced in 1868, and being somewhat late in the spring we restricted our endeavours to a few experiments on the root crops, but owing to the extraordinary character of that summer these were almost a failure. In 1869 we again commenced with greater activity instituting experiments on cereals, root crops, and so on. These experiments were fairly successful. We obtained some good results, and these have been published in a form in which they will have reached every agriculturist in the country. In 1870 we repeated our experiments on a still larger scale, and with the advantage of two years' experience. Last year, at our annual meeting, speaking on the same subject, I mentioned that above 100 plots had been tried, I find we have now 206 plots carried out during the present season. Therefore, so far as endeavour is concerned, we have exceeded the efforts of 1869, but with reference to the result the season has been against us. There were seven series of "root" experiments of 12 plots each, but I am afraid that owing to the dryness of the season we shall have no very decided results. Again, as influencing our experiments, I would call your attention to the peculiar character of the past season. We have been congratulated by many leading newspapers upon the favourable weather we have had, but when we look at the average, but this, if the case, was due to very fine weather during the latter portion of the summer. During the spring we had a bad time for wheat. The plant was thin on the ground, and as some of our plots suffered in this way, the results are in some cases of no great value, consequently, although we shall have results this year, they will not be quite up to the mark we should have expected had the season been better. However, I think we should not be discouraged by partial failure owing to causes beyond our control. We have made endeavours to carry out these experiments on a still larger scale, and it would be a pity if a difficult season deter us from carrying out our intentions. Accordingly the Chamber has sent out a circular inviting the co-operation of the agriculturists to enable them to proceed with these experiments, and if we get their help, we shall find that the principles we have hitherto maintained of simultaneous and simultaneous work will be to our favourable result. It is not necessary for me to enlarge on this, but the value of simultaneous results must carry with it the conviction that it is a right principle. We have not only attempted to obtain the help of the agriculturists of the neighbourhood, but also the help of the Royal Agricultural Society, but that society does not see in the efforts of your Chamber a sufficient inducement for giving a small donation. The £100 asked for by Mr. West was for an insignificant purpose, but the amount was not the "rock on which we split," but the notion that the Royal Agricultural Society could not assist the Cirencester Chamber of Agriculture consistently with its charter, consequently we could not have this insignificant sum. However, I think we shall not want for this £100. I say this with greater confidence, because we have many good supporters, and I have pleasure in proposing the health of the donors and subscribers to the Experimental Committee, especially mentioning Sir Cecil Beadon. Although not a land-owner in this neighbourhood, nor even a resident, still he feels so much interest in the movement as to put his name down for a sum which has been very useful to us. I am sure you will drink his health in connection with the donors and subscribers to our committee with very great pleasure.

Farmers' Clubs.

STOWMARKET.

The Breeding and Management of Pigs.—At a recent monthly meeting of this Club Mr. STEARN read a paper on the breeding and management of pigs. Formerly large breeders and graziers thought the pig beneath their notice; but the thing was changing, for he supplied gentlemen in Australia, America, and the Pacific Islands with them. Still he was often both disgusted and surprised to see what a disgraceful lot of pigs was still kept by many large agriculturists as well as small ones, such as, if kept to any extent, would ruin any one, for they ate an enormous quantity of food, and would neither grow nor fatten upon it. He had studied the management of pigs for the last 30 years, and had found that the better the attention paid to them the greater the profit, and if a person wished to make a pig

pay, it must be kept well when young, and not allowed to run 12 months in almost a starving condition.

Speaking of piggeries, he must say he seldom saw a good one. Some were badly ventilated, others low and damp, nine-tenths of the wall, some two centimetres, with no means of altering them both in summer and winter, and many had the cisterns to receive the wash, &c., from the house inside them, which was very bad, the constant stench injuring the health of the animals, and was most unpleasant to those who had to attend to them. But the worst stories were those with wooden floors laid over a pit, which became full of unwholesome rubbish. He had said he was surprised at the pigs kept by many persons; but he did not know if he ought to wonder so very much, when he took into consideration the general construction of places in which they were kept. If there were one corner on the premises worse than another, there the pigsty was placed, and people almost wanted marsh boots to get to it. There was no question that it would be a great boon to the tenant-farmers if landlords would take more interest in providing better buildings for the pigs. It was not the most expensive place that was the best, but what was required was a simple, economical, well situated, and well managed building. Some built of expensive brick and stone, and others of wood, but proved were not so healthy as a boarded building, tiled and slated; it should be reeded and plastered underneath to prevent the heat of the sun penetrating in summer and the cold in winter, with a ventilator at the top made to open and shut. There should be half-doors. The farrowing pen ought to be large, to give the sow plenty of room, and to admit of rails being placed round the side, so fixed as to prevent the sow from attacking the little ones. These rails should be made to shift according to the size of the sow, from 8 to 12 inches high, and extending about 9 inches from the wall, leaving the supports carried out sloping from the rail to the wall, instead of straight from the floor, so as to leave plenty of space for the pigs to pass between the sow and the wall. Since he had used these farrowing rails he had had hundreds of pigs, and had lost scarcely any from being crushed, whilst taking an average of the country nearly half were lost from that cause. Each farrowing pen should be 8 feet by 10 feet, and the best floor was asphalt or concrete. Rails could not be healthy, for if placed close the moisture stands, and the floor becomes saturated, and if a space be left the refuse litter goes between, so that it will become a mass of putrid matter, likely to bring on all kinds of diseases. In cold weather asphalt or concrete was too cold for very young pigs, and he had false lattice floors to lay down. These were taken up when required, and everything swept from underneath. He had the rails attached to a pulley, and fresh littered every morning, for the cleaner a place was kept the better the pigs thrived. The floors were washed down occasionally, and everything ran off, the asphalt or concrete soon drying. Another advantage of such floors was, that they did not take more than two-thirds of the straw required for any other floor, for the moisture seemed to run under the litter without wetting it so much, the floor being laid a little on the slope. The litter from the pens served for the pounds outside, which ought to be packed in some way, to prevent the pigs rooting. A tank should be placed just outside to receive the drainage from the pounds, the building being raised up to take off the rain-water. The manure was thus made regular and good. On the hot days such a piggy was cool and pleasant by opening the lower doors. Lattice slips were put to all the lower doors to prevent the pigs getting out. Whilst pigs were perfectly cool in this model piggy, the herdsman had to go round several times in the day to all the other places with a watering-pot to keep them alive.

In selecting pigs for breeding, great attention should be given to choosing a good breed that would come to early maturity, for that was where the profit was gained, and the better the quality of the breed the less food was required to bring them to that maturity. He considered no other breed so well adapted for most localities as the black and white Suffolks. The improvement took place not before it was wanted, for a worse animal could not be found than the old Suffolk pig, with its long thin snout, large lop ears, arched back, long legs, thin body, coarse bristly hair, thick long straight tail—in fact, with everything to make it a disgusting-looking brute. When he read a paper on "Swine," a few years since he said he did not like black pigs so well as white, but by judicious crossing they have become equal to the white, and he now had scarcely a preference. They were similar in form and symmetry, and both came to early maturity, and fattened to a great weight with a small quantity of food in proportion to that weight. In choosing the boar and sow of the Suffolk breed, the chief points were a rather small head, with wide, heavy chops, short snout, broad deep chest, ears rather small and thin, with the ends sharp and pendulous, pointing a little forward, roundness of rib, shortness of leg, and small feet, long body, the thigh well dropped close to the back, shoulders and hams thick, the neck rising well behind the ears, small bones in proportion to the flesh, broad or straight snout, rising in back, tall small and curved and placed high, hair thin, long, fine, and silky. As much or more attention ought to be given to

the boar as the sow. He preferred sows for breeding to be rather larger than the boar, and good sized animals, they being more likely to have a large number of pigs. He considered 10 or 12 pigs sufficient in the general way to bring up. A sow for breeding should have 10 or 12 pups. He did not recommend breeding very young, but the proper time for the sow to begin was from 10 to 12 months of age, and the piglets from eight to 12 months. It was well to cross as far distant as possible, occasionally, so as to strengthen the constitution. Some time back he purchased sows from two gentlemen, one of whom had bred in, for more than 30 years, and the other for 60. The first farrows they produced with him came out full of ulcers, the legs of most were crooked, with large spavins, and many turned out good for nothing. When wishing to make a cross, his plan was to buy a sow of a different blood, and then to fall back on his original stock, retaining, by this means, the same character without injuring the breed. The time of gestation averaged about 113 days, but old sows were rather longer than young ones. A sow in pig should have full liberty to roam about, and feed on grass in the summer, whilst in winter she should have roots of various kinds, and about three-quarters of a pint of beans per day. At the time of farrowing, the proper plan was to have a lot of straw, and to sow and to her, as it was not wise to lose half, perhaps the whole of the pigs for want of a little attention at the most critical time. He gave only a very small quantity of litter cut short, and he had a hamper placed in the pen with a little straw in the bottom, and lined with an old blanket. A partition about 24 feet high was put across the pen to prevent the sow getting at the hamper as the pigs came out. The pigs were placed in the hamper and kept there till the sow had done farrowing. After that they were put to the sow to suck, and then put back to the hamper. The sow was kept in the warm milk and given her, and the bed was attended to with straw after this, and the pigs were allowed to go to her again after she had finished her meal. He found that it was the cheapest and best plan to give the herdsman 6d. each for all pigs he could bring up to a month old. As to a sow eating her young, the cause was that in some litters the side teeth were much longer and sharper than in others, so that when the pigs began to suck they bit, and scratched the paps, and caused irritation, which sent the sow mad with rage; she threw one one way, and another, and the sow did this over and over again, and the sow that once did this was further use for breeding. His plan to prevent this was to take away the pigs in the hamper, so that the sow could not hear them, and nip off the long teeth with a pair of pincers. When they were put back the sow would be found to be kind to them, and perfectly docile. With his model piggy, he preferred breeding in the winter, as the building could be easily kept warm, and the pigs would get proper care for the first day or night, the cold did not appear to affect them.

Pigs, which were farrowed in January or February, would grow and thrive in the spring and summer, after being kept eight or nine weeks with the sow before being weaned. They were then fit for either breeding, feeding, bullock yard, or anything for which they might be required in the autumn. By this means they could have another litter of pigs in August, instead of October, for when farrowed too late in autumn young pigs would not thrive through the severe weather in winter, and if they were turned as usual into cold yards or open piggeries, they would be worth very little more for their two or three months' keep. Eight weeks in summer and nine in winter will be found a good time for weaning pigs, and he liked to have those which were not saved for breeding operated upon a short time previously. Boars, for stock, he kept confined in a shed with a roomy yard, allowed them plenty of food, and then on any food which was most convenient, such as Vetch or Mangel Wurzels. As to feeding, when the pigs were about three days old, and whilst the sow was feeding, he gave them some new milk, warm from the cow, sweetened with a little sugar. In three or four days he mixed half-skimmed milk and some oatmeal or sharps, leaving out the new milk by degrees, as well as the sugar, replacing them by Indian Corn or Barley, whole. The sow should be fed on mild food for a few days, and then on mild food, and increase the quantity of these as the pigs grow. For a few weeks after the pigs are taken off the sow they cannot be fed too well or too frequently, but care should be taken not to give them too much food at a time. He gave them a variety of meals, as were most convenient, wetted them with cold and scalded with boiling water, and sprinkled it with a little salt. The food was mixed a day in advance, which gave time for slight fermentation. In summer the food was mixed entirely with cold water, and given cold. Between winter and summer the pigs whole Maize, Mangel, and Swedes, cut small, with a little cold or soil occasionally, and he allowed them plenty of clean water. For fattening he gave Wheat, Barley, and Maize meal mixed together in topsoils, water always kept by them, and a little Mangel cut for them occasionally. Washing and brushing was very beneficial. The difference between this and the common method of treatment was most surprising. Store pigs should have their liberty as far as convenient, and

have the range of large yards in winter and of a piece of pasture in summer. Well-bred pigs, properly fed, would always consume the refuse of the farm and dairy. He gave in detail his experiments, made with a view to test the generally-received theories regarding the loss of the tail by young pigs, and said, "I have quite made up my mind it is neither breeding, feeding, cold weather, cold weather, nor eagerly mind which is the cause, nor does it signify whether the pigs are black or white; therefore, I must leave it to some one with a wiser head than I have to solve this mysterious affair."

DISCUSSION.

In answer to questions, Mr. Stearn said he had seen the pen of pigs at the Islington Show, sent by the Rev. Mr. Bailly, of Swindon, a great breeder of Berkshire pigs. There were three of them, and very fine specimens. They had been sent to the Birmingham Show, where they took the first prize, but at Islington they had been put on one side as of "Not sufficient merit." They were not fat enough, and that was the cause of their being rejected.—He made the milk of young pigs pretty sweet, to a pint like milk putting a dessert-spoonful of sugar. He did not like Acorns as pig food at all. He had tried them, and believed he had suffered this summer from the use of Acorns. He had lost several very valuable pigs, only from eating Acorns. He thought he lost them from that cause, because those that ate Acorns died, and those that did not came out all right.

Mr. WOODWARD said that he considered size and length of great importance in breeding sows. He gave the preference, too, to long animals before short ones. Was that Mr. Stearn's practice?

Mr. STEARN: Yes.
Mr. WOODWARD: How about the condition of your breeding sows? I don't care about keeping them too high at the time of farrowing.

Mr. STEARN: No; keep them as low as you can. Bran sows a few days previous to farrowing, and after that the pigs will do much better food. He mentioned of his had tried a lot of old Suffolk pigs, and found, amongst other evils, that they were so wild as almost to destroy the place they were kept in. He then put into the place some that he considered well bred, and they were quiet enough.

H. A. OAKES asked Mr. Stearn the cost of his piggy as shown in the model.

Mr. STEARN said that with Poplar boards it would cost about £25.

Mr. OAKES: Then you don't advocate the use of the brick and mortar? Wood is more generally the tenant's work. If the landlord builds, he expects it to last for 50 or 60 years.

Mr. STEARN: This will last 30 years. (No, no.) My Poplar board building is now ten years old, and I believe it will last that time. It is as good now as when first built.

Mr. OAKES: I believe if all landlords would supply good buildings it would save the tenants great expense. Good lodgings save food, for warmth is equal to food. The better the buildings the easier it is to fat the stock.

Mr. STEARN: As to feeding pigs, I would advise to put the piggy up, instead of tradesmen. It was only asphalted inside. If they went to the timber yard and bought the boards, he did not think it would cost above £30. The aspect of his building was south, and the doors were so arranged that a thorough draught could always be kept out. As to feeding pigs, I would advise to put the piggy up, instead of tradesmen. It was only asphalted inside. If they went to the timber yard and bought the boards, he did not think it would cost above £30. The aspect of his building was south, and the doors were so arranged that a thorough draught could always be kept out.

Mr. WOODWARD: Then you don't begin by giving them Maize.

Mr. STEARN: No, not till they are four days old. Then we begin to give it soaked, as, of course, they cannot eat it without soaking.

Mr. WOODWARD: Will young pigs begin to eat Maize at four days old?

Mr. S. SCOTT: I was about to ask the same question.

Mr. STEARN: Yes.
Mr. HATTEN asked how much salt was given with the meal.

Mr. STEARN said he could not say. He merely threw a handful in the cistern now and then, as the meal was mixed. The pigs seemed to like the food the better for it.

Mr. LINGWOOD said he knew of a case where too much salt had been given, and the pigs died. Salt for pigs was all very well after they were weaned.

Mr. S. SCOTT asked if Mr. Stearn really thought that there was any profit in the rearing pigs for cups. Of course it was very nice, but was there any real profit about it?

Mr. STEARN: I must say I think there is more profit in the breeding and rearing pigs than there is in any other animals. As Mr. Page knew, he had tried almost everything, and he found that nothing paid like pigs. He had a lot of bullocks once, which paid him *ros. 6d.* a week, at a cost of 13s.

Mr. PAGE said no doubt the pig was the most profitable animal they could put on the farm, but unfortunately they had not the attention they ought to have. They had not from himself he knew, and he thought he might answer for almost every one in the room except Mr. Stearn.

Mr. STEARN said it was very important to have a good herdsman.

The CHAIRMAN: Generally the pigs are left too much to boys.

Mr. STEARN: Generally the master does not look at them often a month.

Mr. PAGE said he did not; he confessed that he liked sheep better, because there was some wool. He must say, however, that he had never seen a pig eat whole Maize at four days old. Sometimes he had given them a few Oats, but they could hardly manage them. He should like to

see them crack Indian Corn, for he was quite an advocate for feeding young pigs, but never could get them to eat under ten days.

Mr. FRASER said it was doubtless of the greatest importance that pigs should be kept clean. Mr. Page appeared to question some of Mr. Stearn's propositions, but he could hardly do so, when he said he did not see his pigs once a month.

A vote of thanks was passed to Mr. Stearn.

Notices of Books.

The Milk Journal. No. 1, 1871. 1, Great Winchester Street Buildings, E.C.

This first number for the new year of a "Monthly Review of the Dairy, Dairy Produce, and Poultry Yard" appeared last week; and a very interesting and instructive publication it promises to be. Leading articles "On the Trail of the Milkman," the "Origin and Co-extensive Factories," the "British Dairyman's Association," and "The Supply of Milk," are followed by a "Dietetic and Sanitary Department," in which such subjects as "Rearing Infants by Cow's Milk," the "Disinfection of Milk Utensils," "The Milk in Foot-and-mouth Disease," the "Deterioration of Milk by Feeding Bottles," and the "Treatment of Dropsy by Milk Diet," are discussed. Then come sections on "The Dairy and Dairy Stock," containing many serviceable papers, one by Dr. Ballard, "On some Sanitary Aspects of London Cowsheep," and these are followed by sections on the butter and cheese trades, the "Poultry Yard," and "The Laboratory." Mr. Jenkins' paper "On the American System of Associated Dairies," is of course given in full; and the whole number is an extremely well edited and successful publication. We take an extract or two:—

On Rearing Calves at Hohenheim.—"The rules laid down at this great agricultural college are, that it is best to rear calves entirely by hand, so as to have less trouble with the calf, and to be able to regulate the quality and amount of food must be regulated as follows:—

1st week	daily	12 lb. of milk, 0 lb. of oatmeal, 0 lb. of fine hay.
2d "	"	" 16 " " " " "
3d "	"	" 20 " " " " "
4th "	"	" 24 " " " " "
5th to 7th "	"	" 22 " " " " "
8th "	"	" 24 " " " " "
9th "	"	" 26 " " " " "
10th "	"	" 16 " " " 3 "
11th "	"	" 12 " " " 6 "
12th "	"	" 4 " " " 10 "
13th "	"	" 4 " " " 10 "

In the ninth week the milk is first mixed with water, and a little fine oatmeal. The meal is afterwards mixed with the food. After three months the milk is withheld, and then the young animals receive daily, two and a half pails of milk, or 22 lb. of hay, or its equivalent. But the calves never after receive, even in summer, any dry food till they are nine months old. The average feeding is so divided that the younger portion receive less, the older more, two and a half years, when they begin to receive the regular ration and are ready to eat the grain fodder, as indicated above. The growth with this treatment is so remarkable, that it is only a little surpassed by the rapidly-maturing Shorthorns.

Average weight of heifer calves at 3 months is 333 lb., bulls 353 lb.

"	"	"	6 "	357 "	"	478 "
"	"	"	1 year	1,250 "	"	1,250 "
"	"	"	"	1,180 "	"	1,300 "

Daily increase of a heifer calf is 1½ lb., of a bull calf, 1½ lb.

Arrangement of a Good Cow-shed.—The following is Dr. Ballard's description, somewhat abridged:—"The shed should be airy and well ventilated. Of all the methods of producing warmth of atmosphere, huddling men or animals together in a close space, shut out from access of fresh air, is altogether the worst that can well be devised. Physiology and animal alike, conducted in it, and experience demonstrates that the laws of Nature are not to be disregarded with impunity. If cowkeeping is much longer to be continued in London, and if cows are to continue to be thus crowded, possibly some man wise in his generation may some day devise a more scientific method of warming cowsheds more accordant with common sense. The cubic space allotted to each cow in a shed should never be less than 100 feet, nor ought this to be principally made up by height. Ventilating openings should be provided in the large open space within the shed, the less danger there exists of dangerous draughts. The best sheds I have seen have been satisfactorily ventilated from the roof. 2d. The paving of the shed should be of such a character as to permit of nothing soaking down into the walls below, and such as shall facilitate the flowing off of liquids quickly from the surface, and an entire and perfect cleansing. Hence, whatever the substance used for paving may be, whether asphalt, brick on edge, iron bricks, &c., it ought to be the best of its kind, and laid in the closest and best manner; and an invariable rule should be to place beneath it a foundation of at least 4 inches of good concrete. With me, this is a *sine qua non* of my sanction being given to the licensing of any cow-shed in my own district. 3d. Next to space, ventilation, and surface-paving, comes the question of drainage, and this, too, the former is not less important than the latter. I should say anything, except that the only proper sort of drainage is by pipes with properly trapped gullies, the strainer at which should be fine enough to prevent the entrance of the manure. It is important that the water should frequently have a coating of lime wash given them; but even this will not ensure cleanliness when a wall is near enough to the tail of the cows to become splashed with their droppings. But the most important thing of all is the proper storage and frequent removal of the dung. One common and dirty

practice is particularly objectionable; I mean that of storing the dung in a pit or other receptacle within the four walls of the cow-shed itself. So objectionable is that, where premises are such as will not allow of a receptacle for manure being constructed outside the shed, such premises, in my opinion, ought not to be applied to the uses of cowkeeping at all. And under no circumstances ought the manure to be kept on the premises longer than 24 hours; after the summer, even the keeping of it for this period is apt to generate most offensive effluvia, which are disseminated abundantly at the time when the dung is disturbed for removal. When this is observed, a chemical deodorant, such as Macdougall's powder, ought to be used for the protection of the neighbourhood against nuisance. 4th. In London dairies the grain bin is often the greatest source of public nuisance. I invariably object to its construction in wood. The fact is, as every one connected with cows knows, that unless well pressed down and dry, they undergo an acetous fermentation, and hence the material of the bin should be non-absorbent and the bin itself well drained, the liquid drained off not being permitted to flow, as it is sometimes, over any part of the surface of the yard. 5th. The water supply should be abundant and good—abundant, in order that there may be no want of water for cleaning and flushing; good and wholesome, on account of the health of the animals themselves. I know that the latter is a point little regarded, but analogy and experience both declare that it is one of some importance. It is important, too, that the water should be kept pure and clean, and that the water supply should be so regulated that it is not so long as the wretched custom prevails of diluting the milk sent out. Hence it is that I insist in every case, that the water provided shall be from the main of a public company, and set my face resolutely against superficial wells and underground tanks upon cowkeeper's premises.

Farm Memoranda.

WESTER ROSS: January 3.—The winter is holding on with a severity very similar to that of last year. Although there has been no heavy fall of snow, the frost for some days was particularly intense, and still continues firmly to hold the ground. The change to thaw has been frequent, but so short-continued, that for a whole month the plough has lain idly aside. The average of the year has been very good, and the crop quite unbroken, a large amount of outdoor labour was very satisfactorily accomplished. Although several patches of Wheat still remain to be sown, a large breadth has already been laid down, very little of which has yet come aboveground. For several weeks vegetation has made little or no progress, and now, the snow having disappeared, the country looks as bleak and barren as possible. Wheat is threshing out fully as well as was anticipated, and is quite dry, and fine, and good for grinding. Barley and Oats have scarcely yielded so well as was expected, but Barley has weighed unusually well, some of it so high as 59 lb. and 60 lb. per bushel, and is of pretty good colour. Turnips, after having made considerable progress in the months of October and November, still remain a good way from being a full crop. On all the lighter soils the severe drought told disastrously, while on the deeper and finer soils the crop is about an average. Sheep generally have been thriving satisfactorily until the very severe frost set in, but among some flocks there has been an unusual mortality, so high as one-fifth of the whole. I do not know whether the real cause has been ascertained, but some thought that the mildewed state of the Turnips was sufficient to cause it, while others supposed that it arose from the insufficient supply of milk that the lambs received in spring. There has been a less demand than usual for lambs for sheep-eating, arising from the smaller number of hoggets that came down this season to wintering. Last spring there was so small a supply of food on the hills from the long-continued severity of the weather, that many of the lambs died from sheer starvation. Cattle, where a full supply of fresh Turnips has been supplied, have been doing well, and are fetching unusually high prices. The new year opens on the farmer in the North with less, perhaps, to disquiet him than in the south, but in the receipt of prices both for corn and cattle there is a satisfactory, while the labourer is overtaken by a severe winter, with a scarcity of labour, and with many of his necessities comparatively high.

NORTH RIDING OF YORKSHIRE: December 27, 1870.

—With the thermometer indicating 19° of frost, and the earth clad in a lively of white 6 inches thick, surely the most unenviable grueler could complain of an unreasonable weather. But with the present condition of the farm commissariat, a green Christmas, however unreasonable, would have been much preferable to the severe weather now current, as a low range of temperature and increased consumption of food are inseparable. The frost set in suddenly, but accompanied, fortunately, with a fall of snow, which is safely preserving the young Wheat, and also the Turnips yet left in the fields. Otherwise, in the absence of snow, the results of the late severe weather would have been disastrous.

With half crops of hay and Turnips, and much under average crops of straw, great difficulty is likely to be experienced in tiding over the winter with anything like our usual number of cattle and sheep. The outlay for purchased foods will be large; and in many instances the chaff-cutter and pulper will be added to the list of farm implements, and considered as indispensable where never thought of before.

Our Christmas markets have passed, with fair shows of fat stock and larger shows of moderate beef and mutton—prices varying with quality, but on the whole satisfactory to the feeder. The supply of fat from this district will now be short for some months.

Farm work generally is forward, and the frost is enabling manure cartage to be got on with.

Foot-and-mouth disease lingers in the district. Cases not many, but yet no clean bill of health. W. J. M.

Obituary.

We very sincerely regret to announce the death of LORD WALSHINGHAM, at Thetford Park, on last Saturday morning. A Vice-President of the Royal Agricultural Society during the last ten years, having served as its President in the year 1860, he has for many years and in many other ways testified his interest in English agriculture, its improvement and prosperity; and his death is a very great loss to the many institutions having those objects in view of which he was an active member. Lord Walsingham is known to English farmers chiefly by his constant success as an exhibitor of Southdown sheep. The Merton flock is of very old standing, though its improvement has taken place chiefly during the past 20 years or thereabouts—when a frequent connection was established with that of Abraham. For many years it has been easily successful at all the agricultural shows, whether of fat or breeding stock, almost invariably carrying off the principal prizes in competition with the best flocks of the Southdown breed. Lord Walsingham was a constant attendant at the meetings of the Royal Agricultural Society and the Smithfield Club; and his loss will be sincerely mourned. Since writing the above, we learn from the public prints the deplorable circumstances under which his death has taken place.*

Miscellaneous.

ECONOMY OF FOOD.—M. Dumas is always in earnest for any improvement of diet. He has patronised the use of gelatine obtained from the carcasses of oxen, sheep, and pigs, by hydrochloric acid. The French Institute appears to have reversed the verdict given 30 years ago against the gelatine as proposed by D'Arcet, the only difference being that gelatine is not now prepared by steam, but by the action of acid on animal products, and that a new name is given to the substance. He has also supported a scheme for grinding the whole of the corn, except the exterior coating, and the making of the flour so obtained into bread. But there is so large a quantity of corn and flour at Paris, that the Government, although approving the scientific principles of this new method of grinding corn, declared the suggestion to be useless for the moment. The same answer was given to another suggestion, relating to the roasting of the grain, and the kind of gruel called *soupe romaine*. It appears that this was the diet of the Roman legions, and that the gruel so obtained is very acceptable indeed. A kitchen for public distribution was said to be opened, but Government interfered, thinking, very properly, that it would be good to delay such steps for many weeks. They will use it only if the siege is prolonged until starvation. *Nature*.

TO WEAN PIGS.—The age at which pigs may be weaned to the greatest advantage is when they are about eight or ten weeks old; many, however, wean them as early as six weeks, but they seldom turn out as well. They should not be taken from the sow at once, but gradually weaned. At first they should be removed from her certain number of hours each day, and accustomed to be impelled by hunger to eat from the trough; then they may be turned out for an hour without her, and afterwards shut up, while she is also turned out for herself. Some advise that the whole litter should be weaned at once; this is best, unless one or two of the pigs are much weaker and smaller than the others; in such case, if the sow remains in tolerable condition, the feeble ones might be suffered to suck for a week longer, but this should be the exception, and not the general rule. Pigs are more easily weaned than almost any other animal, because they learn to feed sooner, but attention must, nevertheless, be paid to them, if they are to grow to strong healthy animals. Their sows must be warm, dry, clean, well ventilated, and weather-tight. They should have the run of a grass meadow or enclosure for an hour or two every fine day in spring and summer, or be turned into the farmyard among the cattle in the winter, as fresh air and exercise tend to prevent them from becoming rickety and crooked in the legs. The most nutritious and succulent food that circumstances will permit should be furnished them. Newly-weaned pigs require five or six meals in the 24 hours. In about 10 days one may be omitted; in another week, a second; and in a third week, a third. They should be fed with three regular meals each day. A little sulphur mingled with the food, or a small

* It has transpired that the late Lord Walsingham perished by his own hand. He had locked himself in his room, and the door had to be forced before the sad event was discovered. The cause of death was at first kept private, but it was impossible to avoid the inevitable investigation, and the jury returned a verdict, "That the deceased killed himself while of unsound mind." *Times*, January 5.

End Tees, 19. — Ships at market, 8; sold, 8; at sea, 30.

Price Lists, with full particulars, free on application to
THOMAS GREEN AND SON, Smithfield Iron Works, Leeds; and
 54 and 55, Blackfriars Road, London, S.E.

Horticultural and Window Glass Warehouses.
JAMES MILES, 6, High Street, and 12 and 13, Blount Street, Shoreditch, London, E.
 CONSERVATORY and ORCHARD-HOUSE GLASS.
Genuine White Lead, Oils, Colours, Brushes, &c.
 GARDEN ENGINES, PUMPS, SPRINGS, INDIA-RUBBER
 HOSE, TAPS, CONNECTIONS, &c.
 Prices upon application.

OSLER'S CRYSTAL GLASS CHANDELIERS,
 TABLE GLASS OF ALL KINDS,
 CHANDELIERS IN BRONZE AND ORMOLU.
 Moderator Lamps, and Lamps for India.
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 PATENT TILE WORKS,
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 class of ORNAMENTAL and PLAIN TILES by the most improved
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UPWARDS OF THIRTY YEARS' EXPERIENCE.
 London House: 59, Conduit Street, Regent Street, W.
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WINDOW GLASS, SHEET LEAD, PAINTS, &c.

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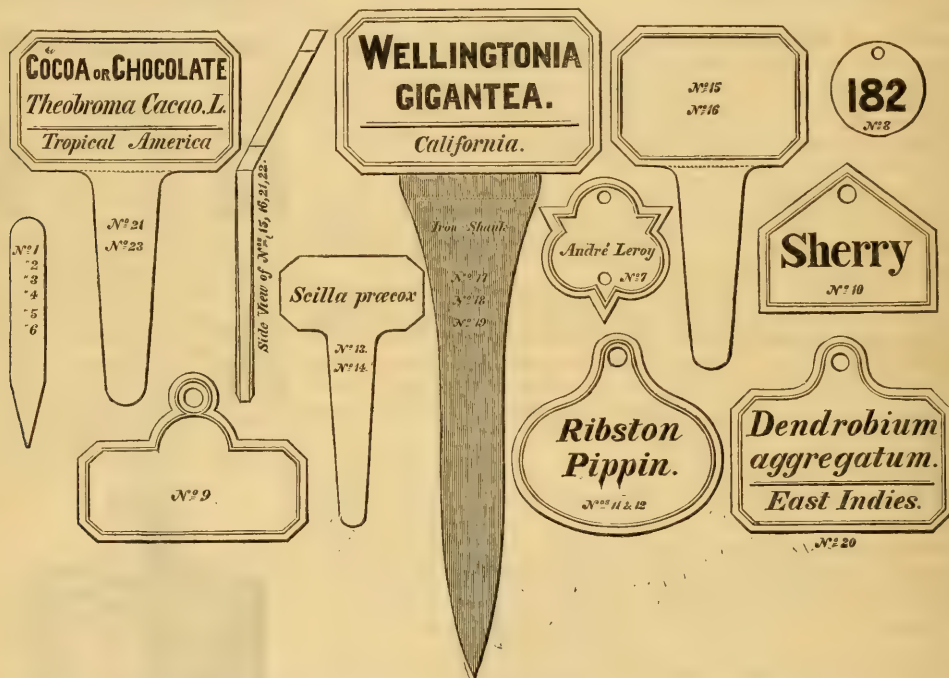
87, BISHOPSGATE STREET WITHOUT, LONDON, E.C.

BY HER MAJESTY'S ROYAL LETTERS PATENT.

TO MEET A WANT WHICH HAS BEEN LONG FELT BY THE HORTICULTURAL PUBLIC,

MAW & CO.'S PATENT IMPERISHABLE TERRA-COTTA PLANT MARKERS

Are offered as a cheap and permanent substitute for WOODEN and ZINC TALLIES for the Labelling of Plants in Pots and in the Open Border, and for suspending to Roses, Orchids, Ferns, Fruit Trees, &c. These Labels, unlike Wood and Zinc, combine perfect durability with a lasting legible inscription, and form an elegant adjunct to the Garden and Conservatory for the naming of Horticultural and Botanical Collections. They are also invaluable for the labelling of Wine Cellars and for general use in situations where other materials are perishable by damp.



Commended by the Editors of the *Gardeners' Chronicle*, and the Floral Committee of the Royal Horticultural Society. (See *Gardeners' Chronicle*, July 11, 1868.)
 Can be procured from the Manufactory, or through any Nurseryman, Seedsman, or Ironmonger.

Specimens sent Post Free on application.

No. 1 3½ by 1 inch.
 No. 2 4½
 No. 3 5½
 No. 4 6
 No. 5 7

No. 6 8 by 1 inch.
 No. 7 21 .. 2 ..
 No. 8 1½ inch diam.
 No. 9 3½ by 2½ ..
 No. 10 2½ .. 2½ ..

No. 11 3½ by 3 inch.
 No. 12 5 .. 4½ ..
 No. 13 2 .. 4 ..
 No. 14 3 .. 5 ..

Can be seen in use at the Royal Gardens, Kew; the Gardens of the Royal Horticultural and Royal Botanic Societies, Battersea Park, the Royal Botanic Garden at Edinburgh; and Botanic Gardens, Glasnevin, near Dublin, &c.

Directions for writing on the Labels with Black-lead Pencil.—Apply a little white-lead paint thinly over the part to be written upon, and whilst wet, write with a hard fine-pointed black-lead pencil. The writing will be perfectly indelible and unaffected by wet immediately the paint is set.

Black Enamel Writing on the Labels.—All the above sizes can be supplied in several colours, ready written upon, with black enamel, having the appearance of jet black ink, but perfectly permanent. On receipt of Lists of Names, Estimates of Cost will be sent for any quantities of Pot or Border Labels, Suspending Labels for Orchids, Roses, Ferns, Fruit Trees, &c. Consecutive Sets of Numerals printed on the Labels, and Labels for Wine Bins, ready written with Enamel, kept in stock.

MAW & CO.'S ENCAUSTIC TILE AND GEOMETRICAL MOSAIC PAVEMENTS and WALL LININGS

FOR CONSERVATORIES, GREENHOUSES, ENTRANCE HALLS, VERANDAHS, DAIRIES, &c.

Printed Patterns of various Designs suitable for the above will be forwarded on application, and Drawings, free of charge, of any of the Designs adapted to the given dimensions of spaces proposed to be Paved, will be supplied, accompanied by estimates of cost, including the expense of laying or otherwise. Applications for Estimates should be accompanied by an exact plan of the space drawn to scale, with all the dimensions marked in figures, and care should be taken that the size and position of all door-entrances and recesses that have to be paved are correctly represented; and when the walls are not exactly parallel, the measurements between the opposite angles, as well as along each wall, should be given.

WHITE GLAZED TILES for DAIRIES, &c.

Address—MAW AND CO., BENTHALL WORKS, BROSELEY, SALOP.

The Telegraph and Railway Station at Ironbridge, on the Severn Valley (Great Western) line is within three minutes' walk of the Works.

RENDLE'S PATENT PORTABLE PLANT PROTECTORS AND GROUND VINERIES.

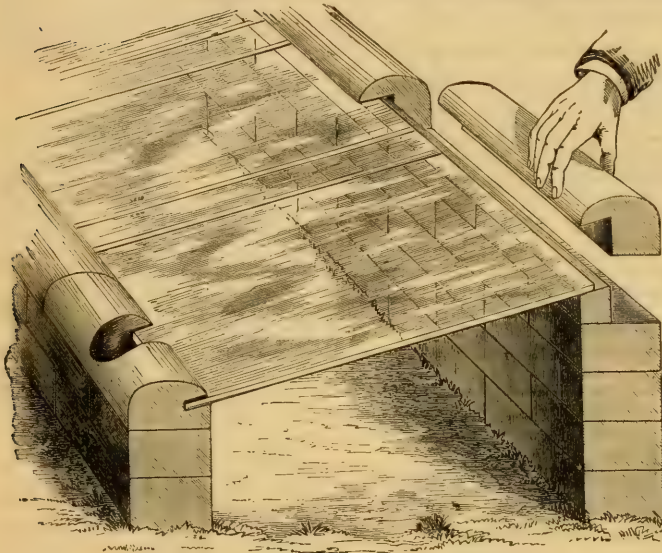
Secured by Her Majesty's Royal Letters Patent (Two Separate and Distinct Patents, 1869 and 1870).

Under the Distinguished Patronage of—

HIS ROYAL HIGHNESS THE PRINCE OF WALES.
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HIS GRACE THE DUKE OF RUTLAND.
HIS GRACE THE DUKE OF SUTHERLAND.

THE MOST NOBLE THE MARCHIONESS OF ANGLESEA.
THE RIGHT HON. THE EARL PORTMAN.
THE RIGHT HON. THE EARL OF STAMFORD AND WARRINGTON
THE RIGHT HON. THE EARL OF PORTSMOUTH, &c., &c.

CAUTION.—Proceedings in Chancery will be immediately commenced against any one infringing these Patents.



RENDLE'S PATENT PORTABLE PLANT PROTECTORS.

This Engraving represents the New Pattern. It will be seen that the top or grooved Brick is formed in two distinct pieces. The Glass rests on the front piece, and the other part can be instantly removed, so that the whole of the Glass can be set free from one end of the Protector to the other in a few minutes.

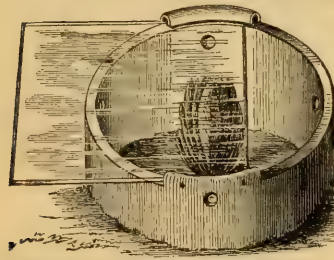
The under Brick is also made with an opening, so that, with the finger, the Glass can be removed or shifted at pleasure.

The Patent Grooved Bricks can be placed on ordinary Kilm Bricks set on the Flat. Full Directions for fixing them: will be sent with each Invoice.

PRICES OF NEW "BELVOIR CASTLE" PATTERN.

NEW TARIFF AND CARRIAGE FREE TERMS.

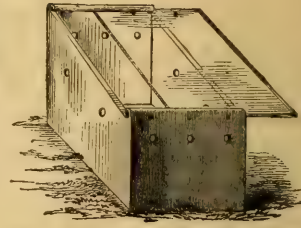
The following Prices are for the Patent Grooved Bricks and the Glass:—



Patent Circular Ventilating Hand-Glass.

GROUND VINERIES AND PLANT PROTECTORS.	For Delivery in London or Bridgewater.	Carriage Paid to any Railway Station within 100 miles of London or Bridgewater.		Carriage Paid to any Railway Station in England and Wales, or Edinburgh, Dublin, Cork, or Belfast.	
		£ s. d.	£ s. d.	£ s. d.	£ s. d.
Ft. in length.					
10 Glass 9 in. wide for	0 12 0	0 14 6	0 17 0		
10 Glass 12 in. wide "	0 14 0	0 17 0	1 0 0		
10 Glass 18 in. wide "	0 16 0	1 0 0	1 3 0		
10 Glass 24 in. wide "	0 18 0	1 2 0	1 7 0		
100 Glass 9 in. wide "	5 0 0	5 10 0	6 10 0		
100 Glass 12 in. wide "	6 0 0	6 10 0	7 10 0		
100 Glass 18 in. wide "	7 0 0	7 10 0	8 10 0		
100 Glass 24 in. wide "	8 10 0	9 0 0	10 0 0		

A Reduction of 10s. per 100 feet will be made if 500 feet be taken at one time.



Patent Square Ventilating Hand-Glass.

PATENT CIRCULAR and SQUARE PROTECTORS or HAND GLASSES.

Patent Circular Hand-Glass.

Diam.	Per doz.—s. d.	Diam.	Per doz.—s. d.
No. 1.—6 in.	8 0	No. 5.—12 in.	20 0
" 2.—8 "	10 0	" 6.—14 "	32 0
" 3.—10 "	12 0	" 7.—16 "	40 0
" 4.—12 "	14 0	" 8.—18 "	48 0

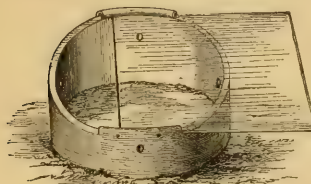
These are most valuable, and will completely supersede the Ordinary Bell-Glasses, Cloches and Hand-Glasses, being so cheap and durable.

Patent Square Ventilating Hand-Glass.

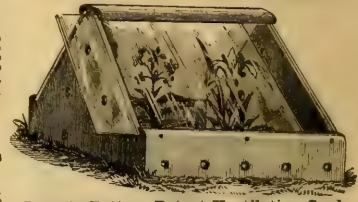
No. 1.—6 by 9, 12s. per dozen.	No. 2.—10 by 14, 30s. per dozen.
No. 3.—12 by 10, 36s. per dozen.	

Rendle's Patent Ventilating Seed Growers and Propagators.

Lean-to Pattern.	Doz.—s. d.	Span-Roof Pattern.	Doz.—s. d.
No. 1.—6 by 9 "	6 0	No. 1.—6 by 9 "	9 0
" 2.—10 " 14 "	15 0	" 2.—10 " 14 "	18 0
" 3.—12 " 10 "	30 0	" 3.—12 " 10 "	48 0



Patent Circular Ventilating Hand-Glass.



Lean-to Pattern Patent Ventilating Seed Grower and Propagator.

THE NEW ILLUSTRATED PRICED CATALOGUE IS NOW READY, AND CAN BE HAD ON APPLICATION, GRATIS.

NEW ILLUSTRATED SERIES OF SHILLING HANDBOOKS.

VINES AND GROUND VINERIES, with 5 Illustrations. One Shilling.—PORTABLE PLANT PROTECTORS, AND HOW TO USE THEM, with 9 Illustrations. One Shilling.—PORTABLE PLANT PROTECTORS, CALENDAR OF OPERATIONS FOR TWELVE MONTHS, with 20 Illustrations. One Shilling.

These Handbooks contain a vast amount of useful information, and can be obtained through any Bookseller at One Shilling each.

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CHOICE SEEDS OF SUPERIOR STOCKS.



MESSRS. VEITCH & SONS

HAVE PLEASURE IN CALLING ATTENTION TO THE FOLLOWING

VALUABLE VARIETIES OF GARDEN SEEDS,

Several of which are now offered for the first time.

Beet, Dell's Crimson.

A very handsome medium-sized variety, of deep red colour and excellent flavour. The foliage, which is of an intensely bronzy purple shade, renders it also very useful for bedding purposes.

Per ounce, 1s. 6d.

Borecole, Veitch's Dwarf Late Curled.

This excellent and very hardy variety, which comes in much later than the ordinary Dwarf Green, is of dwarf habit, and beautifully curled. It stands the coldest seasons uninjured, and we cannot too strongly recommend it.

Per packet, 1s.

Broccoli.

GUARANTEED TRUE.

SNOWS SUPERB WINTER WHITE.

The best winter Broccoli in cultivation. Our stock has been saved with the greatest care, and cannot fail to give satisfaction.

Per packet, 1s. 6d.; per ounce, 5s.

Broccoli, Veitch's Fine Spring White.

A very early and excellent variety, with medium-sized heads, bearing fully white and compact. One of the best to succeed snow's Winter White.

Per packet, 1s. 6d.

Broccoli, Cooling's Matchless.

A very superior selection of the old self-protection Broccoli. The heads are large and white, and it comes into use in April. It was considered by the Committee of the Royal Horticultural Society to be a valuable acquisition, and was awarded a First-class Certificate, April 20, 1870.

Per packet, 2s. 6d.

Brussels Sprouts, Scrymger's Giant.

One of the best varieties in cultivation.

Per ounce, 1s.

Cabbage, Atkins' Matchless.

VEITCH'S IMPROVED.

Perfectly distinct from the sort usually sold as Atkins' Matchless. It is dwarf, of very delicate flavour, turns in quickly, and hearts well.

Per packet, 1s.

Cauliflower, Veitch's Autumn Giant.

This new and extremely valuable late variety is perfectly distinct from any other sort. The leaves are long and tapering, and the habit of the plant is robust, but very upright and compact. The heads are magnificent, beautifully white, large, firm, and compact, and being thoroughly protected by the foliage, remain longer fit for use than any other sort.

If sown in April it will succeed the Walcheren, and coming in between that variety and Snow's Winter Broccoli, is a great acquisition to all gardens. It was awarded a First-class Certificate by the Royal Horticultural Society, November 2, 1870, and we cannot too strongly recommend it. See Testimonials in *Gardeners' Chronicle* of December 24, 1870, p. 1792, and December 31, p. 1734.

Per packet, 2s. 6d.

Celery, Veitch's Silver White.

A variety of excellent flavour, beautifully solid and crisp, of medium growth and very hardy, withstanding the wet when other varieties have perished.

Per packet, 1s.

Celery, Sandringham Dwarf White.

Very dwarf, crisp and solid, juicy, and of excellent flavour. One of the best white varieties.

Per packet, 1s.

Cucumber, Sooly Qua.

NEW CHINESE VARIETY.

This remarkable vegetable, which created such a sensation when shown at the Royal Horticultural Society's Meeting on June 8, 1870, is wonderful alike for the immense size of its fruits, its large dark green glossy leaves, and the beauty of its flowers. In China it is used as the natives as a regular article of food, boiled with rice, or cooked in various ways, and is also much enjoyed by Europeans residing there. The fruit is of rapid growth, attaining in this country a length of 5 to 6 feet and a circumference of 12 to 16 inches, and it is used in the green state just when attaining its full size.

Per seed, 3s. 6d.

ALL OTHER NOVELTIES AT ADVERTISED PRICES.

Cucumber, Telegraph (Rollisson's).

This well-known variety is without doubt one of the best Cucumbers in cultivation, being equally suitable for summer or winter cultivation. Our stock is true and very fine.

Per packet, 1s. 6d.

Lettuce, Hicks' Hardy White Cos.

A splendid variety, very hardy, large, and crisp; stands a long time, and is well adapted for either spring or autumn sowing; strongly recommended.

Per ounce, 1s. 6d.

Melon, Colston Bassett Seeding.

A beautiful netted yellow-skinned variety, of very handsome shape and medium size, averaging about 3 lb. in weight; the flesh is almost white, of delicious flavour, exceedingly tender, and melting; the plant is of good constitution and a very free bearer. It was awarded the First Prize at the Royal Botanic Society's Exhibition in July last.

Per packet, 2s. 6d.

Melon, Queen Emma.

A remarkably handsome fine-flavoured variety, obtained from the Heckfield Hybrid Melon, crossed with Meredith's Cashmere. The flesh is almost white, exceedingly melting and juicy, and with a very thin rind. Its constitution is excellent, and it will be found a very desirable variety, whether for exhibition or dessert.

Per packet, 1s. 6d.

Peas.

EASTES' KEN FISH INVICTA	..	per quart,	2s. 6d.
LANTON'S ALPHA	..	"	6 0
" QUANTITY	..	"	5 0
" SUPREME	..	"	5 0
MACLEAN'S "BEST OF ALL"	..	"	5 0

Onion, Giant Rocca.

A splendid variety, of delicate flavour, large globular shape, and light brown skin. It was awarded a Special Certificate by the Royal Horticultural Society, December 21, 1869. Weight of the bulb exhibited, 3 lb. 9 oz.

Per oz., 1s.

Tomato, Hepper's Goliath.

A very large red variety, raised by Mr. Hepper, Gardener, The Elms, Acton, who has placed the entire stock in our hands for distribution. It was exhibited at the Royal Horticultural Society's Meeting, October 5, 1870, when it was awarded a Special Certificate, being the only Tomato which received a Certificate on that occasion. The fruit is considerably more than double the size of any other sort, frequently being upwards of 10 lb. weight.

Per packet, 1s. 6d.

Turnip, Veitch's Red Globe.

This excellent variety should be grown in every garden. It is far superior to the Red Amsterdam Stone, both in flavour and shape, and has the additional very great advantage of remaining a long time fit for use.

Per oz., 6d.; per pint, 3s. 6d.

Potatoes.

VEITCH'S IMPROVED EARLY ASHLEAF KIDNEY.—We desire again to direct attention to this excellent variety, respecting which we have received many very flattering testimonials during the past summer. It is quite distinct from every other sort, and may be fairly described as the best Ashleaf Kidney in cultivation, being a very heavy cropper, of excellent quality, and a first-rate forcer.

Per peck, 5s.

RED-SKINNED FLOURBALL, per peck, 5s.; per bushel, 18s.

AMERICAN VARIETIES.

EARLY GOODRICH, per peck, 5s.; per bushel, 18s.

ROSE, 5s. per peck; per bushel, 18s.

BRESEE'S PROLIFIC, 1s. 3d. per lb.; 7 lb. for 8s.

KING OF THE EARLIES, 1s. 3d. per lb.; 7 lb. for 8s.

Notice.
EXOTIC and VAUXHALL NURSERIES, CANTERBURY.
MR. MASTERS begs to announce that he has found it necessary to have additional assistance in the conduct of his business. He has therefore taken into PARTNERSHIP with him Mr. J. W. KINMONT, who was for many years Gardener and Steward to the late Archbishop of London. The Nursery and Seed Business, conducted by Mr. Masters for so long a period, will, for the future, be carried on by him, in conjunction with Mr. KINMONT, under the style of "MASTERS and KINMONT."

Messrs. MASTERS and KINMONT have to offer a large and varied collection of STOVE and GREENHOUSE PLANTS, EXOTIC and HARDY FERNS, ORCHIDS, &c. They also beg to call the attention to their clean grown and healthy stock of FRUIT TREES, including trained Peaches, Nectarines, Apricots, Cherries, and Plums, Standard, Pyramidal, and trained Fears and Apples, &c. Their general Nursery Stock of EVERGREEN and DECIDUOUS TREES and SHRUBS, including large Specimens for immediate effect, is large and unusually varied. ROSES, FOREST TREES, HERBACEOUS and ALPINE PLANTS, are offered on the most reasonable terms. Special prices to the Trade on application.

From their large experience in such matters, Messrs. MASTERS and KINMONT are prepared to undertake the LAYING-OUT and PLANTING GARDENS and PLEASURE GROUNDS! SEEDS and every GARDEN FERTILIZER supplied. Experienced and trustworthy GARDENERS recommended.

HENRY CLARK, late Gardener to Earl Cowper, begs to inform his Friends and the Public that he has succeeded to the NURSERY and SEED BUSINESS of JAMES S. WALTERS, the Wing Nurseries, Uppingham, and hopes, by care in the selection of the best stocks, and punctual attention to all orders entrusted to him, to merit the patronage of his numerous customers. A CATALOGUE of SEEDS, ROSES, FRUIT and FOREST TREES, EVERGREEN and DECIDUOUS SHRUBS, CONIFERS, &c., may be had on application.

Wing Nursery, Uppingham—January, 1871.

Vegetable, Agricultural, and Flower Seeds, MISCELLANEOUS PLANTS, SUITABLE for BEDDING and

ROBERT PARKER begs to announce that his CATALOGUE, containing Descriptive Lists of the finest known in cultivation of the above-named is now published, and will be forwarded to applicants. The stocks of seeds have all been procured from the best possible sources; all are warranted genuine, and are at the lowest possible prices. *Particulars of the seeds and plants are requested to compare the prices with those of other houses.*

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The Most Desirable Plant of the Season. PARSONS' NEW WHITE MIGNONETTE, RESEDA ODOKATA EXIMEA. See previous Advertisement

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As a very WHITE FOLIAGED plant, that will grow freely in any common border, and when once planted will take care of itself, being perfectly hardy, we believe that this plant will gain universal favour. It forms dense compact rosettes, in the style of *Centaurea candidissima*, 3 or 4 inches high, and 4 to 6 inches across, retaining their whiteness throughout the year. The beauty and rarity of this species have drawn forth almost rapturous descriptions from the few travellers who have reached its alpine fastnesses. We have proved it for the past two winters, and recommend it with the utmost confidence as one of the most valuable hardy plants that it has ever been our good fortune to introduce. First-class Certificate Royal Horticultural Society.

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The Snowdrop itself scarcely surpasses the whiteness of the blossoms of this plant, which, as an ornament for greenhouses, blooming profusely during the autumn and winter months, is really charming. The habit is very dwarf and compact, with neat foliage, and flowers nearly an inch across. Introduced by us from Natal, and figured in the "Botanical Magazine" for 1866, tab. 5593.

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Which is about 10 days earlier than *Champion* of England, splendid flavour, and very heavy cropper. Individual Peas very large, and of a beautiful dark green colour; pods long, and well filled from end to end.

Height, 4 feet. Price, 2s. 6d. per Quart.

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From Mr. W. CARMICHAEL, *Gardener to H.R.H. the Prince of Wales, Sandringham, December 29, 1870.*

"Your new 'Australian Pea' is a first-rate one, a decided improvement on *Pristaker*, and a great bearer. I know of no sort which bears such a beautiful green colour. I will grow it largely for the Royal table."

From Mr. JAMES M. MCINTOSH (*late Gardener to His Grace the Duke of Buccleugh, Drumlanrig Castle, Eden Cottage, September 30, 1870.*)

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Begs to announce that he has just received, in excellent condition, the two following magnificent LILIES, which are the first that have been imported into this country from their native habitats in California.

LILIUM WASHINGTONIANUM.—A superbly beautiful species, from Nevada, growing about five feet high, and producing a long panicle of from 15 to 20 flowers, which have long tubes and widely expanded mouths, pure white, shading off to lilac, deliciously fragrant. Good bulbs.

Price 1 guinea each.

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MR. WILLIAM BULL also begs to announce that he can supply good bulbs of the following NEW LILIES from Japan:—

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Price 1 guinea each.

LILIUM TIGRINUM SPLENDENS.—This magnificent Lily is of exceedingly robust growth, the stem clothed with compact lanceolate foliage, the flowers, which are of beautiful form, are of a bright orange-scarlet colour, thickly studded with large dark brown spots, which are superior to any other variety in its class, and is a profuse bloomer, producing as many as four dozen flowers on a stem. It was awarded a First-class Certificate by the Floral Committee of the Royal Horticultural Society.

Price 10s. 6d. each.

LILIUM THUNBERGIANUM BICOLOR.—A handsome hardy Lily, growing about 1 foot high, with erect flowers, which measure about 5 inches in expansion, and have the tips of the segments recurved; the sepals divisions of the perianth are all of a bright orange-red, with a distinct flame of orange up the centre of each, and KNIVES, PROTECTING MATERIALS, HORTICULTURAL MANURES, &c., &c. It has received a Certificate from the Royal Botanic Society.

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NOW BEING SENT OUT BY

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This variety is very rare, and by far the handsomest
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The colour of the fruit is a true Pompeian scarlet,
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The *Gardeners' Chronicle*, p. 1871 (1870), concludes a
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BRESEE'S KING of the EARLIES, or FIFTY-DOLLAR POTATO.—Imported seed from America. Described as, exceedingly early, and of very choice quality. Price, per lb., 1s. 3d.; 7lb. for 8s.

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AMERICAN EARLY ROSE POTATO.—For a combination of productiveness and fineness of quality, we believe this variety is without a rival. Price, per lb., 1s. 6d.; per peck, 7s. 6d.

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N.B. As many complaints are received from Customers of the non-delivery of their Vade-Mecum, J. C. & Co. will be pleased to forward duplicate copies in all such cases on application.

Free per Cent. Discount for Cash.

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Orders executed with despatch and in rotation.

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As proved by public and private trials in various parts of the United Kingdom.

Decision of the Royal Horticultural Society, London.
"The Earliest Form of all Ringleaders. Several of the Peas blossomed at the same time, but Ringleader was fit to gather first."
From Mr. H. BEAMS, Gardener to Sir Charles Pressly, Fife Hill.—May 25.

"I gathered to-day a good dish of your far-famed Ringleader Pea. I have grown it now three seasons in succession, and never began gathering later than May 21."
From Capt. C. W. FORD, Keston Lodge, Keston.—May 25, 1869.
"I sowed your Ringleader Pea on January 21, and picked the first dish to-day, this being much earlier than I have ever done with any other Pea."
From Mr. W. H. EAMES, Gardener to Major Boys, The Oaks, Deal, Kent.—December 1869.

"Your Ringleader Pea is still the earliest in cultivation, and the best for first crop. I planted them out in the spring and gathered from them on May 21, saved some of the seed, and planted again on August 20, and gathered from them from the middle of October till November 4."

From Mr. J. NEW, Gardener to Mrs. Nuce, South End, Croydon.—January 20, 1870.

"Your Ringleader Pea is the most productive early Pea I have ever grown; over three bushels high, and covered with pods."

Price 1s. 6d. per quart.

SUTTONS' Ringleader Pea is included in all Messrs. SUTTONS' Collections of Vegetable Seeds.

EXCELLENCE and ECONOMY COMBINED

SUTTONS' £1 1s. COMPLETE COLLECTION

of CHOICE VEGETABLE SEEDS for a SMALL GARDEN contains—

- PEAS, the best, 6 quarts for succession, including Suttons' Ringleader.
BEANS, 2 quarts, including Suttons' Improved Windsor.
FRENCH BEANS, ½ pint, best kinds.
BEEF, 1 pkt., Suttons' dark Red.
BROCCOLI, 4 pkts., best, for succession.
CABBAGE, 5 pkts., best, for succession.
SAYOY CABBAGE, 3 pkts., ditto.
CARROT, 3 oz., best sorts.
CAULIFLOWER, 1 pkt., Early London.
CELERY, 3 pkts., best, Red and White.
CUCUMBER, 1 pkt.
CORN TRONCHUDA, 1 pkt.

From RICHARD STRIDE, Esq., Shirley Warren, Southampton
"I cannot speak too highly of the collection of seeds you sent me, and my Gardener is equally pleased."

Messrs. SUTTONS' Collections are made up to suit the convenience of those unacquainted with the sorts and quantities required for the various sized Gardens. For those who prefer making their own selections at very moderate prices, full particulars of choice VEGETABLE and FLOWER SEEDS will be found in SUTTONS' AMATEUR'S GUIDE, price 1s., gratis to Customers; or SUTTONS' ABRIDGED SEED LIST, Gratis and Post Free on application.

THE HEAVIEST CROPPING POTATO

and the best cooking Potato in cultivation is



SUTTONS' RED-SKIN FLOURBALL.

This extraordinary Potato, NENT OUT LAST SEASON by US, has given the most complete satisfaction. It has the peculiar merit of producing tubers all of uniform size, which are very large. While most other red varieties boil yellow, this is white, of particularly fine flavour, and is most correctly described as "Flourball."

DESCRIPTIVE LIST of other choice kinds may be had on application.

SUTTON AND SONS, SEEDSMEN TO THE QUEEN, READING.

BENJAMIN S. WILLIAMS' GENERAL and NEW PLANT CATALOGUE for 1870, not free on application, contains Lists of Orchids, Palms, Tree Ferns, Stove and Greenhouse Ferns, Hardy Ferns, Climbing Ferns, &c.; Dracenas, Agaves, Yuccas, &c.; Ananas and Canebanes, Canebanes, Cape Hedges, Beaucarnes, Dasyliques, &c.; and also contains a list of the numerous COLLECTION of PLANTS, which at all times will supply a variety. Conservatories furnished, and Choice Plants repaid for Bally or Dinner-table Decoration.

Victoria and Paradise Nurseries, Upper Holloway, London, N.

Russell's Pyramid Primula.
GEORGE CLARKE has this season secured a quantity of this very fine strain, in excellent condition, which he recommends, feeling assured that no other possessors such a robust character, with really splendid flowers. Aged, Red and white, &c.; 2s. 6d. per pkt. Instructions for raising and growing sent if required. Nurseries: Strathdown Place, Brighton Hill, London, S.W.; and Nottingham, Kent, E.

Choice Hardy Scarlet and other Rhododendrons.
JOHN WATERER and SONS have the pleasure of announcing that their CATALOGUE of the above plants, as exhibited at the Royal Botanic Gardens, Regent's Park, is now published, and will be forwarded to applicants. It faithfully describes the colours of the Rhododendrons, and also contains selections of the most approved CONFERS, with heights and prices, and as the leading EVERGREENS and ROSES.

The American Nursery, Bagshot, Surrey.

Special Offer of large Evergreens, &c.

WM. KNIGHT begs to call the attention of the Nobility and Gentry to a few thousands of fine specimens of the following:—
LAURUSTINUS, 5 to 6 feet. PHILLYREAS, 6 to 8 feet.
PORTUGAL LAUREL, 10 to 12 feet. COMMON LAUREL, 10 to 15 ft.
VARIETIES OF HOLLIES, 4 to 7 feet.
RHODODENDRONS, 3 to 5 feet, thickly set with buds.

The above have recently been transplanted, are very bushy handsome plants, and quite sale. Price per dozen or hundred on application.

Planting Season.—Knowled Nurseries, Carlisle.

Messrs. LITTLE and BALLANTYNE, NURSERYMEN and SEEDSMEN, Carlisle, beg leave to request the attention of the Nobility and Gentry to their STOCK of FOREST and ORNAMENTAL TREES, SHRUBS, &c.; and Gentlemen intending to Plant their Parks and Pleasure Grounds, to inspect the Plants at their Nurseries, which they will find well grown and very suitable for exposed situations.

L & B are prepared to undertake the Laying-out and Planting of New Gardens, Parks, and Pleasure Grounds to any extent.

The large Catalogue of the above plants, which is sold and Dwarf ROSES, will be found to include all the best varieties.

Planting Season.

TO BE SOLD, cheap, the ground being required for other purposes, 6 acres of RHOODENDRONS, from 3 feet high, bushy hybrids, well set with buds, the finest lot in England; AZALEAS, strong and bushy, well set with buds; POPLARS, in variety, 2 to 12 feet; NISPERICE, 10 to 12 feet; CHESTNUTS, SYCAMORE, NORWAY MAPLE, 2 to 8 feet; COMMON LAUREL, 10 to 12 feet, bushy hybrids; Forest Trees, Shrubs, &c. Best show GOSSEBERRIES in variety.

E. WHITMAN, The Nurseries, Reddish, near Stockport.

DICKSONS and CO., NURSERYMEN and SEEDSMEN, 1, Waterloo Place, Edinburgh, beg to call the attention of those about to plant to their very large and healthy Stock of FOREST TREES, FRUIT TREES, NISPERICE, &c.; and also of their choice, which are now in fine condition for Transplanting. They are growing, and are exposed, rooted and planted, and are of the highest quality. Samples and Catalogues on application. Special prices will be quoted when large quantities are ordered.

Forest Trees, Ornamental Trees, and Shrubs.

PETER LAWSON and SON have to intimate that CATALOGUES for the present season may be had upon application.

The stock of Seedling and Transplanted LARCHES, SCOTS FIRS, and other FOREST TREES is both unusually extensive and superior in quality. When persons inspection is not convenient, samples and special offers will be sent if required.

Edinburgh and London (50, Budge Row, Cannon Street, E.C.)

The Gardeners' Chronicle

SATURDAY, JANUARY 14, 1871.

MEETINGS FOR THE ENSUING WEEK.

WEDNESDAY, Jan. 18. (Royal Horticultural (Fruit and Flower) Committee) S. Kensington .. 11 A.M.
Ditto (Scientific Committee) .. 1 30 P.M.
Ditto (General Meeting) .. 8 P.M.
THURSDAY, Jan. 19. Lincoln .. 8 P.M.

ALTHOUGH the past year was one of the most abundant in regard to FRUIT CROPS, it was not so remarkable for the appearance of particular acquisitions as several of its predecessors; still the march has been onward, and some good progress has been achieved. In gardening there is no standstill. In other countries near and dear to us, whence many of our new fruits are derived, the march of horticulture has been sadly backward, and the losses which will be sustained through the calamitous war can hardly be estimated. Beginning with Grapes, the most kindly fruit of our gardens, and in the culture of which British gardeners so much excel, we have at home, something worth chronicling—not such startling productions, perhaps, as the Madresfield Castle and Golden Champion, which, especially the former, have so well sustained their reputation, but still extremely useful sorts. Mr. PEARSON is now to give us that long looked-for white companion to the Black Hamburg in his Chilwell White—a hybrid from the Frankenthal, and like it in character. We must also again note that wonderful innovation amongst Grapes, Mr. PEARSON'S "F. de Lesseps." From Mr. PAUL, of Waltham Cross, we are promised a fine late white variety in his Waltham Cross—a true cross and very distinct, the bunch and berries being large, of a beautiful amber colour, and in shape like the Black Morocco; Mr. STANDISH gives us his Citronelle Muscat, and Messrs. LUCOMBE & Co. a Golden Mrs. Pince—all being desirable sorts. In Peaches, although the fruit was never so abundant, we

have to add only one to the list—The Lady, a Frogmore seedling, pure and white of flesh, and of delicate texture and good quality. In Plums Mr. DRY gives us Duke of Edinburgh, a worthy brother to the Prince of Wales—not unlike it in appearance, but of higher quality. In Cherries we have the "Burgley Park Seedling," another reproduction of that excellent variety, Reine Hortense. Pears have come out strongly during the past season. We have in the first place a sterling addition in the Brockworth Park, from Messrs. WHEELER, of Gloucester (see our figure, p. 1603, 1870). This is large and fine, coming into season during the end of September. In appearance it somewhat resembles a pale Louise Bonne of Jersey, with the texture of a Marie Louise. Another valuable variety will be found in Mr. ESSINGTON's "Autumn Josephine," an exact counterpart of Josephine de Malines, but suitable for use in autumn. There is, again, Maud Hogg, a fine Sussex seedling for December, and Cassante du Comice. Of Apples there is not so much to be told. We may just notice an old Irish seedling—the Ecliville Seedling, which, although long famous in Ireland as a large and beautiful early sauce Apple, is scarcely known in this country. It makes us fancy that there are many more good things in that lovely land still unappreciated. Our attention has also been called to another beautiful Apple, called the Beauty of Hants, but which has a very striking resemblance to Blenheim Orange. Another nice little dessert fruit will be found in the American Golden Russet.

Among Figs, long much neglected, but latterly coming into notice, we have this year some sterling additions. The Royal Vineyard is a variety of very high quality, partaking somewhat of the character of Lee's Perpetual. In Grosse Monstreue de Lipari we have another fine addition, suitable for cultivation in the open air; while Monaco Bianco is a pale green-skinned sort and Dr. HOGG's Black, a fine dark-skinned variety of excellent quality. New Strawberries have been plentiful as usual, and some promising varieties have been added. Mr. WM. PAUL gives us Waltham Seedling, an improvement on Sir C. Napier. Mr. BRADLEY, the raiser of Dr. Togg, Oscar, &c., gives us Amateur, a very large and prolific sort. From Mr. FOOTMAN comes Royalty, and from Edinburgh a famous market sort, Duke of Edinburgh. Dr. NICAISE presents us with a batch of some half-a-dozen very large sorts, which, if we may judge from the figures and descriptions (see p. 1135, 1869), must be grand. In Melons there has not been such a host of so-called novelties as usual. We have Colston Bassett Seedling, an excellent sort, and the old Victory of Bath, which is one of the best of all, re-introduced to us. Of Gooseberries, Dr. HOGG gives us a selected list of sterling Scotch dessert sorts, which will prove valuable.

Passing on to VEGETABLES, we have still something to record, although it is not here that we look for absolute novelty—vegetables being more sustained in quality, and improved rather by selection than otherwise. Of Peas, we must again call attention to Mr. LAXTON's William the First, which will this year be introduced to the public. It is a blue, wrinkled marrow, as early as Daniel O'Rourke, and a great acquisition. There are also Laxton's Quality and Laxton's Quantity, two good wrinkled hybrids, and the Kentish Invicta, and Maclean's Best of All. In Broccoli we have the addition of Cooling's Matchless, a splendid late spring variety; and in Cauliflowers, Veitch's Autumn Giant for late autumnal use, and very grand in point of size and appearance. In Beets, we have the new Red Egyptian, a Turnip-rooted variety; and in Celery, a splendid addition in Clarke's Hybrid Red, producing heads of the finest quality. This is one of Major CLARKE's triumphs. In Borecoles, Mr. MELVILLE introduces to us his Hybrid Imperial Scotch Greens, a perpetual variety, which may be cut down and sprung from like any ordinary shrub; the heads produced are close and firm. In Parsley we have a good article—Carter's Covent Garden Garnishing; and even in Mustards we are promised a new Chinese Mustard. Of Onions, we have a splendid introduction in the Early White Naples, producing bulbs several pounds in weight, and most beautifully solid and white; and also the Giant White Tripoli, another fine variety. In Potatoes, there are many claimants for notice—more than we can allude to. We would just notice the

Red-skinned Flourball as an extraordinary cropper, the East Somersetshire Champion, the Rector of Woodstock, Brese's Peers, &c. In Tomatoes we have two claimants, Hepper's Giant and Trophy, both exceedingly large, and very similar the one to the other. In Cucumbers we have fine additions in Cox's Volunter, Dean's Hybrid, and Heatherside Rival, the latter especially being about as perfect as a Cucumber can well be; and in addition to all this, Messrs. VEITCH are to give us a new Chinese Cucumber, the Sooly Qua, producing fruits some 5 to 6 feet long and 18 inches in circumference. The Chinese are said to eat this huge thing, when boiled in the green state, with Rice, &c., and to relish it immensely. The progress, then, of 1870, in fruits and vegetables, is on the whole gratifying and satisfactory.

The question of the superintendence of the CHISWICK GARDENS, referred to in the subjoined communication from one of the foremost gardeners in the three kingdoms—we need not indicate which—is one which we regard as of so much importance at the present moment, and in the present condition of the Society, that we give it this prominent position, believing that the sentiment therein expressed will find an echo in the heart of every true gardener, and of every one who takes interest in the progress of horticulture. Our correspondent writes:—

"Chiswick doomed at last!" Such are the words I have heard among my gardening friends for some weeks past. I fear Chiswick was threatened in the same way. At that time there was a feebleness about the garden that made some change desirable—if not necessary. The change of Superintendent at this time is quite a disturbing element as regards the public value of Chiswick garden. Mr. BARRON has by a steady application of means, and by rigid economy, raised the character of Chiswick garden, and in a large degree restored its historical dignity as a great centre of information and horticultural interest. I know Chiswick well, and much of its history, and have closely observed the general interest that has grown up with Mr. A. E. BARRON's connection with the garden; and with many others who delight in the well-being of dear old Chiswick, I look anxiously for some public explanation on the part of the Council of the severance of the tie which binds them and the present Superintendent together. There are but very few men of sufficient qualification that would undertake the management of Chiswick Garden. Those who have seen the keen and superior interest Mr. BARRON takes in everything connected with the dignity of Chiswick and its devotedness to duty, must feel that he could not wish to leave but for some substantial disturbance. If it is a question of wages, let the Council of the Royal Horticultural Society settle it as men of business, and show themselves worthy trustees of the horticultural interest of England." *Phœnix.*

—We are informed that the ROYAL ALBERT HALL OF ARTS AND SCIENCES at Kensington, will be opened by HER MAJESTY, on Wednesday, March 29.

—We may remind those who are interested in the MEETINGS of the ROYAL HORTICULTURAL SOCIETY at South Kensington, that the season of 1871 commences on Wednesday next, the 18th inst., when one of the smaller winter meetings will take place, and the several Committees will assemble for the first time since their reformation for the present year. The prizes, independent of novelties, will be for Ivies and Conifers, and for kitchen Apples and Pears. We shall take an early opportunity to discuss the arrangements of the prize schedule, which has been already issued; and in respect of the Committees we notice that very little change in their constitution has been made from that of last year.

—We learn that Mr. WILLIAM ROBINSON has lately returned from America, bringing with him a large collection of preserved fruits, vegetables, and other products of Utah territory, as well as an assortment of improved American garden tools. It is Mr. ROBINSON's intention to exhibit some of these at the meeting of the Royal Horticultural Society on Wednesday next.

—We are requested to announce that the anniversary DINNER of the HORTICULTURAL CLUB will take place on Wednesday next, Jan. 18, at Anderson's Hotel, Fleet Street, at 5.30 P.M., under the presidency of Dr. MAXWELL T. MASTERS, F.R.S.

The stewards of the horticultural department of the meeting of the BATH and WEST OF ENGLAND SOCIETY, to be held at Guildford from May 29 to June 2 next ensuing, have ventured on an innovation. A circular now before us states that, "in order to obviate the objections so often made to the system of exhibiting plants in competition for money prizes, it has been determined to give sums of money, in proportion to the importance and value of the plants exhibited, as gratuities to exhibitors' gardeners, and also to enable them to pay the expenses of transit, cost of lodging, board, &c., during the exhibition." Gardeners will have to look after their own plants, which will be exhibited in a tent closed with glass ends. Any further information may be obtained from the stewards, the

Rev. T. PHILLIPOTS, Porthgwillden, Truro; or of the Hon. and Rev. J. T. BOSCAWEN, Lammoran, Probus, Cornwall.

—We have received a manifesto, treating of things in general, from the BITTERNE and WEST END (SOUTHAMPTON) GARDENERS' MUTUAL IMPROVEMENT SOCIETY, and from which it appears that in the main the special affairs of the Society are fairly prosperous. Our sympathies are entirely with such societies when well managed, as we believe this one is, and we should be glad to hear of such associations being formed all over the country.

—The late severe frost will have reminded many persons of the inconveniences arising from FROZEN-UP WATER-PIPES. Our contemporary, the *Field*, recommends the following mode of avoiding this trouble. The present plan, it is observed, is to keep the water-pipes either on the outside of the house, or, if inside, very near an external wall, this arrangement being preferred from previous experience of the annoyance caused by floodings. A very simple addition will entirely do away with all danger. Non-conductors, such as sawdust, chopped straw, &c., which exclude the frost in ordinary seasons, are useless when the temperature is many degrees below the freezing point; but by enclosing all the pipes within a galvanised iron tube, say 1 foot square, outside the house, carrying this up beneath the cistern, and making it serve as the smoke shaft of a coke or gas stove, the whole apparatus is easily kept above the freezing point, and the closets are also maintained in a serviceable state. It is astonishing how small a supply of heat will keep a large cistern from freezing. A small solar lamp, with a wick of the diameter of five-eighths of an inch, burnt 1 foot beneath a lattice cistern, containing 5 gallons of water, will prevent all freezing, except a very thin coat of ice, although the surface is exposed to the outer air. With a cistern of the ordinary size used for closets, this lamp completely excludes frost, and allows the apparatus to be constantly used. Hence, we may safely conclude that the shaft above described would effectually keep pipes, cistern, &c., above the freezing point, and all that would be necessary in addition would be to take care that the main pipe is buried at least 18 inches, or if the earth is very dry, 12 inches beneath the soil. One word of precaution as to breaking the ice. It is absolutely necessary that a full length of ice shall not be permitted to exist from corner to corner, because it is here that expansion causes a rupture; and yet, in breaking it close to the margin, its adhesion is so strong as to require a severe blow, at a risk of injury to the cistern, to remove it, unless great care is taken to chip it away gradually.

—A meeting of the committee of the METROPOLITAN FLORAL SOCIETY was held at St. James's Hall on Tuesday, the 30th inst., when the following arrangements were made:—The Council of the Royal Horticultural Society has agreed to the Society holding its Auricula and Carnation and Picotee exhibition in connection with their Wednesday shows on April 19 and July 19, the competition for the prizes to be confined to members of the Metropolitan Floral Society, and the judges for their productions to be appointed by their committee. The committee has gladly welcomed this arrangement, as it indubitably shows that there is no opposition intended by the new Society, but that its sole object is to encourage a mass of flowers which other societies cannot fully do. The following are the prizes announced, the committee feeling that it is better to limit its operations by its funds, so that no pecuniary embarrassments should add to its difficulties. As circumstances permit the schedule will be extended:—

April 19.
6 Auriculas (amateurs), £1 10s.
1 Green edge do. (open), 7s. 6d.; 5s., 2s. 6d.
1 Grey do. (open), 7s. 6d.; 5s., 2s. 6d.
1 White do. (open), 7s. 6d.; 5s., 2s. 6d.
1 Self do. (open), 7s. 6d.; 5s., 2s. 6d.

July 19.
12 Carnations (amateurs), £1 10s.; £1 10s.
12 Picotees (amateurs), £1 10s.; £1 10s.

At the Crystal Palace show, on June 1 and June 2, medals will be offered for the Fancies (open); 24 do. (amateurs); 12 do., fancy; 36 Tulips (open); 12 do. (amateurs); 24 Pinks (open); 12 do. (amateurs); 24 Ranunculuses (open); 12 do. (amateurs).

—Referring to the note of ("A. M.") in our columns, on TINTED HONEY, a correspondent of the *Field* remarks:—

"The honey produced by the European bee naturalised in Australia is almost always of a dark brown but clear colour, and invariably tastes and smells very strongly of the Eucalyptus. This is often, indeed, a guide to the presence of a bee's nest in a tree. The flavour is unvaryingly durable to those not accustomed to the flavour of the 'Gum tree,' which, by the way, is most distinctly present in most of the wild animals, and in some of the birds even. In the three instances that I have eaten honey from the natives, the honey was always of the same native stinging species, one of which I believe to be solitary. I have remarked that the flavour is not so distinct, and the colour is paler. The productive powers of the European bee in the matter of honey are astonishing. I have seen a bush of the burning tree, known as 'Iron bark' tree known to contain honey. The heat and smoke drove away the bees, and when, after the best part of a night and day, the tree fell, a hollow space about 9 feet in length and nearly 18 inches in width was found entirely filled with comb and honey, some of which when run out

was almost black. Some of the wax supports to the comb were as thick as an ordinary man's finger. In many of the lower combs were dead dried-up grubs, and the propolis tasted as strong as the gum of the tree. There were many openings to the nest, but the lower combs had evidently not been used for years probably. The honey ran out upon the earth in streams, and it was not long before myriads of bees, knowing the fortress had fallen, collected to gather the spoil."

— A new system of LIGHTING PRIVATE HOUSES, as well as towns, factories, &c., was recently submitted to the Society of Arts by Mr. SILBER. The materials proposed to be used are the vegetable or mineral oils, which are to be distributed over the house in pipes, like water, from a general reservoir, containing several gallons, at the top of the building. The flow is regulated by little cisterns provided with a novel and well-constructed tap, regulated by a ball-cock or self-acting float, the lights being as nearly as possible on a level with the distributing cisterns. When the lamp is lighted the oil is, by the ball-cock movement, supplied to the wick automatically as fast as it is consumed, and a very perfect combustion is said to be effected, without the unpleasant odour so common to mineral oil lamps.

— We are requested to state the following additional subscriptions have been received by the hon. secretary, Mr. Treasurer, J. H. STURTEVANT, Esq., Park Gardens, Oakham, who is the GARDENERS' PRIZES for VEGETABLES, at the Royal Horticultural Society's forthcoming EXHIBITION at NOTTINGHAM:—

Mr. Smith, gr., Sutton, St. Helen's, Lancashire ..	5s. 0d.
Mr. Lumsden, gr., Bloxholm Hall, Sleaford ..	5 0
Mr. Frisby, gr., Blankney Hall, Sleaford ..	5 0
Mr. Bevan, gr., Launce Abbe, near Leicester ..	5 0
Mr. Wilson, gr., Uffington House, Stamford ..	5 0
Mr. Lee, gr., Blenheim, Woodstock, Oxon ..	5 0
Mr. Keble, gr., Keble, Oxford ..	5 0
Mr. James, gr., Carlton, Mayo, Ireland ..	5 0
Mr. Davis, gr., Silver Hill, Derby ..	5 0
Mr. Brown, Stamford ..	5 0
Mr. B. ..	5 0
Mr. Temple, gr., Burley-on-the-Hill, Oakham ..	5 0

The subscription list will close on the 20th inst. Gardeners favourable to this scheme are requested to communicate at once with the hon. secretary and treasurer.

— "The Grapes which produce SHERRY," says the "Food Journal," "are chiefly grown in a sandy soil, but DON SIMON DE ROXAS, a native author, divides the Grape-growing lands of the district into four classes: 1, Albarriza—chiefly carbonate of lime, sand, clay, and magnesia; 2, Barros—composed of quartz, sand, clay, yellow and red ochre; 3, Arenas—entirely quartz sand; 4, Bugo—quartz-sand, vegetable loam, and carbonate of lime. The Albarriza is the soil on which most of the San Lucar and real Xeres wines are grown, while the Bugo is the worst and most unproductive of the four varieties. This is in some measure caused by its splitting in the warm weather into immense fissures, so that the vines have to be planted nearly 6 feet apart. Sherry is made thus: The Grapes are harvested as they mature, and are spread out on mats in the sun. After some days they are carefully picked clear of stalks and unripe or decomposed fruit, placed in vats, and covered with a layer of plaster of Paris. Peasants with wooden shoes then get into the vats and trample the Grapes till they part with all their juice, which is run off into suitable vessels and placed in the ferment. This fermentation goes on during nearly two months, and at its conclusion the wine is separated from the dregs or lees, and is then ready for exportation after the customary addition of brandy. It is a common thing to add an infusion of bitter almonds to communicate the well known nutty flavour of fine sherry. When this wine is first produced it is fiery, and has to be matured by keeping for several years. The "maturing" of sherry is an important point, as it does not really attain perfection for bottling until 20 years from the date of vintage. The connoisseurs of old knew as well as our wine bibbers of the present day the value of old wine, and chiefly of old sherry. In Pasqual's "Psalmody," published in 1619, we find—

'Give me sacke, old sacke, boye,
To make the muses merry;
The life of mirth, and the joy of the earth,
Is a cup of good old sherry.'

Such is the method of manufacturing pure sherry."

— The extreme cold weather, which has formed so remarkable a feature in the METEOROLOGY of the past two or three weeks, after reaching the climax on Sunday, January 1, has gradually given way to a warmer state of affairs. On New Year's Day the cold was intense, and the lowest temperature which has been recorded for many years was observed at Wolverhampton, viz., 4° 9, closely followed by Hull, viz., 5° 3, Bradford, 6° 7, Leeds, 7°, &c. (See Mr. GLAISHER'S Tables in our present issue.) THE MAXIMUM TEMPERATURE of the air in England ranged from 48° 8 at Birmingham to 40° at Bradford and Hull, with a mean for all stations of 45° 3, whilst in Scotland they ranged from 49° 8 at Leith to 40° 9 at Aberdeen, with a mean for several stations of 46° 3. THE MINIMUM TEMPERATURES in England were much lower than those in Scotland. In the former country the extreme was 4° 9, and 19° 2 at Wolverhampton, and Portsmouth and Blackheath respectively; whilst in the latter country the lowest recorded is 21° at Dundee, and the

highest is 32° at Greenock, the mean for all stations being 13° 3, higher than the mean for England, which is 12°. THE MEAN TEMPERATURES of the week in England are at most stations very low, the mean for all being 29° 4, whilst in Scotland it is 35° 5.

In the southern country the mean temperatures have a range of 7° 3; the extremes being represented by 26° (at Hull) and 33° 3 (at Portsmouth), and in Scotland of 4° 8, the difference between the temperatures of Aberdeen (33° 1) and Greenock (37° 9); thus England was 6° 1 colder than Scotland. RAINFALL.—As in the temperature, so in the rainfall, the fall in Scotland was many times larger than in England; in the latter country the heaviest fall was 0.53 inch at Salford, and the least was 0.07 inch at Hull, Scotland, the mean for all stations of 0.23 inch, whilst in Scotland the heaviest amount to nearly 3 inches (2.88 inches at Greenock), and the least to 0.18 inch (at Aberdeen), with a mean for the several stations of 1.26 inch.

PORTRAITS OF GARDEN PLANTS.

ACER PALMATUM RETICULATUM, *L'Hist. Hort.* ser. 3, t. 18.

One of the most elegant of Japanese Maples, introduced to our notice by M. Linden. It forms a low deciduous shrub, with slender branches, bearing palmately lobed leaves, the lobes being seven in number, unequal in size, the middle ones larger, ovate-lanceolate, and all of them serrated. The colour of the leaves is a cheerful, sub-translucent, emerald green, the veins of the leaves and veinlets being marked off by a deeper green tint.

AGAVE ELEMETIANA, *Refug. Bot.* t. 163.

This belongs to the stemless group of the Agaves, and is a remarkably interesting plant. Its soft not spiny leaves are densely rosulate, of a pale glaucous green colour, lanceolate-spathulate in form, and rather over a foot in length. The leaves are very bristly beneath when fully grown. The scape grows 14 feet high, including the leaves, and is of 10–11 feet long, from which are successively developed the pale yellowish green flowers. It is a Mexican plant, and has been flowered in the collection of W. Wilson Saunders, Esq., at Hillfield, Reigate.

AGAVE UNIVITTATA, *Refug. Bot.* t. 215.

This also, is one of the stemless species, and has been figured from a plant which flowered in the collection of Mr. J. H. Sturtevant. The leaves, which are lanceolate, are rosette, are rigid, and of a linear-spathulate form, marked down the face with a broad yellow band, which fades as they become mature. The flowering scape grows about 16 feet high, including the flower-spikes, which are greenish yellow. The species is a native of Mexico.

BUDDLEIA CURVIFLORA, *L'Hist. Hort.* ser. 3, t. 125.

This Scrophulariaceae deciduous shrub has been introduced from the Loo-Choo Islands to the Jardin des Plantes, at Paris. Its young branches are 4-winged, and its leaves ovate-lanceolate; while the rosy violet flowers form a narrow elongated terminal thyrse; they are fragrant, and incurved over the tube and a limb of four ovate-obovate segments. The plant is said to be quite hardy.

CAMPANULA RAINIERI, *Flora de Serres*, t. 1908.

A beautiful hardy perennial species of Bellflower, from the Como district. It is of close, dwarf habit, with short sub-erect stems, which bear ovate, remotely toothed leaves, and a profusion of large, funnel-shaped, blue flowers. It is highly recommended by M. Van Houtte, by whom it is cultivated.

CAMPANULA SOLDANELLEFLORA PLENA, *Flora de Serres*, t. 1880.

This is a most remarkable and pretty form of Bellflower, and a hardy perennial of dwarf habit, with lance-shaped leaves and a short erect branching stem, which supports numerous purplish flowers; these, however, instead of being of the normal bell-shaped outline, are cut up into a multitude of linear segments, and are cut to resemble an ordinary Campanula. M. Van Houtte, by whom the plant is grown, states that its origin is unknown.

CLAVIA REIDELIANA, *Gartenflora*, t. 663;

C. MACROPHYLLA, *Bot. Mag.* t. 5829.

According to Dr. Regel, the plant figured as *C. macrophylla* in Versteeg's book, is identical with his *C. reidiana*, published many years earlier. It is one of the Myrsinaceae, and forms a noble single-stemmed stove shrub, bearing a crown of sessile ovate-lanceolate spinosely-serrate leaves of unequal size, the larger ones being 12–20 inches long, and the smaller ones 4–6 inches long. The flowers are slender axillary racemes from amongst and beneath the leaves. It comes from Brazil. The plant figured by Dr. Regel is grown in the Botanic Garden of St. Petersburg, while that figured by Dr. Hooker was flowered in the collection of Mr. Wilson Saunders.

COLEUS SAISONI, *L'Hort. Franc.* 1870, t. 22, t. 4.

This is an interesting sort from *C. Veitchii*, and has flat ovate leaves variegated with white and red, in addition to the brown central blotch, which is most broken up than usual. It is a garden sort, obtained and propagated by M. Lierval.

DRYMONIA TURIALVE, *L'Hist. Hort.* t. 603.

A tall sub-shrubby stove Gesneriad, which obtains its name from having been found on the volcano of Turialva, in Venezuela, by M. Linden's collector. It forms stout quadrangular stems, from which are developed the broadly-ovate, bulbose, glaucous leaves, and from the axils of these proceed racemes of large white pendulous flowers, remarkable for having the lower lobes toothed and the calyx, as well as the under sides of the leaves, is of a dull red colour.

FITTONIA GIGANTEA, *L'Hist. Hort.* t. 611.

This is a branching, sub-shrubby stove perennial, growing about 18 feet in height, and having a close resemblance to *F. (Gymnostachyum) Verschaffelii*, in its broadly ovate, subcordate, bright green leaves, veined with carmine-red, and its terminal spikes of small yellow flowers. It is, however, more erect and shrubby in habit, and altogether larger in its parts, but the colours are scarcely so brilliant. Introduced by M. Linden from Ecuador.

LILIUM TIGRINUM FLORE-PLENO, *Gartenflora*, t. 645.

One of the most remarkable and showy of hardy bulbs recently introduced from Japan. The plant has the habit of the well-known Tiger Lily, and like it produces a bold panicle head of large, orange-red flowers, but instead of being single, composed of one row of perianth segments, they are double, composed of several distinct overlapping series of segments, which are richly marked throughout with black spots. Dr. Regel's figure was prepared from a specimen which flowered with M. Leitch, but it has been bloomed and exhibited in this country by G. F. Wilson, Esq.

THE GARDEN PINK FOR FORCING PURPOSES.

The Garden Pink, in its several varieties, has always been, and will, no doubt, long continue to be, a special favourite. Everybody loves the modest beauty and delightful fragrance of its flowers, and many consider it as only inferior to the Rose itself. One or two varieties of this Pink have been generally found very useful for forcing into flower during the winter and early spring months; and I would here call attention to a few other sorts well suited to the same purpose, but which are not so well known as they should be.

The varieties mostly used for forcing are the Common, or London White, a fragrant and very useful sort, and a larger dark variety known by the name of Anna Boleyn, and which produces exceedingly beautiful and very sweet-scented flowers, but has the great drawback of being addicted to bursting its pod or calyx.

Observing and regretting this defect, an enthusiastic amateur florist, Rowland Dalton, Esq., of Bury St. Edmund's, many years since, after much perseverance, succeeded in originating a variety with flowers of the same colour, somewhat smaller, similar in habit, equally fragrant, and possessed of all the forcing properties of Anna Boleyn, but with the advantage of having a strong, well-formed calyx, which never by any chance bursts; and this very useful variety was named Claude. He afterwards succeeded in raising another still more beautiful variety, which he named Plato, and this is a truly magnificent flower, of a beautiful rose-colour, with a finely-formed, strong calyx, quite free from bursting, and it proves to be also a fine forcing sort, coming into flower earlier than Anna Boleyn.

Another amateur florist residing in the same town, Mr. J. Clarke, who has made the cultivation of the Pink quite a specialty, has, amongst many other triumphs in that way, originated an exceedingly fine variety resembling the old variety Anna Boleyn, but with some improvement. It bears more numerous flowers in habit, and producing in wonderful abundance, finely-formed, large sweet-scented flowers, with a firm strong calyx, which never bursts. This fine variety, which is exceedingly well adapted for forcing, was named Garibaldi. The same raiser also originated another splendid sort, which he named Clarke's Lord Lyons. But this variety, although exceedingly beautiful, is in all respects very nearly identical with Dalton's Plato. Some few years since the Messrs. E. G. Henderson & Son sent out a most useful variety under the name of Most Welcome. This is also excellent for the purpose of forcing, and may be considered as an almost perpetual flowerer, in addition to which it is possessed of all the qualities of a first-class florist's flower, and is quite free from bursting, either when forced or when grown in the open air.

The treatment of these plants for the purpose of forcing is so very simple, that little need be here said upon the subject. During the month of March, or early in April, cuttings should be taken from plants which have been forced, and inserted in a compost made up of sand and sifted leaf-soil, using pots of some 6 inches diameter: place them in a gentle hotbed, and in all respects treat them as cuttings of Verbenas, although they will not root so quickly as the latter.

When rooted, pot them singly into 3-inch pots, and gradually harden off, and towards the close of May, or early in June plant them out in the open border, in any convenient situation, in rows about 15 inches apart, and about 1 foot from plant to plant. While here, let them have abundance of water when required. During the first fortnight of October they should be carefully raised and potted into pots some 5 inches or 6 inches in diameter, using soil composed of turfy loam enriched with a little well-rotted manure, peat, or leaf-soil. They should be placed in a cold shed, or pit, for a short time, and ultimately wintered in a cold pit, from which they are to be introduced to the forcing-house as may be required. When this is done, it is necessary that the plants be kept as close to the glass as possible. Perhaps no better situation can be found for them than a shelf on the back wall of an early vinery or Peach-house, at some 18 inches from the glass.

With the varieties I have mentioned, viz., Common,

White, Claude, Garibaldi, Plato or Lord Lyons, and Most Welcome, assisted by a few of the perpetual or winter-flowering Carnations and Picotees, little difficulty will be found in keeping up an ample supply of these fragrant flowers throughout the entire year. *P. Grieve, Cudford, in "Florist and Pomologist."*

ONCIDIUM SPLENDIDUM.

THIS fine species has already been described in our columns by Prof. Reichenbach, 1870, p. 1213, and has been lately figured in "Bot. Mag.," t. 5878; but we may add to our former notice a few further remarks.

Writing in August, 1869, M. Van Houtte remarks of this truly splendid and extremely rare species of *Oncidium*, that "it does not exist, as far as we know, in England, and is now for the first time figured after nature from a plant in our establishment. According to Dr. Reichenbach it comes very near to *O. tigrinum*, Llav. et Lex. (*O. Barkeri*, Lindl.; *Odontoglossum tigrinum*, Lindl.), which comes from Mexico, whilst our *O. splendidum* comes from Guatemala, if one can place reliance on the notes of the late M. Herment, of Caen, who handed over plants to MM. Thibaut et Keteleer, from whom alone the specimens which exist in collections have probably been acquired. It has a stouter constitution; its pseudobulbs are solid, its foliage is stout, its inflorescence is vigorous, and its flowers, which are of the consistence of parchment, have a noble appearance; in a word, it is a species as beautiful as it is rare."

M. Reichenbach notes that this species differs from *O. tigrinum* in having the claw of the lip much longer, and in the median keel being much more developed. The rounded outline of the pseudobulbs of *O. splendidum* is also very remarkable. To M. Duchartre, he continues, belongs the credit of having extricated this species from the oblivion into which it had fallen.

Our illustration (fig. 4) was taken from a plant exhibited at South Kensington, from the collection of Lord Londesborough, on February 16 last, when it received the award of a First-class Certificate. The plant bore a branched inflorescence, and the broad, flat, bright yellow lip and spotted sepals and petals rendered the flowers exceedingly attractive. *T. M.*

LILIES.

(Continued from p. 1670, 1870.)

IN transcribing M. Duchartre's note relating to double-flowered varieties of *L. Thunbergianum* we omitted to advert to the variety figured in our own columns (1870, p. 1374, fig. 247), from a specimen flowered by Mr. Wm. Bull. In this flower the filaments of the stamens were dilated into petal-like bodies cleft at the top, and with the anther in the notch. Reverting now to M. Duchartre's account of the Japanese Lilies, the one next to be mentioned is *L. eximium*, Court. ("Mag. d'Hortic." n. 300; "Flores des Serres," iii. 1847, tab. n. 84). This plant was introduced by Siebold, in 1830, and placed, with other fruits of his explorations, in the Botanic Garden at Ghent; but it would seem from the statement of Ch. Morren ("Histoire littéraire et scientifique des Tulipes, Jacinthes, Narcisses, Lis, et Fritillaires," Brussels, 1842), that the administrative measures in Belgium, which from December 16, 1830, to the year 1835, had the effect of upsetting all high-class instruction and of destroying all the scientific institutions, the academies, universities, botanical gardens, &c., had also disastrous consequences as regards the collection of Japanese Lilies. Many of these plants were lost, from one cause or another, and *L. eximium* among the number, as Siebold had to reintroduce it from its native country, the archipelago of Liu Kiu. *L. eximium*, Court., closely resembles *L. longiflorum*, Thunb., in habit, foliage, size, and colour of the flower, which is pure white within, greenish externally. Siebold, indeed, regarded it as a variety of *longiflorum*, and called it *L. longiflorum* Liu Kiu; nevertheless, a careful examination will show certain differences which may perhaps suffice to characterise it as a distinct species.

M. Duchartre then quotes some observations which he made on a former occasion, relating to the differences between *L. longiflorum*, *L. eximium*, and *L. Takesima*, which latter has been called in Siebold's catalogue, since his death, *L. japonicum purpureo-vittatum*, and which was also published in 1855 by Siebold and De Vries ("Tsinb. Flora," i. 1855, p. 319, 220, tab. col.), under the name of *L. Jama-juri*. M. Duchartre's comparison of the three plants is as follows:—"These splendid flowers may be grouped,

in the first instance, according to the angle formed by the union of the flower and the stem supporting them. The flower of *L. eximium* is at right angles with the stem or flower-stalk; while in *L. longiflorum* and in *L. longiflorum* Takesima, the flower forms an obtuse angle with the stem, a little more obtuse in the case of the former than in *L. Takesima*. The violet tint of the outer side of the flower suffices to distinguish the last mentioned variety, though it should be remembered that this tint, which is very manifest in the young flower-bud, disappears in the expanded flower on exposure to the light. This violet hue extends throughout the whole length of the prominent midrib of each division of the flower. The flowers of *L. longiflorum* and *L. eximium* are uniformly white.

The general form of the flower affords distinctive characters; thus, in *L. longiflorum* Takesima the form of the flower is tubular, inversely conical (funnel-shaped), with a wide base, and its divisions are but slightly turned back. The upper portion of the tube is dilated at the spot where the lobes begin, and in consequence of this arrangement the flower is moderately open. The flower of *L. longiflorum* enlarges gradually and regularly from below upwards. The flower is more open than in *Takesima*, and shorter, and its six divisions are more widely spreading, the three outer ones are even appreciably revolute. In *L. eximium* the tube is more nearly cylindrical throughout its length; the aperture of the flower is oblique, and its six divisions are longer, narrower, and thinner, and completely

ences are so slight that no useful characters can be obtained from them. Nevertheless it may be remarked that the leaves of *L. longiflorum* are broader, shorter, thicker, and more fleshy than those of the other two; while those of *L. longiflorum* Takesima are the longest and narrowest, and usually 3-nerved. M. Duchartre was originally of opinion that *L. eximium* was a distinct species, but he no longer holds that view with the same confidence, and moreover he considers the two other forms as varieties of one species.

L. eximium has a strong and agreeable perfume, like that of orange blossom, and according to M. Leitchlin it may be distinguished from all the varieties of *L. longiflorum* by its more compact habit, its shorter, more nearly sessile leaves, and generally by the great size of its snow-white flowers (nearly 8 inches long).

Under the name of *L. Corillon*, Siebold and De Vries described and figured ("Tsinb. Flora," 1855, 2d part, p. 311, tab. col.), a Lily as yet scarce. It is marked in the catalogue of M. Laurentius, of Leipsig, as rare, and at the price of 30 f. a bulb; while in the catalogue of Siebold's establishment it was priced at 10—15 f. in 1867, and this year at 5 f. M. Duchartre received quite recently (June 29, 1870) from M. Leitchlin a flowering specimen, which permits him to add some details to those before published.

Lilium Corillon (Siebold, V. l.) is a low-growing plant (33 centimetres = 13 inches, about), with a simple, slender, stiff, glabrous, stem, abundantly furnished with leaves. The leaves are scattered at regular intervals, linear-

lanceolate, acute, sessile, marked below with three prominent shining nerves, and finely spotted in the intervals between the nerves. They are of a bright green colour, slightly whitish below, almost erect, and from below upwards they gradually become broader and shorter. The flower is terminal, solitary, erect, inodorous, of a yellow or slight orange tint within, paler in the centre and on the outside, and marked with linear deep orange-brown coloured spots, arranged in longitudinal rows, which project more or less, and which do not occur either at the centre or in the upper half of the flower. The outer and inner segments of the flower are lanceolate, pointed and hooded at the apex, which is downy. They are marked on the outer surface throughout their whole length with a prominent ridge, corresponding to a furrow on the inner surface. The flower examined by M. Duchartre, instead of having the lax and irregular form represented in the plate in the "Tsinb. Flora," was bell-shaped, with an expanded but not revolute limb. The tube was short, wide, and gradually dilated from the greenish coloured base upwards, and rather smaller than indicated in the original description (M. Duchartre gives the length of the segments of the flower at about an inch). The erect stamens are half the length of the perianth-segments, the anthers are oblong, filled with orange-yellow pollen. The pistil



FIG. 4.—ONCIDIUM SPLENDIDUM.

revolute. The dimensions of the flowers also serve to characterise the varieties. The flower of *L. longiflorum* Takesima is 165 millimètres (6½ inches, about) in length, while the tube of the flower from the base to the origin of the lobes measures 95 millimètres (nearly 4 inches). The flower of *L. longiflorum* (var. *grandiflorum*), and hence larger than in the type) measures 140 millimètres in length = about 5½ inches, of which the tube from the base to the origin of the lobe measures about half (2½ inches); nevertheless, the diameter of the flower from tip to tip of the lobes is appreciably wider than in *L. longiflorum* Takesima. Lastly, the flower of *L. eximium* has a total length of 180 millimètres (more than 7 inches), of which 100 (4½ inches, about) are taken up by the tube. M. Le Maire has remarked ("Flores des Serres," iii. pl. 282, 284) that the filaments of the stamens are of unequal length in *L. eximium*, while they are equal in *L. longiflorum*, as they are also, according to M. Duchartre's experience, in *L. longiflorum* Takesima.

To sum up, *L. eximium* is characterised by its horizontal flower, which is longest of the three; by its narrow tube, but slightly dilated above; its wide and oblique limb, its oblong revolute lobes, and its unequal filaments. *L. longiflorum* has its flowers placed obliquely on the stalk, and almost erect; its flower is the shortest and the most widely expanded of the three; its lobes are wide, the three outer ones appreciably revolute.

L. longiflorum Takesima has the flower obliquely inserted on the stalk, but less so than in the case of the last mentioned, intermediate in absolute length between the two others, the least widely expanded of the three, manifestly dilated at the throat, more or less tinged with violet externally, and with wide spreading (not revolute) lobes. As to the stem and leaves, the differ-

ence is equal to the stamens in length, or a little longer. The ovary is green, 3-sided, with six furrows, and terminated by six rounded tubercles. The style is half the length of the ovary, yellow, triangular, thickened above and surmounted by a deeply 3-lobed stigma of the same colour. The distinctive characters of this elegant Japanese species are these: Stem short, slender, smooth; leaves scattered, numerous, narrow, acute, 3-nerved; flower orange-yellow, slightly spotted, erect bell-shaped; segments lanceolate acute, downy at the apex, flat, or nearly so, much more so in the middle than at the base, triangular. The Japanese call this Lily Ki-Fime-Juri. [M. Duchartre's account of the Japanese Lilies above given, terminates with the words, "La suite prochainement." The number of the Journal of the Imperial and Horticultural Society of France, which contains the original paper of M. Duchartre, reached us in the early part of July, 1870, and in the ordinary course of things another number should have come to hand in August. All the world would know how it has come to pass that M. Duchartre's promise, above cited, has not been kept. All the world, and specially the botanists and horticulturists, will rejoice when that gentleman is enabled to redeem his promise. In the meantime we may state that we shall shortly publish a descriptive list of the cultivated Lilies, from the pen of Mr. J. G. Baker.]

GLASS GARDENS.

DELIGHTFUL idea in this cold weather. Cover the whole garden with glass, score it over with lines of hot-water pipes, and set the frost and the snow, and those rains preceding a thaw which seem colder than both,

at defiance. Well, that would be charming, and even this is amongst the possibilities of the future. In that good time coming when the arts of peace shall supersede the expensive brutalities of war, glass constructive genius and cultural skill will provide artificial climates on a scale of colossal magnitude, of which we have as yet hardly dreamed. The mere money that has been spent by France and Prussia in this war would have built a conservatory reaching from Paris to Berlin, and wide and lofty enough for the two Emperors to have driven their equipages about in it for days and weeks together at pleasure, and to have enjoyed a week's rest in a crystal palace in the middle of it, when they met on either side of the Rhine. The price of those fields of blood that we sicken to read about, would have built, heated, and furnished a winter garden large enough for all Europe, and so long as to open on Berlin at one door, and Paris at the other. Thus the cries of each nation for the capital of the other would have been gratified without the sacrifice of a single life, or the shedding of a tear, or a moment's exposure to the cold. Under such a magnificent transparency the gay Parisian might indeed have tripped off with a light heart to Berlin, and the sober German have returned the visit, and friendship, esteem, mutual affection, have knit the two nations together.

From such scenes as we are now compelled to read of we gladly turn to our glass gardens. It is almost impossible to use the name without thinking of gardens covered with glass; but it is not of such that I am now about to write. Gardens are mostly enclosed spaces, and various substances are used for their enclosure, such as wood, earth, stone, bricks, concrete, and, in these latter days, glass. These are employed not only outside, but for divisions, partitions, and training walls; the latter are often placed to within from 5 to 10 feet of each other, according to their height, the scarcity of ground, &c.—the object of this close packing together of walls being to provide the largest possible training space in the smallest area of ground. Such walls, while they have furnished the means for securing these objects, have likewise presented obstacles to their perfect accomplishment. The substance of the walls has appropriated a large percentage of the available space, and their shadows have deteriorated, lowered the quality of fully one-half of the area remaining. The object for building walls around or within gardens is to provide shelter and improve the climate; in other words, they keep out the cold and keep in the heat; they also disturb the regular distribution of both. More than this, by so much as opaque walls improve the temperature on one side, they degrade it on the

the advantages of glass walls; for where heat travels light follows, and the plants on each side are not merely equally kept warm, but enjoy almost the same amount of light; and not only are light and sun allowed almost a free passage through the glass walls, to the warming and illumination of the wall atmosphere on both sides, but the earth is warmed likewise. The heat that is sent through the glass is largely absorbed by the earth; for the rays of the sun hitting the glass obliquely in spring and autumn are bent earthwards, in obedience to the laws of refraction, and warm the borders, when heat is most needed. In fact, these glass walls may be truly defined as a

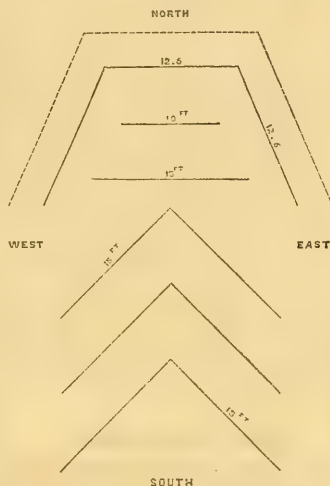


FIG. 7.—Enclosed and Diagonal Walls.

patent for the abolition of cold, gloomy, north walls and borders from our gardens. The roots of the trees as well as the tops may henceforth rejoice in the sun's light on both sides of our walls alike. We may now double the area of tender fruit and flower culture in our gardens without adding one penny to our usual expenditure, for these transparent walls are, in fact, cheaper than any others.

They may also be packed more closely together than any other kind of walls, and there are substantial advantages

This was a most unexpected result, whereas the sum of the two sides showed a much greater gain. During a high temperature the relative advantage of the glass wall is even greater. As these glass gardens are formed of rough plate glass, a good deal of heat is retained in the substance of the glass, so that they average as high a temperature at night as brick walls. It thus appears as if the increase of heat and light on the northern side of the glass gardens is so much clear gain. There is another source of heat peculiar to glass walls. Absorbing no water, there is no robbery of caloric from their face by evaporation. This, during moist weather, proves a great drain on the heat-storing capacity of bricks and other opaque substances. Again, as already shown, the heat reflected or radiated from glass is not lost in glass gardens, it only heats the next wall, to be thrown back from whence it came; at least, a great portion of it is so returned, while another portion goes to stock the earth with caloric to help it to overcome the cold at night. Glass gardens can also be so placed as to shut out the wind and be open only to the warmest aspect. Squares or parallelograms, with the doors opening alternately at each end of the partition, is a common form (fig. 5); or they may all open to the south, the two sides projecting beyond the middle partitions to exclude the cold, as in fig. 6.

Fig. 7 shows, in the upper part, a different arrangement, in which the inside walls are protected by the sides; and, in the lower part, a diagonal form, in which the compound influence of the reflection and radiation of heat would be most powerfully felt. This would be admirably suited for Vine growing in the open air, and for a tender fruit garden in exposed and ungenial localities. In very cold climates the glass gardens might be enclosed with an opaque outer boundary of wood or bricks painted white to throw back the whole of the heat upon the glass, as indicated by the dotted lines in Fig. 7, upper part. But it would seldom be needful to erect such an outside heat catcher.

Fig. 8 is a simple diagram, showing how any site or aspect may be chosen, such as the south side of a rising knoll, or cosy nook, with a western outlook near the Atlantic, or any other sheltered place.

Portable as useful, sound in theory, and successful in practice, glass gardens will speedily assume an importance and a cultural success only second, if second, to glass houses themselves. I look upon them as the most important horticultural invention of the year just closed, and have the utmost confidence that they will vindicate this high character by their actual doings in the year upon which we have entered. D. T. Fish, F.R.H.S.

SEEDLING ORCHIDS.



FIG. 9.—Orchid Seeds Germinating:—1, Nucleus; 2, its Membranous Coat; 3, Perfect Seed.

FIG. 8.—Diagram showing various Aspects for Walls.

tages in such a course, in addition to the economising of space. By placing a succession of glass walls in blocks at any favoured point, or in any preferred form or size, all the advantages of single walls may be enjoyed in an accumulated form. Such glass gardens are like receiving compound interest for our capital. Every wall becomes a source of heat to the next, and so on through the entire series. Each gives as well as takes of its light and heat to air and border. An accumulation of heating force and illuminating energy is thus concentrated in the glass garden by the simple expedient of multiplying glass walls. Within a narrow area innumerable lines of heat will be radiated, reflected, in all directions, and the same rays rebound back again and again. Their course will be altered, but their energy hardly diminished by their rapid journeyings. The result is an artificial wall atmosphere in the open air, warmer and lighter than has ever before been placed at our disposal for cultural purposes. Even during the late severe weather the south side of glass walls has ranged from 2° to 5° higher than the south side of common brick walls.

AFTER many careful experiments, I have come to the conclusion that perfect seeds are produced much more rarely than is generally supposed, indeed, I believe Orchids produce good seed but very seldom, and to this may be attributed the many failures that cultivators have experienced in their attempts to raise hybrids. When Orchid seeds are obtained, they should be examined under a good microscope; if they are perfect, the nucleus ought to be seen beneath the translucent, membranous, reticulated testa or seed coat (see fig. 9). If the nucleus is not developed, it is useless to expect germination to take place; we might as well expect to obtain a batch of young Ferns after having sown the empty spore-cases, which lasts is far from being an uncommon occurrence.

Not forgetting what has already been achieved in the way of hybrids, it will be generally admitted that as cultivators we have still much to learn, in so far as the raising of Orchids from seed is concerned. That which has already been done in this direction ought to induce those who have the opportunity to undertake more extended researches—take, for example, × Calanthe Veitchii, one of the most beautiful Orchids at present in cultivation, or × Cattleya exoniensis, together with

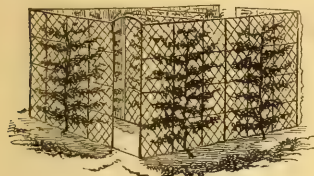


FIG. 5.—Arrangement of Glass Walls.

other. This statement is not absolutely true, because part of the heat absorbed by an opaque wall on one side may find its way through to the other by conduction; but with thick, opaque, hollow, or wooden walls, the amount of heat so conveyed is very small,

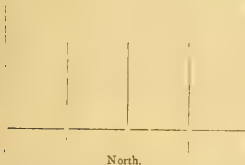


FIG. 6.—Rectangular Arrangement of Walls.

and has little if any practical influence on the vegetation hugging closely its northern side. We may therefore assume that if a south wall is raised 10° by the sun, the north side loses nearly all that the south gains. Thus we find in practice that the south side of an opaque wall is, say, 10° warmer than the north side; taking the sum of the two sides, little if any absolute increase of temperature is gained. We, as it were, rob Peter to pay Paul, and being satisfied that Paul is the warmer thereby, we have troubled little about Peter or the balance that ought to be struck between them. But supposing both could be kept at nearly the same temperature, it is obvious that the sum of the two sides would be much higher. Now this is the great boon that has recently been offered to us by Mr. Beard's invention of glass walls (fig. 5). The heat of the sun warms the south side, and is passed through to the northern side with little diminution of force. Instead of one hot side we have thus two. Neither does this reveal all

× *Cypripedium Harrisonianum*, or × *Cypripedium* (Selenipedium) *Dominianum*. The growers at least have succeeded in rearing seedling plants of the beautiful and rare *Cypripedium* (Selenipedium) *Schlimii*, viz., M. Leroy, Passy (France), and Mr. Pilcher, gr. to S. Rucker, Esq., of Wandsworth. Perhaps the most brilliant success has attended the patience and perseverance of Mr. Dominy, of the Royal Exotic Nursery, Chelsea, who has succeeded in crossing several genera, amongst which may be mentioned *Phajus* with *Calanthe*, and *Calanthe* with *Limatodes*.

I have here compiled a list of hybrid *Orchids*, with their parents, where known. More might be added, but this is sufficient to show that much has already been done; and we may fairly ask, have these results done nothing for botanical science? By hybridisation and grafting we may prove the natural affinity of plants far better than by poring over herbarium specimens—if not so quickly, with far greater certainty. Unfortunately for horticultural science, neither Mr. Dominy nor Mr. Pilcher have as yet given us the details of their successful experiments.

HYBRID ORCHIDS.

× <i>Calanthe</i> <i>Masuca</i> .	× <i>Goodyera</i> <i>discolor</i> .
× <i>Calanthe</i> <i>Domini</i> .	× <i>Anacathochilus</i> <i>Dominianum</i> .
× <i>Calanthe</i> <i>furcata</i> .	× <i>Anacathochilus</i> <i>xanthophyllus</i> .
× <i>Limatodes</i> <i>rosea</i> .	× <i>Goodyera</i> <i>discolor</i> .
× <i>Calanthe</i> <i>Veitchii</i> .	× <i>Goodyera</i> <i>Veitchii</i> .
× <i>Calanthe</i> <i>vestita</i> .	× <i>Anacathochilus</i> <i>Veitchii</i> .
× <i>Calanthe</i> <i>granulosa</i> .	× <i>Acerides</i> <i>alida</i> .
× <i>Cattleya</i> <i>hybrida</i> .	× <i>Acerides</i> <i>hybridum</i> .
× <i>Cattleya</i> <i>Harrisonianum</i> .	× <i>Acerides</i> <i>Fieldingii</i> .
× <i>Cattleya</i> <i>Mossiae</i> .	× <i>Cypripedium</i> <i>Pearcei</i> (enriched).
× <i>Cattleya</i> <i>concolor</i> .	× <i>Cypripedium</i> <i>Mossiae</i> .
× <i>Laela</i> <i>purpurata</i> .	× <i>Cypripedium</i> <i>Dominianum</i> .
× <i>Cattleya</i> <i>amethystina</i> .	× <i>Cypripedium</i> <i>caudatum</i> .
× <i>Cattleya</i> <i>irrorata</i> .	× <i>Cypripedium</i> <i>barbatum</i> .
× <i>Cattleya</i> <i>elegans</i> .	× <i>Cypripedium</i> <i>Harrisonianum</i> .
× <i>Cattleya</i> <i>Andrieuxii</i> .	× <i>Cypripedium</i> <i>villosum</i> .
× <i>Cattleya</i> <i>quimperculca</i> .	
× <i>Cattleya</i> <i>Forbesii</i> .	× <i>Cattleya</i> <i>Pilcheri</i> .
× <i>Cattleya</i> <i>Lodgesii</i> .	× <i>Cattleya</i> <i>Devoniensis</i> .
× <i>Cattleya</i> <i>Brabantia</i> .	
× <i>Cattleya</i> <i>Alandia</i> .	× <i>Cattleya</i> <i>Dominiana</i> .
× <i>Cattleya</i> <i>Laelia</i> <i>crispa</i> .	
× <i>Cattleya</i> <i>Sidneiana</i> .	× <i>Cattleya</i> <i>Mossiae</i> .
× <i>Cattleya</i> <i>granulosa</i> .	× <i>Cattleya</i> <i>Mangelsii</i> .
× <i>Phajus</i> <i>grandifolius</i> .	× <i>Cattleya</i> <i>Lodgesii</i> .
× <i>Phajus</i> <i>irroratus</i> .	
× <i>Calanthe</i> <i>vestita</i> .	

I saw a nice plant of × *Cattleya hybrida* in the collection of A. Turner, Esq., Leicester, some time ago. It bore a grand spike of upwards of 20 flowers. Its affinity with *C. granulosa* is well marked, and it is a very nice addition to autumn-flowering *Cattleyas*.

Talking of sowing *Orchid* seed, here is a recipe from the pen of the late Donald Beaton, first published in the "Journal of Horticulture," p. 61, 1862—

"Get the seed-pod of an *Orchid* emptied on a piece of smooth paper, the seeds being as small as the dust in a sunbeam. Take a very clean No. 20 pot, and put No. 60 pot upside down over the hole at the bottom, and put a piece a inches square of ragged turf of fibry peat over the hole of No. 60. Then take four pieces of rough, cracked charcoal, 3 inches or 4 inches long, and half that thick, or the thickness of the paper on which you are writing the sides of the big pot at equal distances; put your finger on the bottom hole outside, and fill the pot with water, holding the pot in the left hand. Now sow the seeds on the water, and breathe against it till the whole surface is equally moist. Then begin to let off the water from under your finger by the bottom hole very gradually. As the water subsides in the pot, the seeds will stick to the sides of the pots, the peat, and the charcoal, just like so much of a tide mark. When the water is all off, place the pot in a saucer of water, with an inch deep of water in it, and hold it to that point till your seedlings are safely on the wing; put two twigs across the mouth of the pot, and put a square of glass over the twigs, so as to leave a space for air all round the thickness of the twigs. Do not put water in the saucer, or dry the twigs out, and where the heat is at Calcutta point, and if you out of every row of the seeds will not vegetate, and that very soon, why the pollen has not given them the germ of life. I brought root *Orchids* into this world just that way, but, truth to say, all of them found the means of getting out of the world by a route I never could fathom.

Another correspondent,† in the third volume of the "Journal of Horticulture," writes as follows with reference to seedling *Orchids*—

"I have seen ripe seed-pods hanging abundantly from *Broughtonia sanguinea*, from *Angracum funale*, and from some of the *Oncidiums* and *Epidendrums* in Jamaica; and as we know, of course, that all the species are naturally produced from seed, horticultural science ought to be able to solve the problem of their reproduction here. May we not look for seed packets of the epiphyt *Orchids* to be advertised for sale before many years as regularly as Balsam, and *Primula* seed, if not quite so cheaply?"

Perhaps the best manner of raising seedlings is to sow the seed as soon as ripe, on the surface of pots or blocks that are covered with living *Sphagnum*. If the seeds are good, in all probability they will come out of the thousandths of each capsule contains will mark their appearance. The time they take to germinate appears to be very uncertain, some requiring only two or three months, while others remain as many years before they show themselves. *Disa grandiflora* is one of the easiest to obtain from seed; a friend informs me that he has hundreds of young plants from

a single pod. *Cypripedium*, also, appears to germinate readily, three or four hybrids having already been obtained.

As a matter of course it cannot for a moment be supposed that seedling *Orchids* will supersede imported plants, provided we can rely on the stock abroad holding out; and we know that there are some *Orchids* rare, even in their native habitats—*Phaleopsis intermedia* Portei, P. Lowii, and the beautiful *Acerides Schroederi* (A. crispum var. *Schroederi*) being amongst the number.

Again, it cannot be denied that some considerable time must elapse ere seedlings will reach a flowering condition, but this in practice would not prove a serious drawback, since if seedlings were reared year by year there would always be some in a blooming state.

Then, again, in the case of seedlings, there is always an uncertainty as to what they may eventually prove to be, and should they turn out distinct, there can be no doubt but that, in a pecuniary point of view, the rearing of them would be a decided success. Again, should they prove to be like their parents, they would still command a good price in the market. Doubtless, when the germination of *Orchid* seeds is better understood, hybridisation will give us many new and beautiful varieties.

How are we to account for the many varieties of *Cattleya Mossie*, unless crossing by insect agency has taken place in their native habitats, and these plants are seedlings? If the seed, then, germinates abroad, why is it so difficult to manage here at home?

If we look at what has already been effected, we shall see that our list of hybrids does not include many genera,—*Cattleya*, *Cypripedium*, *Goodyera*, *Phajus*, *Calanthe*, *Laelia*, *Anacathochilus*, *Acerides*, and *Limatodes* being all. *Dendrobiums* have been raised from seed, I believe, in an *Orchid* establishment near Manchester, but whether hybrids or not I cannot say. There would appear to be a natural affinity between *Calanthe* and *Phajus*, seeing that they cross most readily, although botanically one belongs to the *Vandee* and the other to *Epidendree*. F. W. B.

Home Correspondence.

The Weather in the South of Ireland, 1870.—It may be interesting to give a summary of the record kept in this garden for the past year as follows:—

	Thermometer.			Rain.		
	Maximum.	Minimum.	Mean.	Greatest Quantity in 24 Hours.	No. of Days on which it fell or more.	Total in Inches.
January ..	54°	16°	37°	15	1.65	6.23
February ..	52°	16°	34°	19	1.43	3.91
March ..	50°	22°	44°	16	1.27	8.84
April ..	50°	22°	36°	13	2.7	8.4
May ..	71°	28°	52°	4	1.08	16
June ..	84°	37°	60°	7	7	1.1
July ..	85°	50°	67°	4	4.6	3.86
August ..	89°	59°	61°	4	9	2.12
September ..	76°	57°	61°	1	6.2	2.70
October ..	60°	49°	54°	8	1.77	7.68
November ..	58°	46°	50°	18	1.31	3.53
December ..	53°	4	32°	23	1.69	3.40

Highest temperature, August 12, 89°; lowest temperature, December 31, 4°; mean temperature for the year, 48°. Number of nights at or below the freezing point, 123°. Greatest quantity of rain in 24 hours, 7.1 on October 16, 1.72 inches; number of days on which .01 or more fell, 167; total amount for the year, 40.94 inches. The most remarkable features of the past year were its extremes on October 10, 11, and 12—the thermometer indicating 12° of frost on the morning of the 10th, and 14° on the 11th, followed by 1.54 inch of rain in the night, and the thermometer 61° at daylight on the following morning (the 12th), succeeded by the roughest wind since January 11, 1866. Also the extreme low temperature of December, falling to 1° on nights of more than 20° of frost. The mean temperature of the week ending December 31, was 22.6°; mean maximum, 33°; mean minimum, 12.5°. The old year passed away with a rapid thaw from a south-west wind, .86 inch of rain falling on New Year's morning. The garden here lies very low, and damp, vegetation has accordingly suffered very much from the severe weather. W. Anderson, Jun., Curraghmore Gardens, County Waterford.

Destroying Weeds on Lawns.—"A Lady's" vitriol-charged walking-stick would prove a charming acquisition to our destructive inventions, especially now that our fair sisters have taken to carrying cudgels. I regret my inability to give any information as to the whereabouts of such a handy stick, but I would respectfully commend the matter to Mr. Dick Radcliffe, who keeps a ladies' repository of elegant garden knick-knacks. There can be no great difficulty in inventing such a stick, as most modern oilers for mowing and other machines are constructed upon the very principle that would render it effective. Press down a spring and out spurts a drop, leave the spring alone and there is no discharge. Like "A Lady," I would be glad to hear of such a rod in a pickle, charged with death-dealing liquid fire to rot and kill other weeds on lawns. Failing a ready-made stick, I

will now bespeak one in advance of any inventor that will offer them at a reasonable price. The great drawback to the use of a small rain can for distributing the vitriol is the stooping, and the loss of time consequent thereupon, and the loss of material from excess of dose. One drop of pure vitriol, or two of half-and-half vitriol and water, aimed truly into the growing eye or heart of the plant, would kill any lawn weeds. As to the views expressed by Mr. Sutherland and yourselves, I accept them, and yet adhere to my own. This may seem to be contradictory, but I really do not see how it can be easier than the smothering of weeds to death by a strong growth of good grasses, either the spontaneous produce of good land, or the result of liberal dressings of almost any kind of manure. Doubtless, too, the Rothamsted experiments may establish the fact that certain manures may be more destructive to weeds than others. This is a point, however, upon which I have not seen any evidence. Doubtless the manures that smothered the growth of grass the most, would kill the most weeds. But whether it be the weeds being overborne by the strongest in the mere struggle for life, any special manure can feed the grass and starve the weeds simultaneously, is the point upon which evidence is forthcoming I believe, but which I have not yet seen. But all this is hardly relevant to the question of destroying weeds on grass lawns. You and your correspondent alike seem to have overlooked the fact, that upon the grass has no chance of smothering the weeds to death. More than this, rank grasses on lawns are often almost as great an evil as weeds themselves. Moderate growth is an essential condition to a perfect surface, any grossness that would jostle weeds to death, any elongation of growth that would smother them with long grass, is damaging, if not fatal, to the velvet pile of a well-kept lawn. Upon such, and only such are really under discussion, I still assert that it is altogether a mistake to suppose that any top-dressing will do more than wither and kill the grass. The most troublesome weeds on such surfaces are Daisies and Plainants, and the above statement is emphatically true in regard to both. Only fancy top-dressing a Plainant off a lawn, and improving the grass by the same process. Has any one ever done it? If so, I hope he will hasten to chronicle the how to do it, as a most valuable New Year's gift for all lawn keepers. In my last letter bone flour was condemned as dirty, &c. These adjectives are not good for bones, but for crushed bones. Since writing the above I have read "J. B.'s" letter, and would advise all who are tempted to try salt in the language of Mr. Punch's advice to people about to marry—"Don't!" As to the pellets of turf, the Plainant roots will be through them before the end of the season. The scooping out will not kill them, and what is even more singular, not even if you put a pinch of salt into each hole before you fill it up,—the roots will suppose, being that the roots escape; whereas, if salt or vitriol is thrust into the heart of the plant, it seems to enter into the circulation and carry death with it to the further extremities. Upon this matter, unfortunately, I have had too much practice, and am only a too trustworthy authority. For years I persevered with "J. B.'s" punching-out and filling-in system, and now I have entirely given it up in favour of crown burning or picking. D. T. Rick, P.S. In reply to "B Subscriber," I have pointed out the blunder I ought to have been "kindhearted," as the context showed.

Habits of the Rook.—During the last week of the old year, when the ground was covered with 3 inches of snow and the thermometer showing from 23° to 20° of frost, the rooks here were seen by two or three witnesses (myself included) at different times to run after the redwing, and knock it down and begin to eat it. In one instance the mangled remains of the redwing were afterwards examined, which proved the above fact. I saw a rook after catching one fly high in the air, with the bird in its beak. These facts are, perhaps, worth recording, not being what is generally supposed to belong to the habits of the rook. Henry Mills, Enys, Penryn.

Tinted Honey.—The rose-coloured honey sent by Messrs. Fortnum & Mason to the Kensington Museum was the result of the following experiment made by Mrs. Gilbert, The Priory, Bodmin, Cornwall. On May 25, 1870, a strong swarm of bees was secured in one's neighbourhood. On July 10 the bees began to work in a glass super which had been placed in the hive; on August 12, finding the bees had only made two small pieces of comb, and ceased work, Mrs. Gilbert began to feed them at the top of the super with loaf sugar, 2 lb. to a pint of water, highly coloured with cochineal, and scented with rose-water. The bees consumed 70 lb. of sugar, and on September 25 Mrs. Gilbert took the super, which contained 33 lb. of wax, and was forwarded to Messrs. Prichard & May, Up to that day the drones were numerous in the hive, but soon after the super was taken they were turned out. J. T. B.

The Frost and the Boilers.—It is not often that we have the same opportunity of testing the capabilities of our heating apparatus as we have had during the last three weeks. Even in this southern part of the country we have had nearly 20° of frost. Not

† *Cattleya irrorata* is supposed to be a natural hybrid.

† P. H. Gosse, Torquay.

for one day or night only, but for several days in succession. A Negretti's self-registering thermometer showed 18½° at daylight on the morning of Dec. 22, and at noon on the same day, during the eclipse of the sun, it registered 10°; and before midnight we had 19°. This low temperature has continued with little variation up to the present time, our thermometer having registered 17° of frost this morning (January 5). This state of things has no doubt caused considerable anxiety to many connected with horticulture; and where the heating appliance was defective or incapable, it is just probable that Jack Frost has left his mark. It would be interesting and valuable if some disinterested correspondents would give their experience with the various boilers under their care during the late severe frost. Some may have had to capitulate; others, it may be, have just managed to keep the invader out-side; while others have been able to look on the attack with unconcern. Now if persons intending to put in new boilers had a record of facts (such as I have hinted might be given) to refer to, they would have little difficulty in making a selection, so as to have a boiler possessing the combined qualities of power and economy. *George Thomson, Stansted, Sussex.*

The Aucuba Fruit and the Cold.—It would be interesting to know how the fruit of the Aucuba, which is now become more plentiful out-of-doors, has stood the severe cold we have had. There are large bushes here which are loaded in places with unripe fruit, and which, during a frost of 20°, seemed unharmed, although the fruit as well as the leaves were, during that cold, fagged, and to all appearance frozen through and through. I may add, that because of the great cold, the female bushes are not so forward as those of male plants on their own roots, which are already showing flower. *Henry Mills, Enys, Penryn.*

Snow and Rain.—Allow me to ask, what is the proportion that snow bears to the water melted from it? In other words, to what amount of rainfall is a fall of snow a foot in depth equal? *R. C. A. P.* [At one of the meetings of the Scientific Committee of the Royal Horticultural Society reported in our columns, it was stated by Mr. Glaisher that, as a general rule, subject to exceptions, 12 inches of snow corresponded to 1 inch of rain. Eds.]

Melon Growing.—I should much like to know if there is any great advantage in growing successive crops on the same plant? I have been a successful Melon grower for 25 years, and have always been satisfied to raise young plants for each crop, often two, and occasionally three in a year in the same pit. It certainly shows first-rate skill to keep the old plants in such health as may enable them to furnish even a second crop; but how about those enemies, such as mildew, red spider, thrips, and gouty stems? For accidents will happen in the best regulated families. My experience satisfies me that it is quite as well, and, in fact, easier, to raise young plants for each crop. We have a crop now ripe (January 5), not a large one, but well flavoured. I don't think old plants would have stood so long. By the way, can you tell me what has become of the trial of Melons which the Horticultural Society undertook a few years since? I sent up seeds by request, but have never heard of any result. *T. P., Portgwidan.*

Seeding Cucurbit.—I send you a fruit of a seeding Cucurbit, grown from cuttings by me for seven years or more. The fruit is large for the season, and longer in the shoulder than usual, which, no doubt, is its great fault. I send it, however, not so much as a specimen of a perfect Cucurbit, but for its good qualities as a winter Cucurbit, and on account of its having been grown from cuttings for seven years. The reason for this has been the difficulty I have found in seeding it, and when successful by finding it never true. It is a white-spined variety, and I have grown nothing else for both summer and winter stock. It has been highly approved of down here, and you will say that the flavour is excellent, in spite of the size of the fruit. *J. T. B.* [We fully endorse your statements. Eds.]

Propagation of Centaureas.—I wish to thank Mr. Clark for his 'simple mode' of propagating these plants by the off-sets, like bedding Pelargoniums. I long for August to come to bed to try it, for they have hitherto proved rather ticklish children, either in spring or autumn. A long, small, white worm has destroyed most of our stock. It gets into the pith by some means, and eats the centre of the stem and its substance clean away—increasing and multiplying at pleasure. The plants have thus been destroyed by wholesale, and I have not been able to find a remedy. *D. T. F.*

About Potatoes.—The last season was a very exceptional one for all late varieties. Many growers have all hopes of getting a crop sufficient even to repay the outlay in planting, and the welcome late summer rain set in, and "lager-sorts" started growing very freely. The autumn being mild, large tubers were formed, and an exceptionally good crop was secured, in so far as bulk was concerned, and free from disease. The early frosts, however, destroyed the still active haulm, before the tubers were properly ripened; hence the flavour, and doubtless the nutritive properties are not up to average. Accepting these

facts as proven, I ask, can the "sets," or seed intended to be employed for the next season's crop, be so well ripened as they should be? Again, in how great a degree may not the Potato murrain be attributable—even admitting it be caused by fungoid growths—to impaired vitality consequent on the loss of constitutional vigour in the parent tuber, brought on by imperfect ripening? Seeds, it is well known, lose their vitality from the same cause. If this surmise be correct, then may I ask, have we any means of artificially ripening the crop, supposed to contain an excess of the cruder ill-developed juices? I believe we have, by simply cutting away from each fair sized tuber intended for a "set" some small portion—sufficient, in fact, to cause some part of the more watery ingredients to flow; the freer watery contents would be dried somewhat in process of absorption by the air, and the residue would collect around and form a dry callus over the wounds, causing, there can be no doubt, the remaining constituents to become more fitted to perform their very important functions. I should like to have the opinion of physiologists on this matter. *William Earley, Valentines, Ilford, E.*

Curious Growth of an Orchid.—*Odontoglossum bicornense* showed a flower stem last month, which, after growing about 24 inches, has thrown out a bunch of leaves, and a miniature plant at the point, and is now throwing out two branches of flowers from the side, besides several single blossoms. Is not this unusual? I am aware that *Phalenopsis Schilleriana* will occasionally propagate itself in this manner, but I have never seen it in *Odontoglossum* being so obliging. *T. P., Portgwidan.*

Brugmansias for the Flower Garden.—I have used them in my way you recommend, in a small way, for some years. Although they are all you say of them when in flower, they take so long to get to that state after planting out, that their season is very short. All their foliage disappears when they are first taken out-of-doors—this happens however careful the "hardening off" process is carried out. We have four varieties: I have crossed two of them, and have four pods of good seed. At Grove Hill (the seat of R. Fox Esq.,) there is a plant of *B. sanguinea* out-of-doors. The number of years has thrown up a quantity of shoots 7 to 8 feet high, and which, when in flower in the autumn, is truly magnificent. At Penrose also, near Helstone, the seat of J. Rogers, Esq., I learn that this plant is out-of-doors, and grows and flowers in the same way. I have left one out this winter, to try if it will do here likewise. Any one who has surplus plants would do well to try them in this manner in the borders of shrubberies, &c., as well as in the way you propose. *Henry Mills, Enys, Penryn.*

Pepper Tree. The following extract from Mr. W. Cuthbert's "Letters from America," now being published in the *Field*, appears to answer an inquiry which I made in your columns (1869, p. 921), viz., What is the Pepper tree, upon which certain silkworms feed in China, the silk thus produced being never eaten by moth? "The Pepper tree (*Schinus Mulli*) is a graceful object in the gardens here (San Francisco), with its prettily divided leaves and drooping bunches of small red fruit. Though very different from the *Pepper tree*, I am informed that it is used here. This is a Peruvian tree, which exudes from its stem and leaves a resinous, gummy juice resembling mastich, and called *Mulli* by the natives; after rain, this exudation is so abundant that the air is quite fragrant from the resin. Although I cannot find the *Schinus Mulli* called Pepper tree in any books, I have no doubt this is the plant that furnishes the Shantung silk, which Mr. Markham states "no moth will touch." *W. T.* [The French call the tree *Arbre à poivre*. Eds.]

Tomatos.—In justice to Messrs. Veitch, to whom I sold my Tomato seed called "Hepper's Goliath Tomato," I think it right to state how I raised it. For years I purchased of Messrs. Carter a packet of Tomato seed, for which I paid 3d.; from a plant I raised from this seed I carefully selected one of the finest fruit, and year after year selected the best fruit—hence my Goliath Tomato. When I purchased the seed of Messrs. Cuthbert, I believe the American Trophy Tomato was not known in this country, and even if it had been, I was not likely to have purchased a packet of such seed for the small sum of 3d. Messrs. Carter still advertise that the Trophy Tomato obtained a Special Certificate from the Royal Horticultural Society on Oct. 5, 1870—my Tomato was the only one exhibited on that day, and is in every respect totally different from the American Trophy Tomato, which is apparently a late variety, as particularly shown by those exhibited in a green state by Messrs. Carter on September 21 last, whereas my Tomato is an early one, and is therefore valuable in short summers. Messrs. Carter say no seed for my Goliath Tomato, which obtained the Special Certificate on October 5 last, and therefore have no right to send out Tomato seed as having obtained a Special Certificate on that day. *John Hepper.*

Cedar, Deodar, Larch.—One who notes analogies, resemblances, and perhaps identities, would be struck, first by the reference to Dr. Hooker's views as to the specific identity of the Cedars of Lebanon, Atlas, and Himalaya; secondly, by the notice of two curiosities from the French nurseries, viz., a deciduous

Cedar of Lebanon, and an evergreen Larch. Is there anything unreasonable in giving a wider extension to Dr. Hooker's views, and including Larch in the same modified species as the Cedars and Deodar? The writer has often indulged in the imaginary conception that a Larch might be looked on as a deciduous Cedar, or better still, Deodar, and a Deodar as an evergreen Larch. Is it justifiable for once to look upon imagination and fact as in accordance with each other? *G. Bath.*

Eye Seed.—I should feel greatly obliged for the name, or any information respecting the enclosed seeds. I sold them as the produce of a perennial plant growing by an old road in Oxfordshire, and that the people there have great faith in their powers of drawing or expelling foreign matters from the eye; and by whom they are called "Eye seeds." *Querist.* [The scraps you send are quite insufficient for accurate determination; nevertheless, on comparison, we have little doubt that they belong to the plant called Wild Clary (*Salvia verbenacea*). Dr. Prior, in his "Popular Names of British Plants," says the word 'Clary' is derived from the Latin *clarea*, which is the name given by the apothecaries into *clara-gyr*, translated oculus christi, Godes-eye and See-bright, and eye-salves made of it." See "Gerarde's Herbal," p. 627. No doubt the seeds would form an innocent lotion for the eye, but it is by no means clear to us that pure water would not be just as efficient. Eds.]

Spongioles.—The answer of Mr. Newlyn confirms my impression of his first letter, that he had gone to old authors for his information, for he quotes Lindley on the obsolete term spongioles. I beg to refer him to "P. Duchartre's *Éléments de Botanique*," Paris, 1867, on p. 238 of which he will find that the term was misapplied, and that he remarks on the desirability of the heading of "Ereurs Anatomiques et Physiologiques consacrées par le mot de Spongioles," where he will find the result of a number of experiments, proving my assertion. His remarks about younger succulents answers itself. *J. Croucher, Kew.* [The structure described under the name spongiole has no existence in Nature. The error has probably arisen from the appearance presented by the root-sheath or pileorhiza. See Hentley's "Elementary Course of Botany," 2d edition, 1870, p. 527. Eds.]

Medial Jelly (see also p. 1676, 1870).—Take Medlars, when sufficiently ripe for eating, wash them and put them into a preserving pan, with a little water; let them simmer very gently till quite a pulp; strain through a flannel bag. To every pint of juice put three quarters of a pound of loaf sugar, boil till perfectly clear, which takes a long time. Put into small shapes or pots. Should the jelly not be firm when cold, it will require more boiling; but it will not require this if well boiled at the first, and too much water is not put in with the Medlars. This jelly should be as firm and as clear as calves' foot jelly, of a beautiful yellow colour, and as transparent as crystal. It is a very delicious jelly, and so like Guava jelly that people take it for such. *G. S.*

Silver Firs.—Can your correspondents tell me, after what has been written on this subject, whether the Silver Fir is, or is not, a desirable tree to plant on the borders of a garden, and whether the objections that apply to the common Silver Fir are likely also to apply to the newer and more valuable kinds, such as *Picea magnifica*, *P. nobilis*, and *P. pinsapo*? *G. F. M.*

Scale and Spirit.—The brown scale having been so very troublesome to me on Peach trees, Orange and Lemon plants, I am very pleased to see something has proved destructive to it. I see Mr. Fish and others (p. 1731), recommend the use of methylated spirits for Peach trees, but do not say how it is best to be used. I fear it would be rather expensive to apply it with a syringe, and to lay it on with any kind of brush would be rather difficult. Is it likely the spirits will injure the buds of Peach trees, and whether the scales will set to work? I have washed some trees with the same sort of wash, adding a little glue; it seems to be rather too binding for the bark. *W. T.*

Keeping Ice.—Perhaps of all materials bricks are as suitable for keeping materials with which to form ice-well, as they are so exceedingly porous and retentive of moisture. I advise, if it be practicable, that the existing well should be "faced" all around the inner side with a moderate coating of cement. It will be of primary importance to make a perfect outlet for any water which may accumulate at the base of the well through the melting of some portion of the ice—the extreme outlet being so constructed that a full current of air may rush up, it into contact with the inner body. Moisture, whether actual or aerial, being the most powerful enemy to contend with, in all efforts to conserve ice it is essential that at the apex of the structure a moderate aperture be made to give free egress to all the moisture that collects within, to be used more especially during the summer months, when evaporation is great, and which, if not dispelled thus, condenses around the block of ice maintained, to its certain destruction. *William Earley, Valentines, E.*

Planting on Chalk Subsoil.—I am not well acquainted with the names of the evergreens and deciduous trees and shrubs that thrive best on a cla-

soil with a chalk subsoil. I should feel obliged by your opinion on this matter. *Planter.* The planter will find the following evergreen deciduous trees and shrubs thrive in a clay soil resting on chalk:—Ash, Spanish Chestnut, Poplars, Maple, Thorn, Laburnum, Beech, Acacia, Mountain Ash, Yew, Holly, and Evergreen Oak. Shrubs—Lilacs, Spireas (of sorts), Berberry (common), Ribes sanguineum, Guedres Rose, Elder, Hazel, Filbert, and Honey-suckle, Aucuba japonica, Berberis Aquifolium, Junipers, Arbutus, Daphne pontica, Alaternus, Phillyrea, Laurustinus, and Portugal Laurel. Before planting, the ground ought to be trenched, and the loose chalk at the bottom of the trenches broken up and mixed with the clay soil as the operation proceeds. *K.]*

Foreign Correspondence.

SOUTH AMHOV, NEW JERSEY, U.S.—*The Extending System of Hothouse Building is well understood and appreciated in this country. It is nothing unusual to see an acre or more of ground covered with houses built on that principle in the large modern commercial establishments here. To look nearer home, I may remark that the same system was adopted in Paris for growing the thousands of fine-foliated and other plants required for the parks and gardens of that unfortunate city, in which I have been for the past few years. A thousand or two of full grown Ox Cabbages would be prized more than all the ornamental plants in La Muette. In this country, where labour and materials are much dearer than in England, it is usual to build from three to six houses side by side, so that the division, which is frequently made of boards, serves for the side of two houses; the gutter is usually a foot wide, so that it is no more difficult to walk on, for putting on shading material, or for making repairs, than on a road which will be, besides effecting a great saving of one wall, extra gutter, and the loss of heat accruing from two outside walls to each house. This is a consideration even in an English winter, and more so here where it is occasionally much colder. The objections urged by Mr. Cannell are just as regards side ventilation, which is of course impossible except in the outside house of the block; but there are many plants which are not benefited by having side air in the winter, if plenty of ventilation be given at the top. Plants will be frequently injured by side air, without injury to the plants, in consequence of the draughting winds which we experience. We find, after being obliged to apply fire-heat to houses containing such plants as Pelargoniums every night for weeks together, that the outside row which gets the least circulation of air will draw up to some extent, but I question if that would not be the case even if side air were available.*

As regards the shade cast by one roof on another, no doubt it may be an evil summer weather, but in November, when it is not thought of here, the sun being much higher and brighter almost daily; in fact, we have had but one day this month, and only one in November, without sun. With houses 12 feet wide (the most useful width for all small stock) there is very little shade even at sunrise if they are erected due north and south, which, for well-known reasons, they should be. There would be little objection to the one larger and more lofty house being built at the north end of the small houses; it would not shade the others; and the whole design would be as good as it could be when all are seen at once from any point, whereas in Mr. Newton's design the whole can only be seen from the centre.

I may mention that here a shed is usually built the length of the north end of the houses, with a door into such houses. In this shed are the fireplace, pots, soil, and all the other necessities for potting, packing, &c., so that nothing has to be carried into the cold in winter, and it is also the coolest place in summer. I may mention that in my plan for the plant-house at Chatsworth I arranged it in such a manner that the family and visitors could go from the mansion without going outside; only a part of it, however, was carried out by me, although the entire plan was approved. Disinterested gardeners, no doubt, formed their own opinion on those houses where criticised in your columns, and probably drew comparisons between it and a certain toy exhibited last summer, which, if the original was to be believed, were caused a complete revolution in building and heating. *James Topley, Dec. 19, 1870.*

Societies.

LINNÆAN: Dec. 1.—G. Bentham, Esq., President, in the chair. G. King, Esq., M.B.; Rev. F. Silver, and F. L. Soper, Esq., were elected as Fellows. The following papers were read:—

I. *Supplementary Note on Chinese Silkworm Oaks*, by Dr. H. F. Hance, of Whampoa; communicated by the President. In a former paper Dr. Hance had shown that the tree on which feeds a larva spinning cocoons, from which large quantities of silk are manufactured in the north of China, is *Quercus mongolica*, Fish; and he had also given reasons for believing that *Q. dentata*, Thunberg, was used to feed the same worm. In an article by Dr. McCartee, which he had previously overlooked, it is stated that the tree pointed out at Chefoo as the Oak upon which the silkworm was reared was called *Tso-shu*, and corresponded with a description by Tournemont,

"*Quercus orientalis castanea foliis, glande recondita in cupula, et acicul. squamato.*" The only oak in Northern China agreeing at all with Tournemont's phrase *Q. serrata*, Thunb., and *Q. sinensis*, Bge. Mr. Mayers, who had made inquiries at Chefoo, stated that he could only find that one species was met with in that neighbourhood, the specimens of which he had been procured belonging to *Q. serrata*. According to a Chinese work (entitled "Nomenclature and Description of Plants"), the *Tsing-kang* tree, which is found everywhere, is that from which the silkworm cocoons of *Kweichow* are obtained, and of this tree there is a plate given, which represents an Oak with leaves like those of a shallow-lobed form of *Q. Robur*, and with three fruits, one distinctly stalked, the dense squamæ of the cupula entirely concealing the acorn, and looking like those of *Q. dentata*, Thunb., though closely appressed, instead of being more or less reflexed. After quoting at length a note by Père Bertrand, Dr. Hance went on to say, that "young trees, or the new growths set from the stumps of old ones, are alone employed for feeding the worms." Another point worthy of attention is the affinity of the *Q. serrata* employed, so far as the larva is concerned, in feeding the silkworms of those of Europe and Western Asia. * Having for several years past made more than ordinary attention to the genus *Quercus*, I believe the specific limits of the *Lepidobalanis* of the eastern hemisphere are most vaguely and unsatisfactorily defined, and I am by no means satisfied of the correctness of the division into north-east Asia. Similar doubts have been expressed by several European botanists, but the total disagreement of writers as to what are good species, even amongst well-known forms, is perhaps the most convincing proof of the uncertain status of the members of the group, and I see no reason, "he continued, "to alter the opinion formerly expressed, that all circumstances would seem to conspire to render the culture of the Oak silkworm in Europe a sure matter of success, if properly set on foot and fostered. It is curious to know from independent sources, that the silkworms of the *Q. serrata* in the north-east Asia are carried on in the south-west as well as in the north-east of this vast empire; and it will be a matter of great interest to ascertain whether any Oak is employed for the same purpose in Northern Burma or Assam, in both of which the genus *Quercus* is very tenacious of vegetation, though that which *Kweichow* is only separated by the province of Yunnan."

II. *On the Sources of the Radix Galangali minoris* of Pharmacologists, also by Dr. Hance. While the source of the Greater Galangal has long been known to be the *Alpinia Galanga*, Linn., that of the Lesser Galangal has been a subject of dispute, and has been supposed to be the *Alpinia chinensis*, Rosc. Galangal is not used in English medical practice, and even on the Continent has become almost obsolete, nevertheless, it is exported from China in considerable and increasing quantities. The exports and the last three years were as follows:—

	From Canton.		From Shanghai.		Total.	
	Lb.	Value.	Lb.	Value.	Lb.	Value.
1867	37,800	£123 10 10	79,200	£354 9 9	112,000	£478 1 7
1868	15,233	.. 57 10	162,308	.. 1149 3	177,641	.. 1206 13 5
1869	..	..	370,800	.. 3046 16 9	370,800	.. 3046 16 9

During an expedition in November last to the island of Haenau, at anchor at Pak-sha, a fishing village, on the south coast of Kwanton, about 17 miles from, and rather to the east of Hoi-hai, on the north coast of Haenau, a party who went a few miles inland met with a quantity of the roots of the Lesser Galangal lying in the sun, exposed to a shallow Bamboo basket. On a sudden the roots of the plant were discovered near the village of Tung-sai, situated upon the bay of Pak-sha, at the southern extremity of the peninsula of Lui-chau-fu, and directly opposite Hoi-hai, the port of Kuang-chau-fu, in Haenau. The plant was growing on very hard and volcanic soil, at an elevation of about 100 feet above the sea. The plants, which had originally been planted, but were now neglected, grew in masses, sometimes more than a foot in diameter. Mr. Swinhoe has since found the plant growing wild in a dense jungle, on the south coast of Haenau. The seeds, good and true, were obtained from the plant. The *Bitter-Sedge*, *Cordarum*, figured in Mr. Hanbury's valuable paper, "On some rare kinds of *Cordarum*" ("Pharm. Jour.", xiv, 418, fig. 8). The species was considered very closely allied to *Alpinia calcarata*, Rosc., but inasmuch as it remained extremely dissimilar to the Chinese plant, and was cultivated within the tropics, and growing and flowering luxuriantly in the Calcutta and Peradenia gardens, if the same as the Lesser Galangal, should have remained so long unrecognised, Dr. Hance was induced to pursue his researches, which, as he has shown, have been successful. He is now proposing for it the name of *Alpinia officinarum*. The paper was concluded by a carefully drawn up description (from living specimens) of the plant, of which Dr. Hance observes, "vix dubie in silvis australium imperii sinensis provinciarum, ubi commercii ergo large cultura."

Dec. 15.—G. Bentham, Esq., President, in the chair. J. C. Mill, Esq., was elected a Fellow. The following papers were read:—

I. *On Sabadilla* (Asargia officinalis) from Caracas, by M. A. Ernst; communicated by Dr. Hooker. The amount of this drug exported from La Guayra, the principal port of Venezuela, amounts to about 5000 quintals annually, the whole being sent to Hamburg. The plant is very common in the immediate neighbourhood of Caracas, on the grassy mountain slopes to the north of the city, on both sides of the old mule road, and on the western side of the road to the village of Antimano. The greatest part of the drug, obtained from the seeds of the plant, comes, however, from the hilly regions of San Antonio and Paracoto, to the south of Caracas, where it grows at an elevation of from 3500 to 4000 feet. The Asargia officinalis was origin-

ally discovered on the eastern slopes of the Mexican Andes, in the neighbourhood of Vera Cruz, by Schiede. It is not recorded from the West Indian Islands, the *Veratrum Sabadilla*, Retz, of the Antilles being an entirely different plant. No other habitat than the Mexican one was indeed known, so that M. Ernst was not a little astonished to find the plant to be identical in its general appearance, as pointed out by Humboldt, it is apparently indigenous in Venezuela, growing in places where it is most unlikely to have been planted, and having been known long before the seeds were first exported by German druggists. The Caracas plant differs slightly, scarcely specifically from the typical form of Mexico in its broader and manifestly channelled leaves. The bulbs contain numerous rapheids of oxalate of lime. Should it prove distinct, M. Ernst proposes to call it *A. caracasana*.

II. *A Letter to Dr. Hooker, dated Sierra Nevada, California, Oct. 28, 1870, on the Californian Pitcher Plant* (from the notes of J. E. Reiche, by Mr. W. Robinson). The Californian Pitcher Plant grows in the Sierra Nevada, at an altitude of 5000 feet above the sea, in small sloping bogs, along with Spaghnum and other bog plants. It is a vigorous growing plant, the stout flowering stems arising from the base of the plant, and bearing a large, as large as Walnuts. At a short distance the pitchers present the appearance of Jargonelle Pears, supported with the larger ends uppermost at a distance of from 10 inches to 24 inches above the ground. This results from the pitchers being quite turned over at it is from the lower half of the pitcher being of a decided pear-like yellow. They are all twisted spirally, especially in their upper portion; and they contain at the lower part a layer of from 2 to 5 inches of the closely packed remains of insects of all sizes, from minute beetles to large powdery moths. When a sharp knife is passed through a lot of brown pitchers withering round an old plant, the stumps resemble a number of tubes densely packed with the remains of defunct insects, but what it is that attracts them to the plant, very few means can be ascertained. Within the pitcher the surface is smooth for a little way down; then isolated hairs appear; and soon the chamber becomes densely lined with sharp needle-like hairs, all pointing downwards—so decidedly, indeed, that they almost lie against the surface from which they spring. The hairs are of a length of about one inch, and are about a quarter of an inch long, and very rigid. The poor insects evidently to travel down these conveniently arranged stubbles, but none seem to turn back. The pitcher which may be a couple of inches wide at the top, narrows very gradually to a point where it is little more than a line in diameter. For some little distance above this point, the hairs all converge, and the unhappy fly goes on, till he finds his head against the thick, firm bottom of the cell, and his rear against myriads of bayonets. Very small insects, such as the narrow-bodied, and above them larger ones, densely pack themselves to death, in the hope of fighting their way out. When held with the top upwards, a reddish dish juice with an exceedingly offensive odour will sometimes drop from them. The time taken will be found to suit the climate of the Eastern States well, but the Darlingtonia perfectly; and in England these are frequently treated like Cattleyas, and people seem afraid to give them enough water. Take *Sarracenia*, for example; it is no uncommon thing to see it coddled like a precious and difficult terrestrial Orchid, but if any one will take a young plant with life in it, pot it in peat, using no drainage but a lump of peat, and place the pot in a saucer of water, and near the glass in a warm pit or greenhouse, so that the plant shall never lack an abundance of moisture, *Sarracenia* will be found to grow as readily as any common greenhouse plant. Nearly the same may be said of the *Darlingtonia*. I found it growing in Spaghnum, with a *Sundew* and *Rushes*. Treat it as if it were a *Sundew* or *Spaghnum*, and success is certain. A warm frame or greenhouse temperature is not necessary, but the warmest greenhouse is intermediate house in summer. It makes runners very freely, sometimes a foot long.

III. *Carnivorous and Insectivorous Plants*, by Mrs. Barber; communicated by Dr. Hooker. The author considers the *Nepenthes*, the *Sarracenia*, the *Darlingtonia*, and the *Cephalotus* as predatory plants, feeding on animal life. She says that the *Nepenthes* is a species of *Drosera* and *Koridula*, "branches of the last named being hung up in forbushes for the purpose of catching flies, and in one species, more particularly described, *Drosera trinervis*, the glands are noticed as catching and retaining the insects, where about 1000 are common, and become almost drained by the many mouth-like glands by which they are surrounded, leaving in a short time nothing but small portions of dust. The different species of *Droseras* are capable of enduring long seasons of protracted drought; and they each have a power of growing, and becoming permanent—for, dry and Moss-like, they await the return of the rainy season, and seldom perish. It is in spring and summer time that these plants set their traps, when the earth and air are teeming with life.

A special meeting, held at the close of the general meeting, Dr. Lindsay Stewart was elected a member of the Council, in the room of the late Dr. Anderson.

Notices of Books.

Charles Darwin et ses Precursers Français; *Etude sur le Transformisme*. Par A. de Quatrefages. Paris, 1870.

(Second Notice.)

The two next chapters contain an abstract examination of abnormal variations, and of return to the primeval type, or atavism; and the history of the so-called lepidopterous in appropriate detail, freed from the false statements propagated about it to confirm the author's views.

In the sixth chapter M. Quatrefages takes up more definitely the argument against Lamarck and Darwin, both of whom he considers confound the ideas of species and of race. He says that Darwin, in order to sustain his theory, should have proved, on the one hand, that crossing between races is not always possible; or, that crossing between species can give rise to hybrid races. This, our author maintains, Mr. Darwin is so far from being able to do, that his own works are a storehouse of observations tending to prove the direct contrary.

M. Quatrefages concludes that the gaps in our present knowledge cannot lead us to adopt hypotheses in contradiction to ascertained facts, and that the general laws of creation which govern the present must have been equally operative in the past. The power which man possesses of creating and modifying races both in the animal and vegetable world, is very great. Beginning with the egg, he can, by the simple application of heat in different ways, evolve abnormal productions,* and by altering the surrounding circumstances of life,† and by carefully crossing only with those possessing like peculiarities, he can produce races so unlike the species that they would certainly be set down, at first sight, as altogether different species. Thus, from one species of pigeon (as Mr. Darwin believes) he has succeeded in raising 150 races, but they are all, nevertheless, one species, and propagate freely among themselves. The old adage, however, "Nature has varied under his hand into 180 races, and it is familiar to every one how wonderful the triumph of human art has been in the vegetable kingdom. But man has never yet succeeded in producing one species, self-maintaining, capable of continued fertility within itself, and unfruitful in crossing with other species.

The advocates of Darwinism say that, if man can do so much, Nature, having all time at her disposal, can do much more, and M. Quatrefages admits that the argument is plausible. He denies, however, its correctness. He shows that man can do many things which Nature cannot, and that in the natural state of things we do not find such phenomena as occur under the hand of man. In fact, if there is anything which must strike an observer in the organised world it is the order and the constancy which we see reigning for ages. The cause of all this is simple and unique. If we could suppose infidelity between the species—suppose that the union between wild species were in all senses and indefinitely fruitful, as they are among our doves and in our stables, what would happen? The barriers between species, between genera, would be taken away. Crossing would take place in all directions; everywhere would appear intermediate types, everywhere the actual distinctions would gradually become effaced and disappear. It is impossible to imagine where the confusion would stay its course. It would become a chaos of mixed races, such as the Babylonians dreamt of, and such as Lucretius described.

"Infidelity between species in the organic world has consequently as important a part as the force of gravity in the celestial world. It maintains the zoological or botanical distance between species, as the latter maintains the physical distance between the heavenly bodies. All these have their perturbations, their unexpected phenomena. Do not, therefore, doubt the great laws which hold in their place the smallest of the satellites as well as the largest of the suns. By no means. Can we on similar grounds deny the fact which secures the separation of the species nearest to each other? The union of the most dissimilar in all senses and in the previous case. In astronomy we should discard at once every hypothesis in opposition to the first, and although the complication of phenomena is much greater in botany and in zoology, a serious consideration of the subject will always lead to the rejection of every doctrine that is discordant with the second.

"Human art may produce results which seem at first not to yield to results of hybridation. It has done so once and may do so again. For all that it has not changed the natural and general law, nor has it demonstrated that it is not existent."

The same observations apply to past geological ages as well as to the present. All things being alike in other respects, fossil species are as well defined and as distinct as those of the present era.

Everything leads us to the conclusion that the laws of the organic world have not changed since the beginning. To admit the contrary is to oppose to all that we know concerning the present and the past of our globe, the possible, the unknown, or, in other words, hypothesis, having for its foundation our very ignorance.

On this account M. Quatrefages declines to believe in the origin of species by gradual transformation, and, in the name of science, feels compelled to combat Darwinism as much as the hypothesis of Lamarck. "In a word (he says, in conclusion), let us not dream what might be, let us accept and search into what is." H.

Among the periodical publications we may notice *The Student* (Groombridge), a publication devoted to the popular treatment of subjects connected with Science, Literature, and Art. The present number

* Experiments commenced by G. St. Hilaire, and completed by M. Deceane. *Cynoglossus* and *Cantharis*.
† M. Deceane has reproduced, by a simple change in the conditions of existence, many forms of one same plant existing in Nature, and which had been taken for so many species properly so called.

contains an excellent article on Wasps, ancient and modern, by Dr. Ormerod; a paper on the edible Frog, by Mr. Shirley Hibberd, and other subjects, well handled and treated by competent writers. It is also illustrated with two coloured plates.—*The Popular Science Review* (Hardwicke), also a quarterly publication, under the editorship of Dr. Henry Lawson, keeps up its well earned reputation by the value and interest of its articles. In the present number is an article on Polymorphic Fungi, from the pen of Mr. M. C. Cooke; and one on Sleep, by Dr. Richardson. The illustrations are generally satisfactory. The Scientific Summary has to some extent been superseded by the publication of *Nature*, but is still an interesting feature of the present publication. A greater division of labour in its construction is however desirable, as occasionally the several subjects are too unequally treated.—*The Florist World* (Groombridge) contains a coloured plate of Mr. Turner's Paeonion "Polly," a good paper on Grape growing, a list of Palms suitable for cultivation, and illustrated by small woodcuts, and other matters of interest.—*The Florist* starts the year with a new and elegant design on the title-page. It contains coloured figures of the Brockworth Park Pear, an illustration of the beautiful pendulous Sophora, and a selection of useful articles.—*The Villa Gardener* gives full value for the sixpence expended in its purchase. The present number contains an excellent article on Grape growing in the open air.—*The People's Magazine*, a publication of general interest, contains also an article on gardening. If people are not gardeners, it is not for want of teachers.

THE WEATHER.

STATE OF THE WEATHER AT BLACKHEATH, LONDON, FOR THE WEEK ENDING WEDNESDAY, JANUARY 11, 1871.

1871. MONTH AND DAY.	Reading of					Hygrometrical Deduction from Glaisher's Tables, 5th edition.	
	Barometer reduced to 32° Fahr.	Dry Ther- mometer.	Wet Ther- mometer.	Dew Point.	Direction of Wind.	Height of Vapour in Feet of Air.	Weight of Vapour in Grains per Cubic Foot of Air.
January.							
5. Thurs.	30.02	35.0	31.5	30.4	SW	62	0.8
6. Friday.	30.02	35.0	31.5	30.4	SW	62	0.8
7. Satur.	30.02	35.0	31.5	30.4	SW	62	0.8
8. Sunday.	30.02	35.0	31.5	30.4	SW	62	0.8
9. Monday.	30.02	35.0	31.5	30.4	SW	62	0.8
10. Tues.	30.02	35.0	31.5	30.4	SW	62	0.8
11. Wednes.	30.02	35.0	31.5	30.4	SW	62	0.8

1871. MONTH AND DAY.	TEMPERATURE OF THE AIR.					WIND.		RAIN.	
	Highest.	Lowest.	Range in Day.	Mean.	Direction.	Force.	Horizontal Movement.	In inches.	
January.	Highest.	Lowest.	Range in Day.	Mean.	Direction.	Force.	Horizontal Movement.	In inches.	
5 Thurs.	35.9	29.9	22.5	37.4	32.7	3.5	SW W.	375	0.04
6 Friday.	44.1	39.9	4.0	37.8	34.5	2.5	SW W.	345	0.04
7 Satur.	39.0	32.8	13.1	38.6	35.3	2.5	SW W.	440	0.01
8 Sunday.	39.0	32.8	6.2	35.9	31.0	2.5	SW W.	320	0.00
9 Monday.	36.0	30.3	5.7	33.4	29.7	2.5	S. W. W.	150	0.00
10 Tues.	36.2	26.6	9.6	34.3	4.6	2.5	S. W. W.	205	0.00
11 Wednes.	34.4	28.8	3.6	35.1	3.5	2.5	S. E. N. E.	180	0.00

Jan. 5.—Variable amounts of clouds were prevalent during the day, and rain fell between 11 A.M. and 1.30 P.M. Generally cloudless at night.
6.—Light clouds present in the morning; then overcast. Rain fell between 4 and 8 P.M.
7.—Generally cloudy. Rain fell between 1 and 2 P.M. Fine Aurora at night.
8.—Fine during the morning and afternoon. Cloudy at night.
9.—Cloudy throughout. Snow fell between 11 and 1 P.M.
10.—Generally overcast. A little snow fell occasionally.
11.—Cloudy till the afternoon; then variable. A little snow fell during the morning, and again very heavily between 9 and 10 P.M.

TEMPERATURE OF THE AIR AND FALL OF RAIN AT DIFFERENT STATIONS.

DURING THE WEEK ENDING SATURDAY, JANUARY 7, 1871.

NAMES OF STATIONS.	TEMPERATURE OF THE AIR.					FALL OF RAIN.
	Highest.	Lowest.	Range of all.	Mean of all.	Mean of all.	
Portsmouth	46.0	35.0	11.0	40.5	37.5	0.0
Blackheath	45.0	34.0	11.0	40.0	37.0	0.0
Bristol	44.0	33.0	11.0	39.5	36.5	0.0
Birmingham	43.0	32.0	11.0	39.0	36.0	0.0
Wolverhampton	42.0	31.0	11.0	38.5	35.5	0.0
Leicester	41.0	30.0	11.0	38.0	35.0	0.0
Norwich	40.0	29.0	11.0	37.5	34.5	0.0
Nottingham	39.0	28.0	11.0	37.0	34.0	0.0
Sheffield	38.0	27.0	11.0	36.5	33.5	0.0
Manchester	37.0	26.0	11.0	36.0	33.0	0.0
Liverpool	36.0	25.0	11.0	35.5	32.5	0.0
Edinburgh	35.0	24.0	11.0	35.0	32.0	0.0
London	34.0	23.0	11.0	34.5	31.5	0.0
Cardiff	33.0	22.0	11.0	34.0	31.0	0.0
Southampton	32.0	21.0	11.0	33.5	30.5	0.0
Exeter	31.0	20.0	11.0	33.0	30.0	0.0
Gloucester	30.0	19.0	11.0	32.5	29.5	0.0
Reading	29.0	18.0	11.0	32.0	29.0	0.0
Bath	28.0	17.0	11.0	31.5	28.5	0.0
Salisbury	27.0	16.0	11.0	31.0	28.0	0.0
Worcester	26.0	15.0	11.0	30.5	27.5	0.0
Hereford	25.0	14.0	11.0	30.0	27.0	0.0
Gloucester	24.0	13.0	11.0	29.5	26.5	0.0
Exeter	23.0	12.0	11.0	29.0	26.0	0.0
Gloucester	22.0	11.0	11.0	28.5	25.5	0.0
Reading	21.0	10.0	11.0	28.0	25.0	0.0
Bath	20.0	9.0	11.0	27.5	24.5	0.0
Salisbury	19.0	8.0	11.0	27.0	24.0	0.0
Worcester	18.0	7.0	11.0	26.5	23.5	0.0
Hereford	17.0	6.0	11.0	26.0	23.0	0.0
Gloucester	16.0	5.0	11.0	25.5	22.5	0.0
Exeter	15.0	4.0	11.0	25.0	22.0	0.0
Gloucester	14.0	3.0	11.0	24.5	21.5	0.0
Reading	13.0	2.0	11.0	24.0	21.0	0.0
Bath	12.0	1.0	11.0	23.5	20.5	0.0
Salisbury	11.0	0.0	11.0	23.0	20.0	0.0
Worcester	10.0	-1.0	11.0	22.5	19.5	0.0
Hereford	9.0	-2.0	11.0	22.0	19.0	0.0
Gloucester	8.0	-3.0	11.0	21.5	18.5	0.0
Exeter	7.0	-4.0	11.0	21.0	18.0	0.0
Gloucester	6.0	-5.0	11.0	20.5	17.5	0.0
Reading	5.0	-6.0	11.0	20.0	17.0	0.0
Bath	4.0	-7.0	11.0	19.5	16.5	0.0
Salisbury	3.0	-8.0	11.0	19.0	16.0	0.0
Worcester	2.0	-9.0	11.0	18.5	15.5	0.0
Hereford	1.0	-10.0	11.0	18.0	15.0	0.0
Gloucester	0.0	-11.0	11.0	17.5	14.5	0.0
Exeter	-1.0	-12.0	11.0	17.0	14.0	0.0
Gloucester	-2.0	-13.0	11.0	16.5	13.5	0.0
Reading	-3.0	-14.0	11.0	16.0	13.0	0.0
Bath	-4.0	-15.0	11.0	15.5	12.5	0.0
Salisbury	-5.0	-16.0	11.0	15.0	12.0	0.0
Worcester	-6.0	-17.0	11.0	14.5	11.5	0.0
Hereford	-7.0	-18.0	11.0	14.0	11.0	0.0
Gloucester	-8.0	-19.0	11.0	13.5	10.5	0.0
Exeter	-9.0	-20.0	11.0	13.0	10.0	0.0
Gloucester	-10.0	-21.0	11.0	12.5	9.5	0.0
Reading	-11.0	-22.0	11.0	12.0	9.0	0.0
Bath	-12.0	-23.0	11.0	11.5	8.5	0.0
Salisbury	-13.0	-24.0	11.0	11.0	8.0	0.0
Worcester	-14.0	-25.0	11.0	10.5	7.5	0.0
Hereford	-15.0	-26.0	11.0	10.0	7.0	0.0
Gloucester	-16.0	-27.0	11.0	9.5	6.5	0.0
Exeter	-17.0	-28.0	11.0	9.0	6.0	0.0
Gloucester	-18.0	-29.0	11.0	8.5	5.5	0.0
Reading	-19.0	-30.0	11.0	8.0	5.0	0.0
Bath	-20.0	-31.0	11.0	7.5	4.5	0.0
Salisbury	-21.0	-32.0	11.0	7.0	4.0	0.0
Worcester	-22.0	-33.0	11.0	6.5	3.5	0.0
Hereford	-23.0	-34.0	11.0	6.0	3.0	0.0
Gloucester	-24.0	-35.0	11.0	5.5	2.5	0.0
Exeter	-25.0	-36.0	11.0	5.0	2.0	0.0
Gloucester	-26.0	-37.0	11.0	4.5	1.5	0.0
Reading	-27.0	-38.0	11.0	4.0	1.0	0.0
Bath	-28.0	-39.0	11.0	3.5	0.5	0.0
Salisbury	-29.0	-40.0	11.0	3.0	0.0	0.0
Worcester	-30.0	-41.0	11.0	2.5	-0.5	0.0
Hereford	-31.0	-42.0	11.0	2.0	-1.0	0.0
Gloucester	-32.0	-43.0	11.0	1.5	-1.5	0.0
Exeter	-33.0	-44.0	11.0	1.0	-2.0	0.0
Gloucester	-34.0	-45.0	11.0	0.5	-2.5	0.0
Reading	-35.0	-46.0	11.0	0.0	-3.0	0.0
Bath	-36.0	-47.0	11.0	-0.5	-3.5	0.0
Salisbury	-37.0	-48.0	11.0	-1.0	-4.0	0.0
Worcester	-38.0	-49.0	11.0	-1.5	-4.5	0.0
Hereford	-39.0	-50.0	11.0	-2.0	-5.0	0.0
Gloucester	-40.0	-51.0	11.0	-2.5	-5.5	0.0
Exeter	-41.0	-52.0	11.0	-3.0	-6.0	0.0
Gloucester	-42.0	-53.0	11.0	-3.5	-6.5	0.0
Reading	-43.0	-54.0	11.0	-4.0	-7.0	0.0
Bath	-44.0	-55.0	11.0	-4.5	-7.5	0.0
Salisbury	-45.0	-56.0	11.0	-5.0	-8.0	0.0
Worcester	-46.0	-57.0	11.0	-5.5	-8.5	0.0
Hereford	-47.0	-58.0	11.0	-6.0	-9.0	0.0
Gloucester	-48.0	-59.0	11.0	-6.5	-9.5	0.0
Exeter	-49.0	-60.0	11.0	-7.0	-10.0	0.0
Gloucester	-50.0	-61.0	11.0	-7.5	-10.5	0.0
Reading	-51.0	-62.0	11.0	-8.0	-11.0	0.0
Bath	-52.0	-63.0	11.0	-8.5	-11.5	0.0
Salisbury	-53.0	-64.0	11.0	-9.0	-12.0	0.0
Worcester	-54.0	-65.0	11.0	-9.5	-12.5	0.0
Hereford	-55.0	-66.0	11.0	-10.0	-13.0	0.0
Gloucester	-56.0	-67.0	11.0	-10.5	-13.5	0.0
Exeter	-57.0	-68.0	11.0	-11.0	-14.0	0.0
Gloucester	-58.0	-69.0	11.0	-11.5	-14.5	0.0
Reading	-59.0	-70.0	11.0	-12.0	-15.0	0.0
Bath	-60.0	-71.0	11.0	-12.5	-15.5	0.0
Salisbury	-61.0	-72.0	11.0	-13.0	-16.0	0.0
Worcester	-62.0	-73.0	11.0	-13.5	-16.5	0.0
Hereford	-63.0	-74.0	11.0	-14.0	-17.0	0.0
Gloucester	-64.0	-75.0	11.0	-14.5	-17.5	0.0
Exeter	-65.0	-76.0	11.0	-15.0	-18.0	0.0
Gloucester	-66.0	-77.0	11.0	-15.5	-18.5	0.0
Reading	-67.0	-78.0	11.0	-16.0	-19.0	0.0
Bath	-68.0	-79.0	11.0	-16.5	-19.5	0.0
Salisbury	-69.0	-80.0	11.0	-17.0	-20.0	0.0
Worcester	-70.0	-81.0	11.0	-17.5	-20.5	0.0
Hereford	-71.0	-82.0	11.0	-18.0	-21.0	0.0
Gloucester	-72.0	-83.0	11.0	-18.5	-21.5	0.0
Exeter	-73.0	-84.0	11.0	-19.0	-22.0	0.0
Gloucester	-74.0	-85.0	11.0	-19.5	-22.5	0.0
Reading	-75.0	-86.0	11.0	-20.0	-23.0	0.0
Bath	-76.0	-87.0	11.0	-20.5	-23.5	0.0
Salisbury	-77.0	-88.0	11.0	-21.0	-24.0	0.0
Worcester	-78.0	-89.0	11.0	-21.5	-24.5	0.0
Hereford	-79.0	-90.0	11.0	-22.0	-25.0	0.0
Gloucester	-80.0	-91.0	11.0	-22.5	-25.5	0.0
Exeter	-81.0	-92.0	11.0	-23.0	-26.0	0.0
Gloucester	-82.0	-93.0	11.0	-23.5	-26.5	0.0
Reading	-83.0	-94.0	11.0	-24.0	-27.0	0.0
Bath	-84.0	-95.0	11.0	-24.5	-27.5	0.0
Salisbury	-85.0	-96.0	11.0	-25.0	-28.0	0.0
Worcester	-86.0	-97.0	11.0	-25.5	-28.5	0.0
Hereford	-87.0	-98.0	11.0	-26.0	-29.0	0.0
Gloucester	-88.0	-99.0	11.0	-26.5	-29.5	0.0
Exeter	-89.0	-100.0	11.0	-27.0	-30.0	0.0
Gloucester	-90.0	-101.0	11.0	-27.5	-30.5	0.0
Reading	-91.0	-102.0	11.0	-28.0	-31.0	0.0
Bath	-92.0	-103.0	11.0	-28.5	-31.5	0.0
Salisbury	-93.0	-104.0	11.0	-29.0	-32.0	0.0
Worcester	-94.0	-105.0	11.0	-29.5	-32.5	0.0
Hereford	-95.0	-106.0	11.0	-30.0	-33.0	0.0
Gloucester	-96.0	-107.0	11.0	-30.5	-33.5	0.0
Exeter	-97.0	-108.0	11.0	-31.0	-34.0	0.0
Gloucester	-98.0	-109.0	11.0	-31.5	-34.5	0.0
Reading	-99.0	-110.0	11.0	-32.0	-35.0	0.0
Bath	-100.0	-111.0	11.0	-32.5	-35.5	0.0
Salisbury	-101.0	-112.0	11.0	-33.0	-36.0	0.0
Worcester	-102.0	-113.0	11.0	-33.5	-36.5	0.0
Hereford	-103.0	-114.0	11.0	-34.0	-37.0	0.0
Gloucester	-104.0	-115.0	11.0	-34.5	-37.5	0.0
Exeter	-105.0	-116.0	11.0	-35.0	-38.0	0.0
Gloucester	-106.0	-117.0	11.0	-35.5	-38.5	0.0
Reading	-107.0	-118.0	11.0	-36.0	-39.0	0.0
Bath	-108.0	-119.0	11.0	-36.5	-39.5	0.0
Salisbury	-109.0	-120.0	11.0	-37.0	-40.0	0.0
Worcester	-110.0	-121.0	11.0	-37.5	-40.5	0.0
Hereford	-111.0	-122.0	11.0	-38.0	-41.0	0.0
Gloucester	-112.0	-123.0	11.0	-38.5	-41.5	0.0
Exeter	-113.0	-124.0	11.0	-39.0	-42.0	0.0
Gloucester	-114.0	-125.0	11.0	-39.5	-42.5	0.0
Reading	-115.0	-126.0	11.0	-40.0	-43.0	0.0
Bath	-116.0	-127.0	11.0	-40.5	-43.5	0.0
Salisbury	-117.0	-128.0	11.0	-41.0	-44.0	0.0
Worcester	-118.0	-129.0	11.0	-41.5	-44.5	0.0
Hereford	-119.0	-130.0	11.0	-42.0	-45.0	0.0
Gloucester	-120.0	-131.0	11.0	-42.5	-45.5	0.0
Exeter	-121.0	-132.0	11.0	-43.0	-46.0	0.0
Gloucester	-122.0	-133.0	11.0	-43.5	-46.5	0.0
Reading	-123.0	-134.0	11.0	-44.0	-47.0	0.0
Bath	-124.0	-135.0	11.0	-44.5	-47.5	0.0
Salisbury	-125.0	-136.0	11.0	-45.0	-48.0	0.0
Worcester	-126.0	-137.0	11.0	-45.5	-48.5	0.0
Hereford	-127.0	-138.0	11.0	-46.0	-49.0	0.0
Gloucester	-128.0	-139.0	11.0	-46.5	-49.5	0.0
Exeter	-129.0	-140.0	11.0	-47.0	-50.0	0.0
Gloucester	-130.0	-141.0	11.0	-47.5	-50.5	0.0
Reading	-131.0	-142.0	11.0	-48.0	-51.0	0.0
Bath	-132.0	-143.0	11.0	-48.5	-51.5	0.0
Salisbury	-133.0	-144.0	11.0	-49.0	-52.0	0.0
Worcester	-134.0	-145.0	11.0	-49.5	-52.5	0.0
Hereford	-135.0	-146.0	11.0	-50.0	-53.0	0.0
Gloucester	-136.0	-147.0	11.0	-50.5	-53.5	0.0
Exeter	-137.0	-148.0	11.0	-51.0	-54.0	0.0
Gloucester	-138.0	-149.0	11.0	-51.5	-54.5	0.0
Reading	-139.0	-150.0	11.0	-52.0	-55.0	0.0
Bath	-140.0	-151.0	11.0	-52.5	-55.5	0.0
Salisbury	-141.0	-152.0	11.0	-53.0	-56.0	0.0
Worcester	-142.0	-153.0	11.0	-53.5	-56.5	0.0
Hereford	-143.0	-154.0	11.0	-54.0	-57.0	0.0
Gloucester	-144.0	-155.0	11.0	-54.5	-57.5	0.0
Exeter	-145.0	-156.0	11.0	-55.0	-58.0	0.0

We are continually hearing that the Society is as prosperous as it is, ought to have fourfold—tenfold its present strength. Representing, in many respects, so well the urgency of agricultural progress and improvement throughout the country, its roll of membership certainly ought to be much fuller. But this extension of influence and numbers it can hope to achieve only by stretching out its hands to grasp sympathy and co-operation whenever these are offered,—by holding out its hands, indeed, to seek aid and ask for just such help as Mr. EDMONDS gave it the opportunity of accepting. The members who succeed are not those of great powers exercised alone: it is those who possess and exercise the power of organising labourers around them for mutual advantage, whose wealth and prosperity increase. And the same truth applies to societies as to individuals, and especially to a great central body like the Agricultural Society of England, whose original scheme and theory seemed to have involved the use of scattered agencies wherever they may be offered. This was, indeed, distinctly enunciated on the formation of the

Society, as one of the duties and objects of the institution. Forms of experiment were published, and the administration of aid and direction of efforts of the kind asked and offered by the Cirencester body, was expressly announced as one great department of the Society's field of operation.

There was, we understand, one fatal objection to Mr. EDMONDS' proposal. The Charter forbade it!—the Charter, which expressly directs the Society to engage the help of men of science. The thing seems so ridiculous enough; and it is certainly an example of fanatic adherence to the letter of the law, the whole spirit and object of the law being meanwhile broken. A society which accepts the assistance of individual men—agriculturists, men of science, interested in the determination of agricultural questions—notwithstanding that these men are also active and energetic party politicians—Tories, Radicals, opposing one another with all their might in the field of politics—is unable, “because of its charter,” to accept the aid of a body of men, also interested, as agriculturists and men of science, in the determination of practical questions—because they in their united capacity are also endeavouring to promote political objects. Not that they have united to push any particular political views, but merely to discuss and, if they can arrive at a common mind upon them, then to urge their decisions upon public opinion and Parliament. The Royal Agricultural Society of England, if it is to have the help of local associations at all, had better welcome all proffered aid within their common field, just as it welcomes individual aid of the same kind, without inquiring what further aims and objects may be entertained or prosecuted outside the fences of that special department which which a common interest exists.

—THERE was a moderate supply of English Wheat at Mark Lane on Monday, but to effect sales it was necessary to submit to a reduction of 1s. per qr. on the various samples. On Wednesday, again, trade was still weak, and prices were maintained only because of the improved condition of the samples.—At the Metropolitan Cattle Market on Monday there was a large supply, and prices of last week were hardly maintained. On Thursday prices were still lower. The foreign supplies were small.

—Mr. PULVER'S PRIZE OX, sold to a Gloucester butcher, weighed 21 cwt. alive when he started on his last journey; his dead weight was 215 stones 5 lb. (to the stone). He had won 25 prizes, amounting together to £304 5s.; he was sold for £100; if he had not been shown at the Smithfield Club in 1869 he would have won another £40 cup and £30 prize, for which, under the circumstances, he could not compete in 1870. Mr. PULVER was also unfortunate in not being able to take him to the Leeds show, in consequence of disease appearing in the showyard in London. His loss through that was £52 10s. He ought to be satisfied with what his ox has done, winning more probably than any ox in England has done before.

• The following is the full list of the subjects to be discussed during 1871 before the LONDON FARMERS' CLUB:—February 6: “English Cheese Factories: how to Establish and how to Manage them,” proposed by Mr. J. COLEMAN, Park Nook, Quorndon, Derby, March 6: “The Supply of English Cavalry Horses,” by Mr. E. TATTERSALL, Albert Gate, Knightsbridge, March 13: “The Grasses of England and kindred Crops,” by Mr. CLEMENT CADLE, Gloucester, May 1: “How to Hire and how to Let a Farm,” by Mr. J. J. MECHI, Tiptree Hall, Kelvedon, November 6: “The Agricultural Labourer—his Employment, Wages, and Education,” by Mr. C. S. READ, M.P., Hovinghamthorpe, Norwich, December 4: “Breeding—Facts and Principles,” by Mr. J. K. FOWLER, Prebendal Farm, Aylesbury. Members unable to attend these meetings are invited to forward practical information upon them. Their letters will be handed to the introducer of the subject referred to.

—A letter from Mr. JOHN BELLOW, a Commissioner of the Society of Friends' fund in aid of NON-COMMUNICANT SUFFERERS in FRANCE, has been published; and we make the following extract from it to illustrate the kind and extent of the help that is needed in those country districts which it is the object of the Peasant Farmers' Relief Fund to befriend. Briefly, we find the state of things, and the remedy proposed for it, as follows:—

“1. The autumn ploughing has been almost universally neglected, owing to the pressure of the war in various ways, but more especially from the seizure of the horses necessary to do that work, and their employment in military service, and from the passage of large bodies of troops having exhausted the usual stores of grain and forage required to feed such horses.

“2. The loss of the seed corn and seed Potatoes by requisitions.

“I do not include the destruction of agricultural implements in this statement; because, although there

are instances in which it has occurred, such instances are not numerous enough to affect the question to any appreciable extent.

“The Metz *Comice Agricole* suggests the following as the most feasible plan by which aid can be afforded to the country:—First, divide the *cultivateurs* into three classes: those who still have means of subsistence in their position; those who have some, but not sufficient, means to do this; and, lastly, those who are so utterly ruined that they have no resources left. It is proposed that the first of these classes should pay full cost for any seed we may be able to furnish them with; the second a reduced price, to be hereafter arranged by the aid of the Maires of the various communes; and the third class to receive free gifts of seed; the Maires, in conjunction with the President of the *Comice Agricole*, aiding us to decide in which of these classes a given individual is to be placed.

If the farmers of England will subscribe, either in money or in kind, for the seed of these three classes, their help will be gratefully accepted. Those who give in kind should know that what will be chiefly wanted are white Oats, Barley, and a little, but very little, spring Wheat, since the latter is a risky crop in this climate; in addition to these, Clover and Vetches. Seed Potatoes will also be of great value; and garden seed in small assortments for cottages, such as Beans, Peas, Carrots, and salad herbs.

“The soil may be described as so nearly like that of the Valley of the Gloucester and the adjoining Cotswold hills that any one who knows that part of England can form a clear idea of Metz. Land a few miles west of it is of inferior oolite, which stone is furnished of good quality for building by the now celebrated quarries of Jaumont.

If a depot can be formed in London for the collection of these seeds, there will be no difficulty in getting the bulk conveyed by water up the Rhine to Dusseldorf or Coblenz, and thence by barges on the Moselle to Metz.”

We add that a letter from Mr. BULLOCK, in the *Daily News* of Thursday, states that £50,000 will barely cover the necessities of the country around Metz at the coming seed-time. Let not our readers forget that the secretaries of the French Peasant Farmers' Seed Fund are ready to receive contributions, either in seed or cash, at Salisbury Hotel, Salisbury Square, E.C.

—At the Dalrymple (Ayrshire) Farmers' Club the other day, a conversation took place on FOX-HUNTING, from which it would appear that opinion is not unanimous on the agricultural benefit of that pastime in that quarter. Mr. HENRY CAMPBELL, Fimmore, stated the argument in favour of the proposition that fox-hunting is a benefit to the country, but particularly to the district over which the foxhounds run. “It is the means of keeping a great deal of money within ourselves, as it were. It is the means of keeping our landed proprietors at home; and not only that, but strangers are attracted, and ultimately stay where such good sport is to be found, keeping up large establishments of servants and horses. These are supplied from the fruits of our soil, and no doubt they are a great deal of circulating capital, and a great deal of money in our midst, which must be a benefit to the country. Then again there is the preserving of foxes, which all consider another very great boon to the farmers, as it is a very good means of doing away with hares and rabbits.” And other speakers acquiesced. On the other hand, Mr. NIVEN thought they could get on without fox-hunting. He was of opinion hunters often did a good deal of damage, and he was not always glad to see them; and Mr. WILSON said, if there were beasts to stir among fox-hunters, they would be fox-hunting the evils. He was not sure that foxes kept down rabbits; such had not been his experience. Mr. MCCONNELL thought foxhunting a great humbug altogether. Hunters often did great damage both to fields and fences; and Mr. MURDOCH, Holchouse, entirely disapproved of the pastime. He argued that the consumption of food and spending of money on horses and servants for hunting purposes was not of advantage to the country, in respect that these were not used for a useful purpose, but merely for the gratification of a passion. He pointed to STUART MILL'S “Principles of Political Economy” to prove his assertions. The Chairman thought there could be no doubt the great majority of the meeting agreed that foxhunting was a benefit to the country, and that was his own opinion also. He directed attention to what the want of resident proprietors had made Ireland, and this finished the discussion. Whatever the full statement of the argument may be, the Chairman appears to us to have on this occasion summed up rather the votes than the arguments.

—Mr. G. ELLIS writes to the *Times* about the CULTIVATION OF SUGAR-BEET IN IRELAND. He says:—“I enclose analyses made by Dr. VOELCKER of several samples of Sugar-Beet grown this year in the county of Kilkenny. This is the second year that I have had the experiment tried in that locality. The best result last year was 10.91 per cent. of crystallisable sugar, the best this year 14.81. When it is taken into account that 6 per cent. for spirit and 8 per cent. for sugar will pay the manufacturer, we may fairly say that our two years' experiment has proved the power of growing Sugar-Beet in Kilkenny fit for a manufacturer to deal with. He seeks to alter his country the capital requisite for a sugar factory, and he hopes that this statement may, in some measure, tend to that desirable result. Dr. VOELCKER says of his Beets:—“I question much whether better and richer Sugar-Beets have been grown this season in the most favoured Beetroot districts of Belgium or France.”

Roots grown by Viscount CLEYDEN, at Gowrandemesse near (heavy loam, with yellow clay; Oats, 1862; manure, 16 cwt. Beet 1870, with 6 cwt. best superphosphate per Irish acre, contained 14.81, 14.69, and 13.34 per cent. of sugar respectively; and roots grown by Mr. THOMAS SEIGNE, Kilmara farm (heavy clay land, limestone bottom; manure, 6 cwt. superphosphate per Irish acre—preceding crop Oats, following Potatoes), contained 12.42 per cent. One grown by Mr. THOMAS SEIGNE, Coppenga farm (light loam, marly bottom; manure, 16 cwt. of superphosphate per Irish acre—preceding crop Barley; this farm is on a hill side upwards of 600 feet above sea level), contained 11.96 of sugar; others varied from 10 to 14.73 per cent.

—The *Mark Lane Express* last week published its analysis of returns from correspondents regarding the character of the PAST HARVEST. The summary is as follows, and we also condense the remarks which our contemporary appends to the tabular statement of the reports communicated to him:—

Condensed Reports of the Cereal Crops of 1870.						
Conditions.	Wheat	Barley	Oats.	Beans	Peas.	
Failure .. ..	..	..	2	11	14	
Two-thirds under average ..	1	..	12	3	22	
One-half under average ..	11	13	29	20	..	
One-third under average ..	19	37	21	22	..	
One-fourth under average ..	..	..	..	..	..
One-fifth under average ..	21	8	5	22	80	
One-sixth under average ..	1	20	2	..	..
One-seventh under average ..	1	..	..	..	..
Under average ..	102	214	224	153	105	
Average	213	144	106	99	180	
Over average	57	54	18	3	17	
One-fourth over average ..	..	..	..	..	..
One-fifth over average ..	3	2	1	1	..	
One-fourth over average ..	16	2	1	1	3	
One-third over average ..	4	1	1	..	..
One-half over average ..	6	..	..	..	..
Totals	487	521	442	335	374	

The season of 1870 was a peculiar one, two periods of excessive drought having intervened during the summer, which while they almost destroyed the pasture grounds, and reduced the hay crop to the lowest minimum on record, caused fears that the crops of cereals would also suffer to an equal extent. And on the light lands the drought worked great mischief, but on the strong and well-cultivated drained lands the effects were felt rather in the shortness of the straw than in the deficiency of the yield of Wheat. Thus, the returns show 213 cases of average, 115 above, against 156 under average. It is almost impossible to assess satisfactorily the actual deficiency, but probably it may be reckoned at one-sixth under an average. As a rule, the lands on which the Wheat crop was deficient were those of which both soil and subsoil were composed of sand or a sandy gravel. The Barley crop is far less favourably reported than the Wheat, there being 318 under average against 203 average and above. With only 59 cases of over average against 318 under, there is a large deficiency, which we cannot estimate at less than one-fourth of an average; while, if we take into account the general inferiority of the quality, the deficiency will be still greater. The Oat crop is still less favourable than the Barley, there being 314 cases under against 106 average and only 22 above average. We therefore estimate the deficiency in this crop at one-third of an average. The Bean crop exhibits a considerable deficiency, there being 231 under against 104 average and above, with only 4 actually above, against which are 11 failures. This crop, therefore, must be assessed at a deficiency of at least one-third of an average. The Pea crop shows a singular discrepancy in its returns; for whilst there are only 163 cases under against 201 of average and above, with only 21 above, there are 14 failures, and 22 cases of two-thirds under average. We confess that, looking through the reports of this crop, it is spoken of more favourably than we expected. At the same time we are bound to estimate the deficiency at one-fourth of an average, with the quality still generally good. If we add up the figures in the above Table, so as to get the average them under only three divisions, we get the following results:—

	Wheat.	Barley.	Oats.	Beans.	Peas.
Average	213	144	106	99	180
Over average ..	115	59	22	5	20
Under average ..	156	318	314	231	163

Our own report at harvest time, from a smaller number of correspondents, was as follows:—

	Wheat.	Barley.	Oats.	Beans.	Peas.
Average	67	55	21	25	67
Over average ..	10	12	6	4	7
Under average ..	47	57	93	72	16

A comparison of these shows a very near agreement of the two witnesses as regards Wheat, Oats, and Beans. Our contemporary, however, with the experience of the threshing-machine to aid him, gives a worse account than ours of Barley and of Peas. He is no doubt right in saying:—“The season of 1870 has been peculiarly unfavourable to the agriculturist. With a

Beasts, sheep, and pigs have each a separate market, and this may give rise to special bullock, sheep, and pig trains in the removal of stock, so as to avoid con-

fusion in the throng of delivery; but no difficulty will be experienced by railway companies to meet the demands of the trade in this respect with special and mixed trains. Sales, again, are sometimes slow, at other times quick; but as the number of stock each market day is known before removal takes place, quick sales and slow sales will not alter the trains required, and cattle trains can easily be timed to suit the traffic on the main lines. Passenger trains leave the platform at the appointed time, whether the carriages are full or not. This would not suit cattle trains, for if the 8 A.M. train, for example, was not full it could remain at the platform until 8.20 or 8.40, and so on. In short, trains would leave the platform when full, and time their speed to meet the main line time. And as a large proportion of stock is always slaughtered at the market abattoirs for the dead meat market, there would be more trucks at the several ingress railway termini than would be required for the removal at the egress platforms. There would, therefore, be no want of trucks, provided there was suitable communication between the different railways. Most of the railways on the north of the Thames now run through trains to the south, and they have also connection with the metropolitan lines. The cattle trains from Scotland and the North of England are badly timed at present, portions of trains having to be shunted here and there for hours in succession; but with the slowest sale nothing of this kind would be experienced in the railway removal of stock from the market. The trains to the different places would follow each other in regular succession, leaving the market platforms when full. At the stations of delivery there would require to be cattle trains, sidings, and platforms, similar to those at the producers' end of the line. In the metropolis and suburbs there ought to be a great many of these sidings in the metropolitan lines to meet the requirements of butchers, but further into such details space will not permit us to go.

The tramways now coming into use in the capital are obviously a legitimate means of conveying live cattle, also dead meat from the dead meat market, and vegetables from the vegetable markets, butchers and greengrocers using their own vans and paying the tramway companies so much per head and ton per mile. From a map just published, tramways are to be made all round the cattle market, but no proposal is yet announced for the market itself. This is evidently behind the go-a-head spirit of the age. Farmers experience the necessity and realise the profit of investing more capital in mechanical means, and if some of our wealthy enterprising butchers would make a move by train, they would find that the horses they require to serve their customers could bring home in tramway vans (disinfected if necessary) all their purchases from market, in much better condition, and at less money out of pocket than they now pay on the old drove system.

The old horse-van is another means of conveying live stock that is subject to improvement. We are not aware of a butcher in the capital who keeps his own cattle-van. Butchers have their men and horses, but they have not their vans. Their own horses might be in harness twice the time they now are daily, so that on the two market days three or four journeys to the market would not harm them. Those who hire out vans have to keep men and horses for them, and the men and horses are probably on an average more than half the time idle. Of course, their charge for taking home the butcher's bullock must be five or six times what it would cost the butcher with his own van; and this is not the greatest expense, for the hired van, like the hired plough and seed-drill, cannot always be got in the nick of time, and the loss or delay often exceeds the cost of the van, so that the total loss is not very easily estimated. The absence of economy in this system of cattle conveyance is patent, and naturally suggests the remedy—the butcher's own cattle-van. If farmers have to invest from £4 to £5

more money per acre for steam and other mechanical appliances, in order to keep pace with the times, how can butchers expect to get on otherwise? The day is gone by when blue frocks can count themselves an exception to all rule, or laugh at the progress of applied science in their own craft. *W. B.*

CHAFF-CUTTERS.

[We take the following extracts and illustrations from the excellent report of the implement judges at Oxford, relating, as they do, to an implement of special use at this season of the year, and especially at this season of this year.]

EACH year the importance of cutting straw, as a means of economising more valuable food, is better understood. The results of the dynamometer trials are most interesting and unexpected. Considering the attention that has been expended on this class of machines for a

alteration according to the nature of the substance to be acted on.

A travelling web is introduced in place of the ordinary bed of the feeding-box, carried on a pulley, which is fixed just behind the lower feed-rollers, and driven a trifle faster than the latter, in order that the straw may be ready for the rollers. This is a material help to the attendant, relieving him of the labour of pulling the straw or hay forward, and allowing him to concentrate his whole attention on the feed. The box in the power-machine which we are describing is 14½ inches wide. The face of the box is made of chilled metal, and bevelled. This is done to prevent the knife-edge being blunted by contact, especially if badly fixed on the fly-wheel; but we could not ascertain that there was otherwise much advantage.

There is no reverse motion for the rollers, as it is not considered of any use; in the event of choking it is only necessary to throw the machine out of gear, and reverse the pinion on the line shaft. Two sizes of chaff, ¾ and ¾ inch, can be cut by the arrangements we have described without change of wheels; but a further alteration can be effected, if required, by change of wheels. The machine was admirably made, and worked very smoothly.

We noticed that an opening of 2 inches was left between the lower roller and the travelling web, and we are inclined to think that this, and the angle at which the teeth are set in reference to the feed-rollers, has much to do with proper delivery. In some cases the point of the tooth is brought too forward, and the back of the tooth is too long; so that either the litter is not caught by the teeth, or else, being caught, it is carried round, instead of being left at the mouth of the box. According to the tabulated results, this machine made extraordinary work. The cut was clean and continuous, and the sample in consequence particularly even; and, although not so fine as in some other cases, it fulfilled the required conditions.

Bentall's machine, which was bracketed as equal with that of Picklesy, Sims & Co., was considered strong, simple, and serviceable. The frame is of wrought angle-iron with cast top; the mouth of the box 15½ inches wide, by 4 inches high, when fully open. The fly-wheel has three knives, which lap over each other, each knife being fixed by 10 set screws. The feed-rollers are solid, and carry 18 rows of teeth, which resemble those of the Richmond & Chandler shape, and are not unlike the upper beak of a hawk. Three lengths of chaff are in cut without change of wheels, and this is effected by three gearing-wheels cast in one piece, sliding on the line shaft, which will be understood by the illustration, from a photograph (fig. 13). The working parts are well covered, and the position of the lever-handle, coming above the top of the box, would enable the workman, in the event of an accident, to stop or reverse the machine very readily. Supposing that his arm were drawn into the feed-rollers, his body must come in contact with the handle sufficiently to throw the rollers out of gear. Another commendable arrangement is the existence of a spring attached to the handle, which prevents the reverse gearing coming into action, except pressure is put on the handle. Unless some stop is provided in the attempt to stop the rollers, the handle is often, and unavoidably, turned too far, and the rollers reversed. The fly-wheel is flanged and heavier than is often the case, which increases the steadiness in work.

The price, without the driving-pulley, is £14 14s., reasonable, considering the amount of good work put into this machine. Picklesy, Sims & Co., have been for several years extensively connected with the manufacture of chaff-cutters, and, from the character of the machines exhibited at Oxford, it is evident they understand how to make a good chaff-cutter. The peculiarities of the power-machine in the catalogue will be most readily understood by the plan (fig. 14)—A, main driving-shaft; B, clutch on driving-shaft, fitted with parallel keys; C and D, bevel pinions (with clutch-teeth on inner

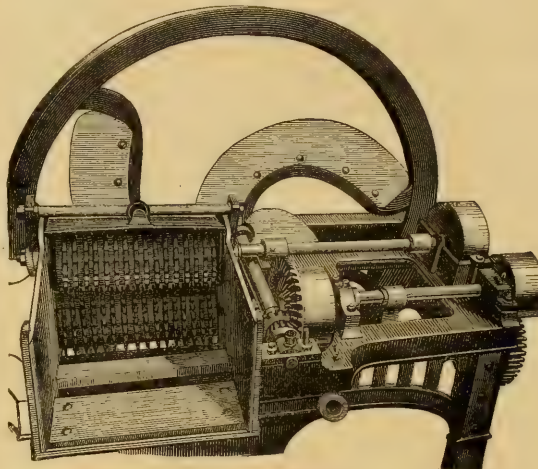


FIG. 10.—VIEW OF MESSRS. RICHMOND AND CHANDLER'S CHAFF-CUTTER, SHOWING GEARING.

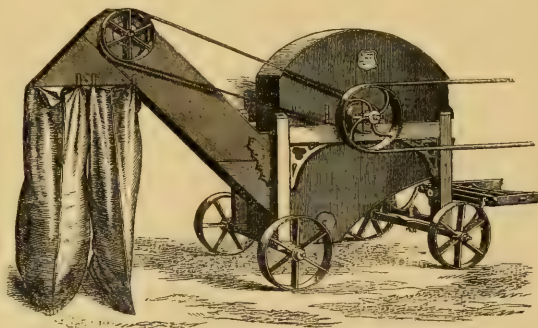


FIG. 11.—MESSRS. CARSON AND TOONE'S CHAFF-CUTTING ENGINE ON WHEELS, WITH CHAFF ELEVATOR.

period of over 20 years, we were not prepared to find the difference of power consumed for a given quantity of work to be more than 100 per cent. Some portion of this result may be attributable to skilful management, and such veterans as Messrs. Richmond & Chandler have little to learn. No doubt the bearings of their splendid machine (fig. 10) were well oiled, and the knives brought up to a razor-edge; but other makers were equally attentive to their interests, yet none could produce similar results. Hence we must conclude that the method of gearing adopted by Messrs. Richmond & Chandler, and which we shall describe, must be economical. There is very little alteration in these machines since the Bury meeting, but, as the report on that occasion merely enumerated the prizetakers, the following particulars may be deemed interesting:—

The first peculiarity we notice is the movable or expanding jaw to the mouthpiece, which jaw is hinged to the axle of the upper toothed roller, and is pressed down by a hand-screw, so as to securely hold the materials being cut, while admitting of considerable

face), working loose on driving-shaft, and each gearing in the bevel-wheel e ; F , handle for shifting the clutch, a , into gear with the bevel pinions c or d , as may be required.

The engraving illustrates the clutch in gear, with the bevel pinion d , which gives the forward motion to the feed-rollers; by shifting the handle F until it is stopped by the catch f , the clutch is thrown out of gear, being left midway on the shaft between the two pinions. If the catch f be raised, the handle may be moved further over, and the clutch gears into c , which gives the backward motion to the feed—which is considered desirable when it is necessary to clear the box.

The working parts are well protected, the gearing simple and strong; the mouth of the box 14 inches by 5 inches. The feed-rollers are solid, and carry 15 rows of teeth. The fly-wheel, with pulley number, cover each other, two being at work at the same time. The chaff was regular, and the box constantly full; but the tabulated results showed that the power consumed was greater than with Richmond & Chandler's machine, which is probably owing to more complicated gearing. The fly-wheel was noticeable for its weight—a desirable feature of a power machine, as power is accumulated and given out as required.

The chaff-cutter for hand-power, by the same firm, has no clutches. The change



FIG. 12.—SLIDING PINION.

of cut is produced by means of a sliding pinion (fig. 12), thus placed on the bevel-wheel shaft, in lieu of the clutch and clutch-pinions.

The chief peculiarity in Carson & Toome's chaff-cutter (fig. 11), which was highly commended, consists in two pairs of rollers to assist the feed, these being grooved instead of toothed. The mouth of the box is not nearly so large as in several instances, only 10½ by 4 inches, yet, owing to the efficient action of the rollers and the form of the knives, a large quantity of chaff was cut. A light sheet-iron shield is fixed to the frame between the fly-wheel and the pulley, to keep the chaff from collecting round the inner periphery of the latter.

The chaff was excellently cut, not ¾, but about ½ inch. It was clear that the first set of grooved rollers levelled the straw, and prepared it to be carried to the mouth by the second set, and thus materially assisted the attendants. In order to secure strength, the wheels are of malleable iron, the spindles large, bearings of brass, and frame of wood, which Messrs. Carson & Toome find more durable, the iron being liable to fracture. This machine can be mounted on wheels, and fitted with a bagging apparatus, consisting of a case enclosing the knife, with an elevator on one side, from which the chaff is delivered into bags. On the large and exposed sheep farms in Wiltshire this addition is found very valuable, as chaff can be cut, however rough the wind may be.

Thomas Alcock, of Radcliffe-on-Trent, was commended for his serviceable power-machine, which lacked the fault of some of the larger makers; and the axle of the fly-wheel not being true made it wobble. Two sizes of chaff are cut by a simple alteration of shaft. Three knives, which lap over each other, and two of which are always cutting. Mr. Alcock fed the box himself. The feed rollers are peculiar in having a double set of teeth, or more properly the intervals between the sets, protecting teeth are raised into small sections, and thus the rollers have a double action on the fodder; whether it was this, or the excellence of management, the feed was very regular, and the sample of chaff particularly good. The quantity cut was only small. The mouth of the box is 13 inches wide, and the price £13.

R. Maynard, of Whittleford Works, Cambridge, exhibited his portable steam-power sifting chaff engine (fig. 15), which is intended to be used in conjunction with a portable threshing-machine to cut the straw, screen, and bag the chaff as fast as the straw comes from the machine. It is driven by a strap direct from the fly-wheel of the engine; the pulley, or knife shaft, being 28 inches in diameter, revolves 270 per minute, and as there are 5 knives it get 1350 cuts in that time. The chaff as cut falls on to a sieve, which separates the cavings, unavoidable in a power machine; these cavings are brought out of the end of screen, and in one machine a caving-elevator is provided by which they are returned to the box, incorporated with the straw,

and cut over again. The chaff, after passing through the riddle, falls into a shoot, which, being finely perforated, allows the dust to separate during the passage of the chaff to the elevator, on which a sack is hung to receive it. The judges distinguished this machine, which they did not consider could come into competition, by awarding it a silver medal.

THE PRINCIPLES OF BREEDING.

[Mr. T. F. Jamieson, Lecturer on Agriculture in the University of Aberdeen, recently delivered the first lecture of the season on the "Principles of Breeding Domestic Animals." The following are extracts from the lecture.]

OF all the various departments of husbandry, the rearing of live stock is, perhaps, the most interesting in which the farmer can engage, and also the one that holds out the highest prospect of reward to those who can prosecute it with ability and success. More espe-

cially is it so in our country, which has outstripped all others in this pursuit, and has become famous over the whole world for the excellence of its various breeds of cattle, sheep, and horses; so much so that men which they can nowhere else find in the same degree of perfection, and which improves every other with which it is mingled.

farmer has in view is to convert the vegetable produce of his farm into beef and mutton, and what he wants is an animal that will do so to the greatest advantage. Mr. M'Combie tells us that there is a kind of cattle in the northern parts of Scotland which he calls "Highland Hummies," a race of starved vermin which he considers the worst of all breeds. No kind of food will tame them much. The choicest specimens are distinguished by brown ridges along the men's backs. They can, he says, be made older, but they defy even his own well-known skill to make them much bigger or fatter. Food, as he rightly tells us, is entirely thrown away on such animals. On the other hand, he points out that beasts of the right sort grow and feed rapidly; there is no difficulty in making them fat; the difficulty, rather, would be in making them lean when once in good condition. Evidently, then, it must be very unprofitable for a nation, as well as for the individual farmer, to have a race of cattle like these Highland hummies, which Mr. M'Combie abhors, and, fortunately, there is no difficulty in obtaining plenty of the opposite kind.

Again, differences equally striking may be seen in regard to dairy produce. Some animals appear to be nothing less than machines for turning grass into milk. A good dairy cow will give 500 gallons of milk in the course of a year, yielding 150 lb. of butter, but some will give much more than this, and some much less. Some cows when at their best will give as much as 7 or 8 gallons a-day for a time, others only 2 or 3. Now, if we want dairy produce, it is of the utmost importance to select animals having this natural adaptation for the purpose, and it is generally found that these qualities will be inherited to a considerable degree by their offspring.

The art of the breeder consists in developing the type of animal suited for the purposes for which it is to be kept. The dairyman wants a beast that will give a maximum of good milk; the cattle-feeder one that will grow and feed rapidly; and experience shows that these desirable qualifications can be perpetuated, and that races can be formed which will continue to manifest the same properties. Whether it is possible to unite these two advantages in the same race is a subject which I will not at present stop to discuss, but it is manifest that it would be a very desirable object to attain. A breed that would combine in the same animal the property of giving an abundant supply of good milk, and of producing offspring that would either grow and feed rapidly if put to fatten, or be good for the dairy if kept for milk, this would be a combination of the greatest excellence. Opinions differ as to the possibility of uniting these two qualities in a high degree of perfection; and, at all events, it is certain that it is very difficult to succeed in it.

In Proceeding to Establish a Breed, it is of the utmost importance to start from a right foundation. It is comparatively easy to select good animals, but it is a slow and difficult task to improve them. For example, if we were to take a lot of those bad Highland beasts, which Mr. M'Combie has so strongly denounced, and try, by gradual selection and careful weeding, to rear from them a fine race of cattle, our chances of success would be small indeed. It is an old saying that you cannot get Grapes from Thorns nor Figs from Thistles, neither can you get good beasts out of bad ones. The progress of improvement in the individuals of any race, when kept entirely by themselves, seems to be very slow indeed. A rapid advance may be made by crossing with animals of superior blood, but unless this can be obtained we cannot expect to make any very speedy improvement. Accordingly we see that our most successful breeders have taken great pains to procure the best animals they could find anywhere in the commencement to start from, and their prosperous results have in a great measure arisen from the judgment and skill with which they made their first selection. The late Hugh Watson of Keilor made a very great improvement upon the black polled breed of cattle, and it would perhaps be difficult to point to any old animals of that race nearly so fine as those he succeeded in producing. He was the first great improver of the breed over all the finest herds of polled Angus and Aberdeenshires are more or less indebted to his blood. It may be said, here was a great and rapid improvement effected, and a succession of fine animals reared from ancestors much inferior in type. I am aware that I may be treading on somewhat delicate ground when I say that many people, however,

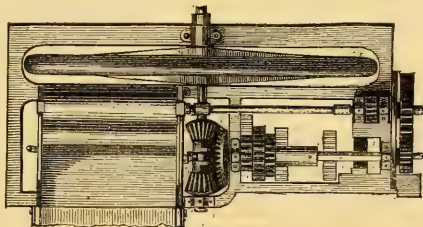


FIG. 13.—PLAN OF BENTALL'S CHAFF-CUTTER.

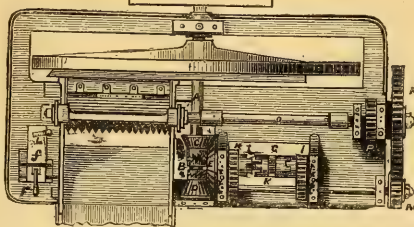


FIG. 14.—PLAN OF MESSRS. PICKSLEY, SIMS, AND CO.'S CHAFF-CUTTER.

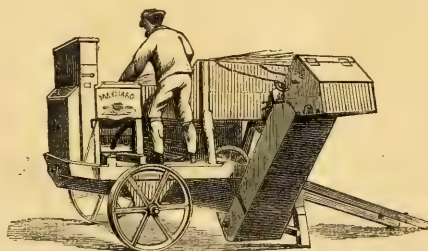


FIG. 15.—R. MAYNARD'S PATENT PORTABLE STEAM-POWER SIFTING CHAFF ENGINE.

cially is it so in our country, which has outstripped all others in this pursuit, and has become famous over the whole world for the excellence of its various breeds of cattle, sheep, and horses; so much so that men which they can nowhere else find in the same degree of perfection, and which improves every other with which it is mingled.

Difference between Good and Bad Beasts.—Every one must have remarked the immense difference that often exists between animals in regard to the progress they make upon the same sort of food. You may have two cattle of the same age and tied up together in the same stall, getting food and treatment precisely the same in every way, yet the one will remain obstinately lean, while the other will get as round and fat as an Alderman. Two cows may be feeding in the same pasture; the one gives abundance of milk, the other almost none. Here, then, it is evident there is a great waste of food in the one case compared with the other. Both may consume the very same quantity, but they differ greatly in the way they dispose of it. The object the

ment in the individuals of any race, when kept entirely by themselves, seems to be very slow indeed. A rapid advance may be made by crossing with animals of superior blood, but unless this can be obtained we cannot expect to make any very speedy improvement. Accordingly we see that our most successful breeders have taken great pains to procure the best animals they could find anywhere in the commencement to start from, and their prosperous results have in a great measure arisen from the judgment and skill with which they made their first selection. The late Hugh Watson of Keilor made a very great improvement upon the black polled breed of cattle, and it would perhaps be difficult to point to any old animals of that race nearly so fine as those he succeeded in producing. He was the first great improver of the breed over all the finest herds of polled Angus and Aberdeenshires are more or less indebted to his blood. It may be said, here was a great and rapid improvement effected, and a succession of fine animals reared from ancestors much inferior in type. I am aware that I may be treading on somewhat delicate ground when I say that many people, however,

is, as I said, the very best tribes in Mr. Colling's possession was got by him from Mr. Maynard, of Eryholme, who had carefully bred them for a long time. It was the custom of the Maynards to bring 16 bullocks and heifers to Darlington market on the first Monday of March. The bullocks were from four to five years old, with fine wide horns, good bone, and very deep flesh, and were keenly looked out for year after year on the pavement opposite the King's Head. Mr. Thornton tells us that Charles Colling's farm overseer had previously been with Mr. Maynard, and some remarks of his led Colling and his wife to take a drive one fine day over to Eryholme. When they arrived, their attention was attracted by a fine cow which Miss Maynard was engaged milking. Colling offered to buy the cow and her calf, and after some haggling on both sides, the purchase was made for 30 gs., and Maynard gave him a long pedigree of them,

Now, if this sum was equally divided among the 3000 farms, it would give each farm 2263 dols. as the average income. But as there are 1000 farms that run from 3 to 20 acres, or that are under 50 acres each, some idea may be had as to whether the farming is as productive in its results as in other sections. If we have figured correctly, the average produce per acre, in 1864, amounted to 30 bushels of wheat, the smallest amount of wheat sold from the country has been a little above 18,000,000 lb. In 1864, the cheese crop was only a little over 13,000,000 lb. We have preferred to give statistics because every section has its standpoint as to what is considered a fair return from lands when employed in ordinary branches of farming, and we may remark here, that Herkimer county having no cities within her boundaries, there are no extensive fields for market gardening or small fruit culture, from which very large returns are sometimes made.

3. Now, in regard to the improvement of farms, there is no question but that lands may be kept in fertility and increased in productiveness with more ease and with less expense under the dairy than under a system of grain growing. The dairy farmer has the means at his command for making large quantities of manure. That he is wasteful of this material and injudicious in its application, it may be often, and, perhaps, as a general rule, is charged against him. Still, under all mismanagement in this regard, it is believed that dairy lands are steadily improving in the elements of fertility, and are now in better heart for grain crops than when grain growing was made the business of the farm. It is true that upon many farms the yield of grass is much less than it should be, but this is not so much on account of any lack of fertility in the soil as from the use of improper crops—allowing weeds to creep in, overstocking pastures, feeding down the aftermath of meadows, cutting grass when over-ripe, and other abuses, which, in time, have served to lessen the product. When farms have been properly managed, and have received the liquid and solid excrement of the stock, judiciously applied, they have been wonderfully improved, and are annually yielding immense crops. Dairying, like any other branch of farming, requires brains, and without brains it is likely to make poor returns. *Rural New Yorker.*

Home Correspondence.

Profits of Prize Farming.—I thought that it was very probable that some of your correspondents might have disputed the correctness of the figures of "W. G. D." contained in his letter on the "Profits of Prize Farming," but as, on the contrary, they are corroborated by "J. B. M." in your last paper of 1870, I am tempted to make one or two remarks upon them. In the first place there is a receipt in the Kirtlington farm accounts of £1650 for 300 bacon hogs; but there is no item under that head in expenditure. If "W. G. D." reckons pigs' food amongst corn and cake, that item would be reduced to about the same amount as the one at Ashgrove; then, how can it be possible, with the same acreage of green crops on both farms, for the one to sell out (besides the pigs and buying-in price of bullocks and tugs) £2772 worth of stock, and the other just over £2000? But 300 pigs will, on the average of years, and then with good management, produce a total gross cost, plus 5s per head profit, so that before the £1650 could have come into pocket, £1575 would have been paid out. Now, putting these 300 pigs, as bought in, at £3 each, we have an expenditure item of £900, which would seriously interfere with the profit to balance £1282! Again, if the Ashgrove farm really produced 90 per acre on the Wheat land, and £8 per acre on the Barley land, or £8 6d. per acre on the corn land of the farm, with a rate (including rates and taxes) of only 2s 6d. per acre, he must indeed be a manager, and his mutton and beef paying as they have this last year, who could not make more than 74 per cent. of his capital; and as the management of Ashgrove is good, there must be some mistake in "W. G. D.'s" figures. *W. J. Edmonds, Sudthrop House, near Lechlade, January 4.* P.S. I presume the price per acre for corn is intended to be suppositious, as I should not think it likely that the Ashgrove farm, this year, averaged by a very considerable sum £8 6d. per acre, or the Kirtlington farm that sum by pounds an acre.

To Mr. Mechi from his Friend.—Christmas time, a festival of peace and good-will, should be to all men a festival of retrospection and of hope. Thus I take up my pen to commune with yourself, as an agricultural friend whom I value, and to wish you everything that can be embraced within the term—the "compliments of the season." May the coming year be one of prosperity in agriculture; may landlord, tenant, and labourer be brothers, and may each cherish their relative positions in the true economy of farm wisely and well. It appears to me agriculture is destined to experience great changes, from social and commercial causes. Farmers, to hold their own, must adjust and modernise their ideas and their operations with the change of circumstances. The labourer's position and ideas are fast changing from brute force to skill and intelligence; and are landlords not to sympathise

in these changes? Are the old inconsistent farm agreements to be continued? Is a national tenant-right never to be recognised, so that capital may be protected by confidence in its application to the soil? I want to see agriculture free and unfettered in cultivation, as also in the manufacture and disposal of her productions. For until this sound and cardinal principle of the management of the land, intelligence and capital in farming will not have free scope. I hope I fully believe the signs of the times are suggestive of progress in agriculture, and some of us may yet see that England can not only abundantly supply her own population with food, but have a surplus wherewith to exchange for luxuries of other climes. I see you have been amongst your Essex friends at Coggeshall—it is a pleasure to note your discussions there are free from personal matters, for, whenever these creep in, they prove a hindrance to the preservation of root crops, especially Mangels, interests me much. Your replies to the questions about double ploughs, and the comparison of manual, horse, and steam labour, I fully endorse; as also with respect to large and small holdings—"let your capital fit your farm." I am tempted to speak with you about sewage farming, which is pregnant with great results, equally as promotive of health to large towns as of immense productions from the soil; and also upon the subject of local taxation—the increase of local rates, which are all paid by occupiers of real property, while all other sources of income escape. This is unjust, and must be revised. But I must not here enter upon this topic, so farewell. May we both meet next Christmas in health and happiness, and may agriculture abundantly prosper. —, near Manchester.

Potatoes.—"T. L. M." inquires "for the best and heaviest croppers for a strong soil, the most prolific early, second early, and late Potatoes respectively." Cattle Potatoes are mentioned in his question, and I take this to be his chief consideration; I will qualify it by presuming that the sorts may also lay a claim to consideration for the dining-table, and recommend the Early American Rose, Paterson's Victoria, and Sutton's Red-skinned Flourball. (I had the latter variety sent to me from the Messrs. Sutton, and also the Red-skinned; and I send you, therefore, so far as I am concerned, if there is a mistake it is in the nomenclature of the firm.) If "T. L. M." will plough his "strong soil," and plant it on the ridge, the first and last sorts especially will prove much the better for it; they will not then eat so soddened, so to speak, which is a chief fault in the American Potatoes, and more particularly when grown on the flat, on strong heavy ground. *Robert Penn.*

The Cheese Factory System.—[We take from the "Journal of the Society of Arts" the following letter from a Cheshire correspondent on extending the factory system in that county.] I have had several interviews with large dairy farmers in Cheshire, as to the desirability of adopting the factory system, but, except in a very few cases, I cannot find that they are in the least disposed to give up the established custom of cheese-making in favour of the new system. In fact, they maintain that they are not in possession of sufficient data to justify them in making so radical a change. When Mr. Jenkins' paper before the Society was announced, I had a hope that the entire subject, in all its bearings, would be treated upon in the paper or in the after discussion, and that I should be then in possession of information and facts the better to enable me to re-open its discussion, with stronger and more convincing arguments as to the utility and profit likely to accrue from the adoption of the factory system in this county. However, in this I have been disappointed, for the very ground the farmers cannot see their way clear upon was not touched in the paper, and only just alluded to by Mr. Trask and Mr. Rigby in their discussion. Upon the cold, hungry, clay soils of Cheshire, a large quantity of manure is required, to keep the land in anything like proper condition to grow remunerative crops, and in every well managed dairy a large number of calves are kept, and the first place to consume the whey, and in the second place to produce and make as large a quantity of manure as possible. The making of this manure is of essential importance to the Cheshire farmer. Again, the whey and its productions, like butter-milk, are very important articles in the consumption of his household, for his servant-men, &c. These things should all be taken into consideration, and properly dealt with, each in its proper place, before there is a good case to convince the dairy farmer that he is one whereby he can obtain 61d. per gallon for his new milk, whilst, at the same time, he must necessarily sacrifice certain other advantages, is more, or even as much to his interest as that system he has followed for so long a time, and which he so well understands. It is wonderful how soon the work in a well-regulated dairy is daily performed, and how easily by a good class of men, management the farmer's wife or daughter, as the case may be, gets through the daily work of cheese-making. There are, of course, exceptions to this rule, but I speak in a general way. The largest amount of concentrated labour required at a given time is for milking purposes. Now, this is an important part of the subject, for although by joining a factory the indoor work and the cheese-making—the latter of

which is usually performed by the farmer's wife or daughter—is materially reduced, still a staff of servants will be required for milking purposes, and one with a horse and cart, daily to convey the milk to the factory. The description which Mr. Jenkins gives of the operations in a private dairy does not apply with much force to Cheshire, for, in the locality in which I reside, and in general in the county, the most improved milks for dividing and grinding are put into a proper state, as well as the foot-presses for pressing it, and instruments for ascertaining the proper temperature of the milk, are in general use, and the old "rule of thumb" is the exception. I think, also, that it will be found that the best quality of Cheshire cheese is in greater demand than the American, and realises a better price. The rinderpest decimated the dairy stocks of Cheshire about four years ago, and this has had a depressing influence upon the price of cheese-making. *A Member of the Cheshire Chamber of Commerce, Chester, December 12, 1870.*

Tithe Commutation: Septennial Averages.—As many of your readers may feel anxious to know the result of the corn averages for the seven years to Christmas, 1870, published in the *London Gazette* of this evening,—viz., Wheat, 6s. 4d. per imperial bushel; Barley, 4s. 6d.; Oats, 3s. 0½d.;—I beg to state for their information that each 100 of the rent-charges will, for the year 1871, amount to 104 15s. 1d., or nearly ½ per cent. more than last year. The following shows the worth of £100 tithe rent-charge for the last seven years:—For the year 1865, £98 15s. 10½d.; 1866, £97 7s. 9½d.; 1867, £98 13s. 3d.; 1868, £100 13s. 8d.; 1869, £103 5s. 8½d.; 1870, £104 15s. 0½d.; 1871, £104 15s. 1d. The average value of £100 tithe rent-charge, for the 35 years ended since the year 1836, is £104 15s. 1d. The Editor of the "Willichs' Tithe Commutation Table," 25, Montpelier Square, S.W., Jan. 10.

Foxhunting.—Under this heading you have inserted lately three letters from me, complaining of the annoyance and loss to some farmers caused by this amusement. In those letters I spoke in favour of tenant-right in England, and gave an opinion that the landlords of the country had made laws favouring the land-owning class at the expense of the occupying class and the nation. The letters are in your paper of Nov. 19, Dec. 26, and Dec. 17, 1870. *The Agricultural Gazette* of Dec. 31 contains a letter advocating foxhunting, to which is appended an editorial note which my letters levelled "disgraceful charges against whole classes." I hope I have said nothing that is untrue, and will gladly apologise for any mistake I may have made. I am pleased to find in your leading article of this day (Jan. 7) exactly what I always urge myself. You ask for Chambers of Agriculture to discuss, promote, enforce attention to—"the miserable effects of game preservation to excess—the utter selfishness of battues . . . the necessity of absolute security for the tenant's capital." Thanks for this. English farming cannot prosper until something like this does come. Give tenants security, and they will farm well. Give absolute tenant-right to the whole of the agricultural Kingdom where a farmer's property is safely secured to him? I always have understood that the agricultural papers advocated good farming—the production of more food for the people. I thought my letters pointed out a way in which food was diminished and crops injured. Would it not be better for all agricultural papers to urge landlords to so shape their amusements as not to hurt their tenants, nor lessen the country's produce? I think it will be useless to try to stir farmers' complacency. If the agricultural papers did so, an expression elsewhere would be found for wrongs. I cannot believe that Mr. Wren Hoskyns would excuse such a thing as this: Just before the late frost a hundred or so of hunters rode diagonally across a field of Wheat near me, and back again, leaving about 50 yards wide of it trampled into a puddle. Now, I ask whether there is any other country in the world in which that has its crops trampled up in this way? I do not wish to be understood as claiming that the agricultural papers have any right to demand such a thing as legitimate amusements or privileges, but I do think that tenant-farmers' property in England is often so ruthlessly destroyed that I fear no remedy can be found for it until farmers protect themselves at the polling-booths. Appeals to landlords to grant leases, to destroy hares and rabbits, to abandon the six months' notice to quit, have been in vain. If more farmers (at least 100) were in the House of Commons, a bill would be introduced to the effect [To say that landowners "sneakily connive" to maintain a felonious law (see p. 1684, 1870) is a disgraceful charge.—Let "H. H. O." wait till harvest time, and then report on the injury which he thinks has been done. But we do not deny that the field may have been hurt by the raid in question. Even then, however, the blame does not necessarily lie upon any one class. The appetite for amusement, and especially the amusement of foxhunting, is a national one, and, coming from members of pleasure to a matter of business, the refusal of the lease, of which our correspondent complains, is much more often the act of the tenant than the act of the landlord. So that here, too, while the argument may be sound enough, the personal application of it is a complete failure.]

Farmers' Clubs.

WENLOCK.

The Evil arising from Importing Foreign Stock.—Mr. H. W. KEARY was not one of those who ascribed all the evils of the present day to the free introduction of stock. Pleuro-pneumonia and the foot-and-mouth disease he did not think originally came from abroad, or, at any rate, he did not think they were now propagated by the introduction of foreign stock. He thought they arose from atmospheric causes, for he frequently found them breaking out in districts where no foreign stock had been introduced. He had known something about farming for 40 years, and his impression was that pleuro existed in this country long before the free introduction of foreign cattle. His impression was that both pleuro and foot-and-mouth disease were rife in this country before foreign cattle were imported. But some diseases came directly from abroad. There could be no doubt whatever that diseased cattle were introduced, and it was equally certain that the present system of importation was objectionable. If any plan could be devised for compelling the animals imported to undergo a quarantine, or for slaughtering them at the ports of disembarkation, it would, he thought, be very desirable. There were difficulties in the way of the latter remedy which he thought would render it at least difficult to carry out, and he was, therefore, of opinion that a complete system of quarantine would be most desirable, especially in certain cases. Cattle defined for disembarkation, and animals were not disembarked promiscuously at any port in the kingdom. As to the foot-and-mouth disease, he thought it was propagated sometimes in the most unjustifiable manner by the carelessness of those upon whose farms the disease already existed. There were gentlemen at that table who could bear him out when he said that the disease had been carried about in the neighbourhood of Bridgnorth and Wenlock and Edgworth—by the practice of allowing pigs to run about on farms where the disease existed. They knew that the habit of the pig was to get into every hole, into every fifth, and he did not know any animal that would be more likely to spread disease. He thought that when disease existed on a farm, no animal ought to leave it. Although he admitted that the restrictions which had been enforced upon the farmer were exceedingly inconvenient, and had been attended by heavy loss, yet he believed those restrictions were warranted by very good results in preventing the spread of the disease. He did not think he thought the manner in which diseases were spread about the country had now become so apparent that more stringent rules than existed at present should be enforced as to the movement of cattle. He thought some simple machinery might be devised for carrying this out. As to the foot-and-mouth disease, although it was a troublesome disease, it was rarely fatal, nevertheless the milk of a diseased animal was most dangerous for a human being to drink. He did not think pleuro could be communicated so easily. He was not sure that it could be communicated except by contact with an animal already diseased. He thought it a subject well worthy of their consideration as to whether stringent rules could not be enforced to prevent infection spreading when disease existed in a district.

Mr. EVAN DAVIS, sen. : Mr. Keary had said that foot-and-mouth disease and pleuro were in England before the introduction of foreign cattle. That he meant, no doubt, was the free introduction of foreign cattle. Pleuro, he believed, was introduced into this country by Dutch cattle in 1840. He was fully aware that that was a very delicate question they were going to discuss. He recollected the enthusiasm with which the struggle for free trade was carried on, a quarter of a century ago, and he believed that the man who now attempted to introduce the old question of protection would be met with ridicule. Acknowledging that he believed that the free trade was the best way of free trade had been to enrich others more than ourselves, yet he did say that the farmers of England should at least have fair play. All they asked for was just and equitable laws, and they would then defy the whole world. They did not intend to appeal to the country to put an end to the introduction of foreign stock; but they did wish to impress upon the legislature the necessity of taking efficient means for preventing the importation of diseases, and the dissemination of them over the country. He had no doubt whatever that that was a question as much affecting the interest of the consumer as the producer. His belief was that the supply of animal food in this country had been lessened rather than increased by the introduction of foreign cattle. He would read the substance of a report drawn up by Mr. Kilby. From this it appeared that during the last 30 years cattle had been destroyed by lung disease of the money value of £53,597,198, by foot-and-mouth disease of £48,389,219, and by rinderpest £4,047,378; making a total of £106,033,795. It was entirely from foreign diseases that that great loss had been sustained. Then, again, the Government statistical returns for 1868 put the cattle stock in Great Britain down in money value at £78,809,203, so that the loss sustained by foreign diseases exceeded the value of all the cattle stock in Great Britain at any one time. By £21,824,592, or, as Mr. Kilby had put it, 127 per cent. on the stock held by the British farmer.

This was a great loss. Had the country been compensated for it? He feared not. He believed, and his belief was borne out by facts, that the British consumer was 7 per cent. worse off than if he had never tasted foreign beef at all. The present price of beef was strongly confirmative of this. Taking the five years preceding the free introduction of foreign stock, the price of beef was 54d. per lb. Now it is 74d., so that the effect of the introduction of foreign stock has been to multiply the consumer in 2d. per lb. Some might say that the rise in price was caused by an increased consumption, but he did not think that accounted for it. So long as the consumer was content to be fed by the British farmer, he was well fed and fed cheaply. He enjoyed his beef at 54d. per lb., but when he began to grumble and went elsewhere for a supply, he had raised the price of his beef by 2d. per lb. He thought, under all those circumstances, that the consumer ought to join the producer to press upon the Legislature the necessity of taking such steps as were necessary for the whole of the cattle to be killed at the ports of disembarkation, or at any rate to adopt some stringent measures to prevent the spread of these diseases.

Mr. H. BURTON : The Privy Council watch over the importation of foreign cattle with extreme care and attention, and, I may say, anxiety; and no time or trouble is spared in meeting every emergency as it occurs, such as a notice of disease in any particular quarter. Instructions are received from time to time from the Privy Council as to what prohibitions are to be enforced, which make it a matter of great importance to you more than a general idea of the practice or system which Mr. Keary styles an evil, as it differs under so many different circumstances. I must speak more particularly of the Metropolitan area; the outports are governed by special rules, according to local conveniences. The importation of cattle is looked upon as merely permissive, being necessary for food, and not for feeding or breeding purposes. Upon this principle is established a groundwork, whether at outports or in the Metropolis. All cattle arriving from non-infected countries are examined on landing, kept in quarantine for twelve hours, and then examined again. If landed at Thames Haven, they are sent up to the Metropolitan Market by railway, to be slaughtered; and the same process is allowed only at other specially defined landing-places. No cattle once entering the metropolitan area are allowed to go out of it alive. Should a cargo of cattle arrive from an infected country all must be slaughtered on landing; a certain time elapses and disinfection takes place before the premises are again used. Should a cargo arrive from a non-infected country, and one head thereof is diseased, all are slaughtered on the spot. This applies equally to oxen, sheep, swine, goats, &c. No regulations could be carried out more stringently, the idea being that the importation of cattle is necessary to provide food for the country, and in this case it does not matter whether the supplies reach the market dead or alive. The following illustration of the strict measures adopted is given in the *Quarterly Review*. The Queen recently had her from the Duke of Saxe-Coburg. It was for breeding purposes, and of course was only of use alive. The correspondence about the beast was most voluminous. It was at last allowed to be sent to Southampton, this being the nearest point by sea where it was required. It remained in quarantine 28 days, and Her Majesty had further to give a bond for £100, as a guarantee that the stipulations of the Privy Council were complied with. It was impossible for me to guess what the result was, but the Queen's cattle had been sent to the Farmers' Club together to discuss. The simple truth seems to me that the people of England will have "roast beef," and the country cannot produce a quantity equal to the demand. It is, therefore, actually necessary to import stock. The question remains, how to do it without spreading disease—a contingency which is always to be provided for. As a practical effect of your deliberations, if the resolutions passed are forwarded to the Privy Council Office, I am sure if there is any objection discovered on original ideas expressed, a very courteous reception will be given to the same.

Mr. M. G. BENSON, the chairman, said that some of his cattle had taken the foot-and-mouth disease from cattle on adjoining land, which was in the occupation of a jobber. The man affirmed that there was no diseased stock when they arrived, and that he gave instructions to his cowman to keep his stock away, as foot-and-mouth had come from an infected place. There was no doubt whatever that his (Mr. Benson's) animals caught it in that way, but the singular part of the affair was that Mr. Lever's cattle, on land adjoining, intermixed with the others, and yet that gentleman had not one attacked. His (Mr. Benson's) cattle must have caught it over a gate, but the others, although intermixed, did not take it at all. He thought it rather remarkable that, during the cattle plague, South Shropshire should have been so free from it, as compared with the rest of the country. The most infected parts were those on the other side of the river, and he thought the river, forming as it did a boundary, had a good deal to do with it. Animals were not allowed to cross the bridges from one part to the other, and it was hardly likely that any swam the river. He believed they could have pleuro without any contagion whatever. It was nothing more than in-

flammation of the lungs, and might be caused by ordinary atmospheric influences. He could not go so far as Mr. Davis, who said that the importation of foreign stock had raised the price of beef 7 per cent. The real question was, could farmers feed more than they did at present? He should doubt that very much. He thought that every farmer, supposing him, of course, to have the necessary capital, stocked his farm properly, and got as much cattle upon his farm as he could keep, and if he got more than he could keep the stock would only become deteriorated. He thought the letter read by Mr. Burton, evidently from a gentleman who had the means of judging for himself, showed that every means that could be taken by the Government to prevent the introduction of disease, and that being so, he did not see what more they could desire in that respect.

Mr. KEARY hoped the same stringent means would be adopted to prevent the spread of disease in this country, which it appeared were adopted to prevent its introduction from abroad. Jobbers were a very useful body of men—

THE CHAIRMAN : Rather unscrupulous at times, though.

Mr. KEARY : They were, perhaps, at times rather unscrupulous, and were certainly not so careful as they should be, and so were often the cause of much mischief. He thought the present Government were taking all the precautions they could call upon them to do, and he did not think, after hearing Mr. Burton's announcement, that they were in a position to call upon the Government to do anything further as to foreign stock. He thought, however, something was needed at home, in the rural districts especially. He repudiated the idea of employing policemen as inspectors, urging that they should have men more experienced in the detection and identification of disease. He disagreed with Mr. Davies as to the rise in the price of beef being caused by the introduction of foreign stock. How, he would ask, had the population of this country increased of late? And besides that, people were now in a position to eat meat, whereas ago could not, in consequence of the lowness of wages, afford it.

KINGSFOTE.

Local Taxation.—At a recent meeting of this Club, Sir GEORGE JENKINSON, Bart., M.P., opened the discussion on this subject. He quoted the first Act which dealt completely with the subject of poor-rates, the 43d Elizabeth, c. 2, which was enacted in order that order might be taken—

"For setting to work the children of all such whose parents shall not, by the said churchwardens and overseers, or the greater part of them, be thought able to keep and maintain their children; and also, for setting to work all such persons, married or unmarried, having no means to maintain them, and use no ordinary and daily trade of life to get their living by; and also to raise weekly or otherwise (by taxation of every inhabitant, parson, vicar, and other such of exchequer or other lands, and also, *utiles impropritate*, proportions of tithes, coal mines, or saleable underwoods, in the said parish, in such competent sum and sums of money as they shall think fit), a convenient stock of Flax, Hemp, wool, thread, iron, and other such and such other goods, work, and also, such sums of money for and towards the necessary relief of the lame, impotent, old, blind, and such other among them being poor, and not able to work; and also for the putting out of such children to be apprentices, to be gathered out of the same parish, according to the ability of the parish, and also, for the better and more effectual way for the disposing of the said stock, as otherwise concerning the premises, as to them shall seem convenient."

The Act specifies "every inhabitant," and distinctly points to the difference of such persons as against "every occupier of lands, houses, &c.," and it palpably intends that every "inhabitant" shall be taxed as well as every "occupier," of lands, houses, &c.; and after ordering that, it finally orders, so as to prevent any one escaping who is able to pay, "That this tax shall be gathered out of the same parish according to the 'ability' of the same parish;" and I should like to know what on earth can the "ability" of the parish mean, but the ability of all the inhabitants and the occupiers of land and houses of the same parish? No reasonable doubt can be entertained that the spirit of this Act—so far as the intention of the framers of it went—was that all classes of the community should equally contribute their proper share of the burden for the relief of the poor, and that this should apply to all trades and professions, and to all personal property as well as to land and houses. That this view is a sound one is shown by the report of the committee of the House of Lords which sat in 1850 on Parochial Assessments; and the 6th resolution of their report says—

"That the relief of the poor is a national object, towards which every description of property ought justly to be called upon to contribute, and that the Act of 43d Elizabeth, c. 2, contemplates a contribution according to the ability of every inhabitant."

Well, the question then arises, why was real property only specified? and why was not other property named also, as liable to be rated to the relief of the poor and sick and aged, &c.? The answer is obvious: no other property such as is now designated personal property at that time visibly existed. No funds or railways, or rich iron mines, or other such personal property then existed; and all the mass of wealth, which is now possessed,

by the merchant princes of this rich country, was gradually arisen since the days when this tax was first imposed. Then why, I ask, as in process of time it did arise, should it not have taken upon its shoulders its fair share of the burdens of the nation? Can any person say that the wealth of the country, no matter from what source it may arise, ought not to bear its share of the relief of the poor and sick and aged? And still, that it ought not to contribute to those burdens that are more imperial than local, and as such concern every class of the community? As an instance, I quote the charges for police, for the gaols, for militia stores, for lunatic asylums, for coroners, and other charges, to say nothing of the charge for maintaining turnpike roads, and soon for the education rate. Who can say that the fundholder is not as much interested in the maintenance of all those institutions? I have named, police, gaols, militia, &c., as the landowner? It is said that land has risen in value since the imposition of this tax: well, and if it has, has not this other wealth, this mass of personal wealth, also risen? and why is account to be taken of the rise in value of one class of property, viz., as to land, and no account whatever of the rise or other class of property, viz., personal wealth?—and moreover, the land has risen in value by the outlay of capital; and why are you to tax capital in improving land, and to leave untaxed capital invested in other sources of wealth? That is a direct penalty imposed on agriculture and on the improvement of land, and therefore, on the amount of food to be produced for the people. Moreover, when land was so exceptionally taxed it was also exceptionally favoured by protection, the farmer's crops were protected by restrictive duties, which have now all been swept away; and I for one do not regret it, as I had rather pay under his altered circumstances. But as he is now made to compete with all the world, he ought not to be taxed more than any other class, and especially for objects that other classes benefit by as much as he does. Now, as to the rise in value of land. In a lecture I lately heard read on the Fen country, at the Central Farmers' Club in London, in describing the rise in value of Fen lands from drainage, &c., it was stated that in 1651 Lord Arundel, one of the great nobles' associates, in obtaining the Great Level, became so discouraged by the reverses and losses sustained by the adventurers that he sold his 5900 acres for 3s. 9d. per acre, the same now being worth probably from £30 to £50 per acre. Many farms in later times have been sold at very little over their present annual rentals, and some at even less. Through the kindness of Mr. Richards, of Wimbington, I am able to present the assessments to the poor rates in the parish of Doddington, made at different periods, showing the influence which improved drainage has had upon the value of Fen lands:—

Acres.	Rateable Value.
1736 200 ..	£40 0 0
1784 200 ..	60 0 0
1822 200 ..	100 0 0
1869 200 ..	238 0 3
1784 60 ..	15 0 0
1831 60 ..	21 0 0
1869 60 ..	68 1 4
1757 20 ..	2 0 0
1784 20 ..	5 0 0
1822 20 ..	26 0 0

That the use how capital expended on land is taxed; capital, the use of which has made fertile thousands of acres of land, and thus produced increased food and employment for thousands of the people. And now let us compare the treatment given to capital invested in other branches of commerce. I will first quote a case I have often before alluded to, because I think it so well exemplifies my argument. Between two and three years ago Mr. Crawshaw died possessed of over £80,000 in funds, producing nearly £30,000 a-year, and of the owners of the title property was benefited and protected by the police, the jails, the militia, &c., just as much as any farmer here benefits by those institutions; and yet in respect to that particular property Mr. Crawshaw did not contribute one shilling to the local taxation raised for those charges.

Now, I will refer to some of the great sources of wealth in this country, none of which contribute to the local taxation charges. The following condensed statement will convey an idea of this capital:—

Funded and unfunded debt	£805,000,000
British railway shares and debentures ..	355,000,000
Indian railway shares held in England ..	96,500,000
Colonial Government securities	16,000,000
Indian Home Bonds	6,000,000
London Joint Stock banks	15,500,000
Irish and Scotch banks	12,750,000
Bank Stock	14,500,000
Insurance companies	15,000,000
Mines, British and foreign	10,000,000
Steam companies	5,000,000
Telegraphic companies	9,000,000
Gas, canals, waterworks, bridges, &c. ..	20,500,000
Docks companies	6,700,000
Total	£1,288,750,000

Now first as to the exemption of income derived from the funds. It is argued that the State has no right to tax income derived from the funds; and to prove this, the original Act of 1692 is quoted. The Act provided that money lent "shall not be charged or chargeable with any rates, duties, or impositions whatever." But

although the capital of funded property is not to be taxed, the principle of taxing the income of it for imperial purposes is fully recognised by the imposition of the Income-tax, which is increased or lowered from time to time, as the necessity for it may arise. But no such tenderness is shown to landed property; every fresh charge, as it arises, is all heaped upon the landowner, and the poor rate has increased during the past 10 years by nearly three millions. In 1859 the amount levied was £1,188,880; in 1868 it was £1,054,543."

After a further discussion of the injustice to land of comparative exemption from taxation enjoyed by these various kinds of property, Sir G. Jenkinson referred to his remedy for the present very unjust system. "I would retain the present arrangement of local management by boards of guardians of the funds raised for the relief of the poor, sick, and aged; and I am not sure I would not even extend that system, and make each parish relieve and maintain its own sick and poor and aged. . . . I would remodel the poor rate, and keep it to its original purpose, viz., the relief of the poor and sick and aged; and the rate for this should be locally raised and locally administered, assisted by a grant for establishment charges, for salaries of medical officers, &c."

That as to all the other charges now heaped on to the poor rate, such as the charges for police, gaols, turnpike roads, and education rate, lunatic asylums, militia stores, &c., I would have a county fund for all those, and I would pay into that county fund all the proceeds of the various licenses collected within each county, such as the licenses for public-houses, and gun licenses, and shooting licenses, and perhaps also the licenses for horses and carriages, which are peculiarly applicable to the rate for maintaining the turnpike roads. I would also create a new schedule of the Income-tax, which I would call the county-rate schedule, and that should be divided in fair proportions (to be decided hereafter) between owner and occupier. From this fund I would have all those charges paid, now so unjustly lumped in with the poor-rate, and levied solely on one class of property, viz., land and houses; and I would have this fund administered by the court of quarter sessions, assisted by a county council, and the amount of the taxes made by the Government to each county from the new schedule of Income-tax should be a fixed sum, in proportion to the average expended by each county on the same charges during the previous five or seven years, and any excess over that should be met by local funds.

Colonel KINGSCOTE, referring to Mr. Gladstone's caution that the agriculturists might find upon inquiry that they were not paying more than they should, observed: "All I can say is, let the inquiry be made, and see if such is the case. If we are paying no more than we should towards the local taxation of the country our mouths will be shut, and we shall not grumble. But I expect that the more you inquire into the matter the more clearly you will find that the house and land interests are being taxed far beyond wealth of other kinds. And he concluded:—let us not have to pay these taxes which we pay and not for them; let us have help from the community at large in those matters which are for the benefit of everybody; and, if you like, let our system be under Government supervision, as our Poor-law system now is."

Mr. MARLING, M.P., said:—"I would remind the Club that taxes, of whatever kind they may be, are always extremely irksome and disagreeable, and that he generally felt those taxes which we pay and not for them which we don't pay. And, with regard to this subject, whilst there is much room for improvement, I give you as my opinion that, however much you discuss it, and however much it may be agitated, when the account comes to be shown up you will find that, looking at it from an agricultural and public point of view, the land does not bear more than its fair share of the taxation of the country. I would refer to one or two points of the existing system. You will find that the Excise and the Customs are the two great sources of income to this country, and that, although there have been so many remissions, they now pay considerably more than they did 30 years ago. I remember a remark made by Lord Halifax many years ago, when he was Chancellor of the Exchequer, that he believed the land in this country paid a smaller amount of the general taxation, in proportion to what was raised, than in any country in Europe. There is also another point of view in regard to this question, and that is the original tenure upon which land was held. I admit that I am here touching upon a very serious point; but, still, we should look to all sides of the case before we make a noise. Under the feudal system the whole of the expenses of the military and of the general government of the country was borne by the land, and upon that condition the land was held; and the only remission of that at the present time is the small relief paid by the tenant. First, that the tax was remitted for 4s. in the pound upon the then value of the land, and shortly after a law was passed which stereotyped the rate at which the land was then valued, the assessments were fixed, and the rate, in my parish, for instance, is not now more than 4d. in the pound. Mr. Marling said he should feel great pleasure in joining in an evening's discussion upon this point, and con-

tinued—"The Property and Income-tax is extremely moderate now, and, under Schedule B, I am quite sure all the farmers must feel that they are dealt with very tenderly and very leniently as compared with other classes. I think that when the Income-tax was first imposed under Schedule B all occupiers of land paid two-quarters of their rental; now, I believe, they pay half. Then the general taxation of the country—take, for instance, the Customs and the Excise—is much reduced, and bear with very little pressure upon the community as a whole. Still, it will be found, I think, that where funds are administered locally they must be raised locally. With regard to turnpike roads, I think it will be extremely unjust that the expense of these roads shall be thrown upon the land, and I cannot but hope that some system will be devised under which those persons who use the roads and keep horses shall be at the expense of maintaining these roads, and I have no doubt that if this subject is gone into, in other ways improvements may be effected. But I would earnestly suggest that the inquiry shall be entered upon in a spirit of fairness, and especially let us take care we don't throw the burdens upon those less able to bear them than are the upper classes. I am for placing the burden of taxation where it can best be borne. If we have a burden to carry let us put it upon our shoulders, and let our legs and arms be left free for action in carrying it. Causes of great wealth are very much like what we see in some of the operations of Nature. The rain that is falling to-day is treasured up in storehouses wherein it is preserved from evaporation against the time when we need it to make fruitful the earth during the dry months of summer. Property treasured in the funds comes out by and by to be invested in the land, and is then liable to the general taxation of the country; and if you attack such matters without waiting for the due bearing of the burden, I think you will be killing the goose to get at the golden egg."

Mr. BURNETT, the Secretary, gave his opinion that there was no class of men more hardily worked than the farmers, and he sketched them in their toil from early morning till late at night, in the darkness of winter and the burning sun of summer. But he announced that what Mr. Marling had said was not intended to place a burden to carry let us put it upon our shoulders, and let our legs and arms be left free for action in carrying it. "As soon as people get a little money," he said, "they want to invest it in the best way they can. I'm not going to invest mine in the funds: neither would I go into manufactures."

Notices of Books.

Beetroot Distillation. Containing a report on the subject. By Dr. Aug. Voelcker, F.R.S., Messrs. D. Saville & Co., 10, Abchurch Lane, London, E.C.

The Beetroot Sugar Question. By C. F. De Man. W. Ridgway, 169, Piccadilly, W.

The Beetroot-sugar question may be considered now to be as satisfactorily answered by English experience, as it was by that of Germany and France. At Lavenham and at Buscott it has been proved that Beets sweet enough can be grown, whatever the season may have been, to justify either a refiner or a distiller in giving what is a profitable price for them to the grower. It is possible to grow 60 cwt. of sugar per acre on English soil by means of them, and that must be a paying business. Beets, according to Dr. Voelcker's analysis, as given in another column, have been this year grown in Ireland, yielding from 10 to 14 per cent. of sugar, of which the greater part is easily extracted; and it is certain that 20 tons of Sugar-Beet can be without much difficulty grown per acre, while 30 and 40 tons are possible. The root which has grown in spite of difficulties, and attained a considerable size in a somewhat stunted plight, is a sweeter root than one which has grown away vigorously from the first. It has always appeared to us, therefore, that the best crop must be better than the best well-grown seedlings. The root which is buried up to the shoulder in the ground is sweeter than one which stands almost wholly in the air and sunshine. On this ground, too, the transplanted crop must be the better of the two. Every pound upon a square foot corresponds to 20 tons an acre. And we strongly recommend any one who wants to achieve a maximum experience in Beet this year—if he has a well-tillied corn stubble in a good condition in early spring, to get the small furnish plants of fair sown next month, which will furnish plants of fair sown early spring to be transplanted. Then let him plough and plant the ground at once, dibbling the roots with a large, deep dibbler, so that the fibres shall not be doubled up in planting them—those who are dibbling them following every plough, and planting the roots at 12-inch intervals, or thereabouts, in the fresh turned furrows. It is probable that the roots will average a 2 lb. apiece—it is certain that they will ripen early enough to start the sugar-making at the end of the month. If the land has been well and deeply tilled, and can be kept clean, without excessive labour, wholly by hand hoeing, it is probable, we think, that in this way a maximum crop of first-rate roots will be obtained.

The two books named at the head of this column, contain, one of them, a trustworthy account by a so-mind and well-informed man, and the other, rather

suggestive than substantial, a statement by an enthusiastic and, probably in his particular line, also well-informed man—of what is possible in the growth of sugar and of spirit by Sugar-Beet cultivation. Mr. De Man, in a random and ill-arranged collection of short chapters, tries to urge the cultivation of the crop in England, by somewhat extravagant accounts of Belgian experience.

"The following is a statement of the value of an acre of Beetroot, and the expenses of growing an acre of Beetroot in West Flanders:—

Nett value of an acre sold on foot	£20 0 0
Rent and taxes	£2 10 0
Ploughing, harrowing, &c.	1 5 0
Manure	5 0 0
Seed and sowing	0 10 0
Weeding, &c.	1 10 0
	8 0 0
Leaving a nett profit to the grower	£12 0 0

"I do not hesitate in stating that an acre of Beetroot-sugar can be grown in England at the same cost as in Belgium; rents are higher in Belgium where Beetroot is regular, but labour is cheaper.

The author relates, moreover, an experience of the use of oil as a manure, which still further tests our ability to confide in his judgment:—

"My relative had flattered himself that, this season, if the season was favourable, he would grow exactly 22 tons of Beetroot-sugar per acre for the sugar factory, and so near has his calculation been verified, that the result has been 22 tons 6 cwt. per acre. I had also flattered himself, to his neighbours, that he could grow 10 tons of Beetroot for cattle food to the acre, in this experiment he has somewhat failed in his calculation, since the production upon an eighth part of an acre has been 10 tons 5 cwt., which is at the rate of 82 tons per acre. How was this extraordinary produce obtained? Simply by the spreading of 4 cwt. of linseed oil over the eighth part of an acre, being at the rate of £20 per acre."

The roots were grown, no doubt, as he informs us; but that the oil had anything to do with the crop we take leave to doubt. The following is a portion of the chapter on transplantation of the Beetroot plant.

"The experiments which have been recently made by Belgian and French agriculturists have been very successful in every instance. Five tons more Beet have been obtained per acre, of a better quality is superior, producing from 2 to 3 per cent. more sugar—an acre, *semis en pépinière*, produces plants to supply 15 acres for transplantation. The land to grow this plant for transplantation must be made very rich; colza cake should be applied to the soil in liquid or in powder at the rate of at least £10 per acre. Farmyard manure is often added to this, to the value of £4 per acre. The farmyard manure should be ploughed in in autumn about 4 inches deep. The colza oil-cake to be put on the land in January or beginning of February.

So soon as the land intended for this purpose can bear the horses, say at the beginning of March, one deep ploughing should be given; then, two or three days after, a cross harrowing, and five or six days after a second deep ploughing; then, in a very few days, harrowing and rolling should be proceeded with (the weather permitting), in fact the land should be made like a garden.

"The land should be sown by the 15th of March, at the rate of at least 40 lb. per acre, to be sown broadcast (under no consideration in drills). One acre of Beetroot plants, sown in this mode, will supply sufficient plants to transplant 15 acres of the land."

As this operation takes place early in spring, when the weather is still very cold, a piece of land is always chosen that is more or less protected from the eastern and northern winds; and if the season be very dry, a weak farm liquid is often applied to the plants, in such cases the plants should be grown up to the proper size required for transplantation by the 15th of May, if possible. The plants should have attained the size of the thickness of a finger before being pulled for transplantation. But as there are so many different sizes of fingers, it will be more systematic to say that the plants should have attained an average of 5 centimètres in circumference, before they are fit to be pulled for transplantation.

"The plants should be pulled carefully, without force, to prevent the roots from breaking at the thinner ends. The plants must be returned to the soil, that is, transplanted, the same day that they are pulled.

"The following is the way in which the transplantation is done. I will explain it as well as I can:—The rows to be 18 inches apart, and about 12 inches distant in the rows; a man with a wooden implement (composed of a board about 18 inches high, with a handle to it, the lower parts of the two poles are of iron, and are in the shape of a Beetroot plant of about 10 inches in circumference, but gradually pointed), makes two holes at a time with great quickness; two or three boys follow with a lot of the young plants, and drop them in the holes, losing not more than the same time with the root; this is also done with great quickness.

"The soil having become stiff by the tramping of the planters, a man follows with a rake to loosen the soil, and especially to adjust the soil round the plant, in order to

"This is about an average value of manure to the acre for Beet grown for the sugar factories. To apply more or less depends upon the depth of the land."

"These Beetroots weigh from 20 to 40 lb. The largest will be sent by various exhibitors. Such experiments are worthy to be tried by British agriculturists, and the soil that is transplanted in the same way is used on a large scale for green crops only. If the oil is spread over the land, if possible on a rainy day; if not on a rainy day, water must be spread immediately over the oil with a watering-cart; or otherwise the oil should not be exposed to the sun. Colza oil has also been tried for garden vegetables, but colza oil does not possess such stimulant power as linseed oil, still it is also a wonder-working manure."

"This is done by boys of 14 or 15 years old, who are more suitable to do this kind of work than men, because it is done in a stooping attitude."

be sure that the holes may be properly filled and closed, without which the plant will not take new life.

However, it takes always two or three days before the plants begin to grow again. Six or seven days after the transplantation has been performed, it is necessary to go over the plantation, to see if there are any plants which have failed to assume new life. There are always some, perhaps one in twenty plants, which will not grow, the cause of which is that the plants have been too closely sown in the soil, or to have been left too loose in its residence.

"The expenses of growing an acre of Beetroot plant for transplantation are considerable, and I have not yet been favoured with all the particulars to be able to give a correct account of the precise expense, but it is to be sure not to be under the mark I will set it down at £30 per acre. As the acre grows in the *pépinière* nursery (as it may be called) supplies plants for the transplantation of 15 acres, it follows that the extra expenses to grow an acre of Beetroot by the transplantation plan are at the rate of £2 per acre.

"Now let us see the advantages of growing the Beetroot on this new plan. In the first place we have an extra produce of 5 tons per acre, as already mentioned; in the next place it is seen that the clearly ascertained fact is that the transplantation plan produces from 2 to 3 per cent. more sugar. Therefore the extra produce in weight and the extra produce of sugar derived from this new mode of growing the Beetroot-sugar, may be set down without exaggeration at £8 per acre; but to make the value of the extra extra produce of sugar to be deducted, and therefore the advantages gained are £6 per acre. I now ask myself again, what shall we hear next of the *plants prodigieuses*?"

Dr. Voelcker's report is a good, practical, and substantial account of Beetroot cultivation, with full particulars as to climate, soil, manure, seed and sowing, after cultivation, and harvesting—explicit, trustworthy, solid, as all Dr. Voelcker's writings are. The practical part of the essay is followed by a full discussion of the composition of English-grown roots, and a report on Beetroot distillation, and stills, and the character of the distillate entirely of the characteristic aroma of the Beet, and a pure and simple spirit is the result. The following is a paragraph on this subject:—

"The purity of spirit-of-wine is only a relative purity, and is far from perfect in most cases. In fact, spirit-of-wine generally is a very complex mixture of water, ethyl-alcohol, amyl-alcohol, various ethers, organic acids, aldehydes, glycerine, essential oils and hydrocarbons, of which little is known. These bodies, resembling each other, and being so close together, are difficult to separate from another. In spirit-of-wine these by-products of distillation are by no means disagreeable, but in the case of Beetroot spirit it is absolutely necessary to remove them, in order to obtain a perfectly neutral and pure alcohol. If these foreign matters are only partially separated, the alcohol assumes a bad state by its impurities."

"The effect of these foreign substances upon alcohol is more energetic under the prolonged action of heat. Every attentive distiller knows full well how prejudicial to the quality of the spirit is the influence of a prolonged distillation. The alcohol produced during the first 24 hours is much finer, and more neutral, than that obtained after 40 or 50 hours. Under the continued influence of heat and the hydrocarbons, acids and ether, the constitution of the alcohol is partially changed, and new products are obtained, which have a strong and disagreeable effect. It is as objectionable to work with slow acting stills as with imperfect ones. The Savalle stills meet these inconveniences by the great regularity and rapid progress with which the distillation proceeds."

"With an ordinary still it is impossible to separate sufficiently from the foreign impurities from alcohol, but with the rectifying Savalle stills, spirit of great purity is obtained with certainty."

To Dr. Voelcker's report are appended by Messrs. Savalle, who publish it, various testimonies to the merit of the still, and a number of estimates in answer to the question, Is Beetroot distillation profitable? These estimates must be taken for what they are worth; we do not indorse them, and we would much rather have the Buscott experience than the estimates on which the enterprising owner of the Buscott property is acting. Of this we are not to be deceived by-and-by. But while we do not believe, from the quality of the roots and the excellence of the process to which they are subjected, that the speculation will be profitable. We give, as a last extract, the following passages on the value of pulp as food for cattle, extracted, not from Dr. Voelcker's report, but from Messrs. Savalle's appendix to it:—

"Mr. Bella, of Grignon Agricultural School, made experiments on cows with Beetroot and pulp. To two cows he gave a certain quantity of hay, meal, &c., and to one some Beetroot, to the other pulp instead of Beetroot. The cow kept on pulp gave more milk and of a better quality than the cow receiving raw roots. In order to avoid all errors, Mr. Bella changed the food and gave the pulp to the cow which was fed before with roots, and to the other he gave roots instead of pulp. The result was, that the one receiving the pulp, after a time, gave more milk than the other; the milk was much richer in butter, and the cow herself was in much better condition."

"In Morton's 'Cyclopædia of Agriculture' we read:—'One acre and a-half of pasture grass is the usual allowance to each dairy cow in Gloucester from May 1 to December 1. During the winter and spring months hay almost the only food given; and as each cow will consume 2½ tons, it requires the same extent of land—1½ acre—for the winter or for the summer. The expense of feeding a milk cow for 12 months is calculated at £4 for grass, 12 for hay, in summer, and as the milk is sold for making and attendance falls to be added to a like quantity

of land, the cost of the winter keep is not overestimated at £5, which amounts to £9 per annum."

"If pulp is mixed with meal, oil-cake, meal, &c., the yearly cost of the food for milk cows is reduced from £9 to £6 or £7. For fattening purposes the economy is even greater."

"Thousands of farmers on the Continent have experienced the advantage of pulp feeding, and are so satisfied that they constantly increase the growth of Beetroot for distillation. For this reason, in many districts on the Continent where formerly only a few hundred bullocks were fed, after the introduction of Beetroot distilleries, several thousands are fed."

Farm Memoranda.

THE FARMS OF MESSRS. STILGEOE AT ADDERBURY, NEAR BANBURY.—The following is an account of two of the commended farms in the Oxford Prize-Farm Competition, taken from the Journal of the English Agricultural Society:—

1. Mr. Nathaniel Stilgeo's farm is situated at Adderbury, and contains 507 acres, of which 271 are arable and 236 pasture. The soil of the former is a good mixed red loam, and the latter chiefly strong clay on the slopes, with deep alluvial soil in the meadows, which form the northern boundary of the farm.

It is farmed on a six-course rotation as under:—1, roots; 2, Barley and Oats; 3, seeds; 4, Wheat; 5, Beans; 6, Barley.

Four acres of Mangel Wurzel are sown on 27-inch ridges, about the middle of April, and have 12 loads of farmyard manure and 3 cwt. of superphosphate of lime per acre; 40 acres of Swedes and Turnips are drilled on the flat, 21 inches apart; the Swedes are manured with 10 loads of farmyard manure and 3 cwt. of superphosphate of lime, and the Turnips with 5 cwt. of superphosphate alone. The sowing of Swedes is commenced in the middle of May, and the Turnips in the middle of June. These are all horse-hoed as often as necessary, and hoed, picked, and finished for about 7½ per acre. The Mangels are taken up and stored in the usual way; and the Swedes are taken out for cattle, and the remainder fed on the land by sheep eating cake.

Barley is sown after Swedes and Turnips, but Wheat sometimes succeeds the Mangel Wurzel. Chevalier Barley only is grown, and the heavy seeding takes place per acre is sown. The first sowing takes place very early, viz., in the second week in February, and all the Turnip land is sown in succession as soon as it is ready. The Barley is cut by a reaper, is left on the swath, and is carried loose.

Seeds are sown in the Barley with a hand seed-barrow in the usual manner, at the rate of 12 lb. of mixed seed per acre. Part of the seeds are mown and part grazed with sheep. No manure of any sort is applied, and Wheat is sown upon them rather late in the autumn.

Wheat follows seeds; the land is ploughed in October, and pressed with a Cambridge roll. Sowing commences about the last week in October, 3 bush of seeds are drilled per acre. Burrell's Red and certain white varieties are the kinds most usually sown.

In early spring the Wheat is all hand-hoed, and later on Thistles and weeds are carefully taken out. The Wheat is cut by scythe, and is tied and shocked by the day, and the whole cost of Wheat and Barley harvest ranges from 12s. to 14s. per acre.

Beans follow Wheat, farmyard dung being applied on the Wheat stubbles. Both spring and winter Beans are grown, and Rape or white Turnips are generally sown between the rows when the hoeing is finished. In favourable seasons a great deal of sheep feed is produced in this way.

Barley or Oats are sown after Beans, without any manure.

A dairy of 40 Shorthorn cows is kept, and the produce is made into butter. There are also now on the farm 10 in-calf heifers, to calve about Michaelmas; 10 2-year-old heifers, 12 yearlings, 10 calves, and 10 feeding cows, making a total of 92 head of dairy stock, which is the usual number on the farm. These are summered on the pastures, and in winter have roots, hay, and chaff, and a small allowance of linseed cake.

Two hundred Oxford Down ewes are kept; they generally produce about 250 lambs; about 70 heaves are put into the flock every year, and the remainder are all made off fat at twelve months.

Six breeding sows are kept, and all the produce fed off on milk and flour.

Four horses are kept, two colts are worked—two are sold every year, and two foals are bought. The pastures are useful dairy land, but with the exception of the low meadows not first class. They have rather an impoverished look, and it appears as if the large herd of dairy cows, and the young cattle, and the flock of ewes and lambs were gradually impoverishing them. I think that Mr. Stilgeo will soon find it necessary to alter his system of farming in this respect, and he should do so either by using a larger quantity of artificial food for his stock, or by resorting to bone manure upon the grass land.

The arable land is extremely well cultivated, and the whole of Mr. Stilgeo's farming operations are carried on in a most methodical and business-like manner, but

he has somewhat lost sight of the fact that pastures pay as well as, or even better than, ploughed land for high farming.

Mr. Zachariah Stilgoe's Farm is also situated at Adderbury, near Banbury. The soil may be described as a kind light red loam resting generally on a rubbly stone subsoil, free working, and easy to farm; in short, an excellent Turnip and Barley soil. The extent is 340 acres, of which 125 are pasture, leaving 215 acres of arable.

It is farmed upon a six-course rotation, as follows:—1, roots; 2, Barley; 3, seeds; 4, Wheat; 5, Beans or Peas; 6, Barley or Oats.

The Mangels and a part of the Swedes receive 12 loads of farmyard dung and 3 cwt. of superphosphate. The remainder of the Swedes and the white Turnips are grown with 5 cwt. of superphosphate alone. The Mangels are grown on 27-inch ridges; the Swedes and Turnips on the flat, from 18 to 22 inches apart, according to circumstances.

The manure is drawn off for consumption by cattle in the yards, and the remainder are fed on the land by sheep eating corn and cake.

Barley is sown very early, commencing, when the season admits, early in February. The land is ploughed once, and then scarified, 35 bush. of Chevalier seed being sown. It is mown by a reaper, and tied and shocked for the convenience of harvesting. In favourable seasons good crops are produced, of the best market quality.

Seeds succeed Barley, and are sown by a handbarrow in the usual way; about 12 lb. of mixed heavy seed and a little Italian Rye-grass are generally sown.

Wheat follows the seeds; no manure is applied in the autumn, sowing does not commence until the last week in October, when 3 bush. per acre of Burrell's Red and some white varieties are drilled on a stale furrow. It is the opinion at Adderbury that Wheat is subject to drought and millinery if sown earlier; but it is probable that little more than half the seed sown a month earlier would produce a better crop, and be less subject to disease. No top-dressings are applied in the spring.

Beans follow Wheat, farmyard dung being applied on the Wheat stubble. Winter Beans are generally sown, but they are a failure this season here, as in many other places; Rape or Turnips are sown between the rows of Beans, and in most seasons produce an excellent crop of winter food.

Barley or Oats follow the Beans, and complete the course.

The cultivation is of a very superior character; the greatest cleanliness prevails, and nothing could look better than did the generality of Mr. Stilgoe's crops in the month of May. In July, however, the drought had told severely, and we were certainly disappointed not to find heavier crops than corn.

About 50 Hereford or Shorthorn oxen are grazed on the pastures in summer, about 20 more are bought in the autumn, and the 70 are all fattened in the stalls and yards during the winter.

A flock of 200 very good Oxford Downs is kept, the produce generally being about 250 lambs; 70 ewe hogs are annually put into the flock, and all the rest, including the draft ewes, are made off fat in the spring of the year, and about 150 hogs are bought and fattened during the winter.

Four breeding sows are kept, and all the pigs are fattened on the produce of the farm.

Eight working horses are kept; they are worked generally in pairs, are stabled during winter, and kept in the yards on green food during the summer. They are never turned out into the pastures at any season of the year.

A small proportion only of the 125 acres of pasture land is mown, and never two years in succession without having sheep folded on it, eating cake or corn. Until weaning time the ewes and lambs are always in hurdles, the lambs running forward and eating a moderate quantity of cake. In this dry season both cattle and sheep had cake-troughs in almost every field, and although rather short of grass were doing well.

The fences are remarkably good, and are carefully well maintained. There is not a gap to be seen, and scarcely a weed on the banks; there is as little water as possible, and in the arable fields the corn grows quite close to the fence.

There is very much to admire in the system of farming pursued at Adderbury. The cultivation is very superior, the crops are clean, the pastures and fences well managed, and the stock good, and carefully attended to. There is not, however, the same bulk of corn or the same promise for roots as we have described on the two prize farms, although the district is considered one of the most fertile in the country.

Miscellaneous.

A SEWAGE FARM AT MADRAS.—It consists of about 37 acres of land; but of these only two are at present under cultivation. The land came into the possession of the Municipal Commissioners early in June, 1869, and operations were commenced before the close of that month. The site is an old swamp, where water used to collect and remain stagnant for weeks together, the ground not being more than 4 feet above sea level. The soil is said to be as bad as it can be,

consisting of a stiff clay, mixed with much salt and a little sand. After being dug out and exposed to the sun, the clay splits up, and sand is readily washed out by a shower of rain. It was necessary to raise the land before cultivating upon it. For this purpose tanks were dug here and there, and the earth taken out of them was used to raise other parts; the tanks receive the rain, which is further kept off the ground by an embankment round the land. The sewage at present used comes from the Perambore Barracks and a village hard by, and amounts to about 5000 galls. in the day. It is run off morning, noon, and night, and is exhausted in about half an hour; flowing easily, and rapidly losing all smell. By the method of cultivation at present followed, a bed, 2 or 3 yards wide by 6 or 8 long, is made, and sewage allowed to flow into it for two or three or four days. In a couple of days the seed is planted, and when the plants are up they are occasionally fostered with sewage. Any sign of bleaching is regarded as an index of the necessity of stopping or diminishing the supply of sewage. The soil grows best is of the same class as in Europe. Captain Tullock, R.E., who reports the doings on the farm, says, "If we continue to get as fine crops of Guinea grass as the one just cut, the yearly produce will be enormous." For example, the grass was put in from roots, July 11; on August 27 a cutting 3½ feet high was got; a second on September 21, weighing 248 lb., the bed being 23 feet long by 18 feet wide—equivalent to 100 bushels per acre; at 8 cuttings a year, 20 tons of Guinea grass per acre per year; representing about 20 tons of hay, and in Madras it would fetch 20 rupees per ton. The common Hurrala grass, Beans, Radishes, Marrows, Potatoes, Tomatoes, and also the Cocoa-nut, the Jack, and the Tamarind trees have done well. But Lucerne has not flourished. So far as the experiment has gone it promises well. But it is a question with some sanitarians in Madras how far simple irrigation with water would be sufficient to grow sewage. The engineers here have not yet found the limit to which the grass crops may be irrigated with sewage. At the suggestion of Captain Tulloch, some of the solid excreta, collected away from Madras, is to be used as a top-dressing, being ploughed in before the liquid is let over the land.

The Week's Work.

JANUARY 14.—*Water Meadows* will be behind should the frost continue much longer, and therefore will require to be attended to as directed last month, regulating the intervals of flooding by the temperature the moment a settled thaw comes. As a rule, never float over ice or wash the surface in heavy floods. An extra flow will sometimes carry off a slight frost during night, but very great caution is necessary in adopting this alternative practice. In rainy weather the engine will be used to lower the sluices in the evening to obviate washing over-night by extra head pressure in rivers, which rise rapidly several feet during a storm.

Hay Meadows requiring manure will also lose time, and therefore finish top-dressing as directed last month as soon as the weather will permit; rich composts apply with manure-distributors, but heavy doses of inferior sorts cut out on the old plan, breaking up the surface and spreading the seeds. Use the shovel, soft flat meadows should, if possible, be fertilised by irrigation, but when there is not a command of water advantage should be taken of frosty weather, when large doses of compost are to be applied, but it is always better to use artificial manures, and apply them in open moist weather with broad-wheeled manure-distributors, and if the surface is so soft as to carry the horses' feet, hire a steam manure-distributor, if you have not one of your own. All the above top-dressings will be well chain-harrowed in as soon as spread, and when heavy doses of compost are not washed in properly to the roots of the grass, it may be advisable, where grass seeds have not been sown, to harrow a second time towards the close of the month, or early in February, or before vegetation commences, as the weather directs. Heavy dressings of clay and marl should be applied to soft meadows in frosty weather, and to all meadows when they carry the carts. Care may be taken on to land of any kind requiring it, although covered with snow several inches deep. It may also be spread, but when the snow is deep it is more difficult to spread the clay equally, but mistakes can easily be corrected when the thaws come.

Irrigation Works for river and rain water, farm sewage, and town sewage, may be executed where the frost will permit, as directed last month. Much of the work in the conveyance of the water and sewage to the land may be done in frosty weather, so long as the surface of the ground can be broken with pick, wedges, and the sledge-hammer. Underground conveyance by iron pipes is to be preferred to the old plan of open carriers, or even underground brick sewers—open gutters for distribution being confined to the spreading the liquid evenly over the ground, both on the ridge-and-furrow and "catch-water" plans, whether to grass, corn, or green crops grown on the flat, or in the case of vegetables, and green crops, the ridges are to be preferred to open channels in the soil, more especially for corn and green crops. The improvements being made in

this respect are many, and as experience points the way, further advances will, no doubt, be made to meet the varied wants of practice in the growth of different crops. Even Italian Rye-grass may now be ranked as an arable crop in rotation with Wheat, Oats, Barley, Cabbages, Mangel Wurzel, &c.

Water Storage works may also be profitably executed at this season, when the necessary labour required is plentiful, generally speaking. Although this is a comparatively new work in this country, forced upon by the heavy losses sustained last year, and in 1868, during the summer time, it is otherwise in warm climates; and it is a singular instance of agricultural progress, that at the time the proposition is being enunciated at home, the old water reservoirs and storage works of our Indian empire, in use during Herodotus' time, but neglected during the ages of misrule that have intervened, are being re-opened and enlarged, to supply the growing demand of Hindoo farmers. It was the destruction of the water-storage of Canaan and the adjoining countries that reduced them to their present almost barren condition as compared with the time of David and Solomon; so that, viewing the success of the practice wherever it has been properly carried out, the surprise is that the English farmer has been so long in thinking about it. Were the floods of water that flow to the ocean in the winter time, doing immense harm in their course, all stored up for summer use, it were difficult to say what the harvest result might be, and such is the practice to be now entering upon of every promise of success.

Warping in open weather is another work which can be favourably carried out by the old or natural practice during floods, and by the artificial wherever there is a command of water and clay or other warping material to mix with it. There are only a few places where the former practice is applicable, *i. e.*, the letting in of river water conveying much mud in suspension to land silt at a lower level; but it is otherwise in the late fall, for at this season water may be stored during night, or collected in quantity sufficient during the day to warp immense tracks of bog in Ireland, all the fen land in England, and very large areas of poor, sandy, and gravelly soils all the kingdom over, the warp being applied to any desired depth. In North Lincolnshire and the West Riding of Yorkshire large areas of poor, peaty soil have been thus warped, with sufficient profit to warrant the recommendation of the practice generally. It is, in fact, the carrying into practice the old maxim, "Lay clay on sand and you buy land."

Early Lambing is now general in our southern counties, and this year will require more than ordinary attention of the shepherd. Although the sudden outbreaks of rain, sleet, frost, and snow are frequent and trying, they are of short duration, and not nearly so killing as the March and April outburst storms of the North. Both ewes and lambs are kept in the open, or on palped Carraway, and Clover chaff, than in the open field, but there are many sheltered exceptions to the contrary, and with the increase of solar heat and light, the grass daily becomes more nourishing. *W. B.*

Notes to Correspondents.

Pigs: R. M. K., having read with interest the paper by Mr. Stearn, "On the Rearing of Pigs," asks a question on the subject of the best mode of rearing. He keeps two pigs upon the manure heap at the end of his stable; the pit is 20 feet by 10 feet, and is covered over for more than half of the length by a rain-water tank, under which the pigs sleep, and feed shelter from rain and sun. He has no straw, but as he expected, he has thought that being always upon the warm manure may not be good for them. [Pigs are less adapted for box-feeding than any other animals, from their habit of rooting in their lairs, which causes fermentation in a mass of their droppings. Moreover, a mere roof shelter would exclude draughts, and pigs will not prosper under such circumstances. You had better hedge in their shelter by straw or hurdles around the tank, and occasionally clean out their lair, giving them frequently dry straw on a dry floor.—Mr. Mechi's article is published by Routledge & Co., Broadway, Ludgate Hill, E.C.]

PICKLY COMFREY.—R. We cannot do better than give you, in answer to your questions, the following remarks by a correspondent of the *Field*:—"I procured in the month of January last, 100 sets of the Pickley Comfrey. I remember the advertisement of it proposing that it would soon become as commonly sold in London for green fodder as Vetches. This was not a prediction likely to be fulfilled, for the leaf is extremely marcescent when plucked, and the roots give the food a taste which could not make a green store of it. It would probably ferment and become unwholesome in this state. But, as taken immediately from the plant grown on the spot, I know of nothing at all comparable to it to set before cattle for nourishment. If they do not take to it at first, they soon come round to it. Where cows are kept, there is nothing probably that can be so advantageously placed before them when they are tied up for milking. Your correspondent asks 'How often it can be mown?' I do not think it can be mown more than once, the most practical mode of 'taking' it leaves is not to take the whole of them—as I did till within a few years past—but to pluck the four or five most forward leaves from each crown. A tender hand will be better for a glove, but a hand ordinarily exposed will not need one. The leaves are not much less than more than an ounce. By this method of treatment, the leaves that are left will be allowed to expand

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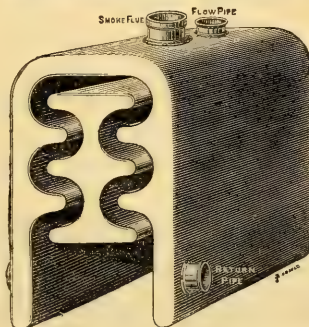
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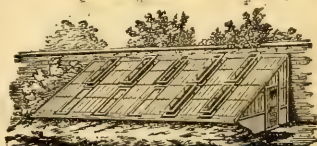
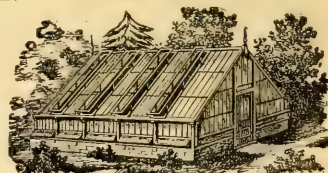
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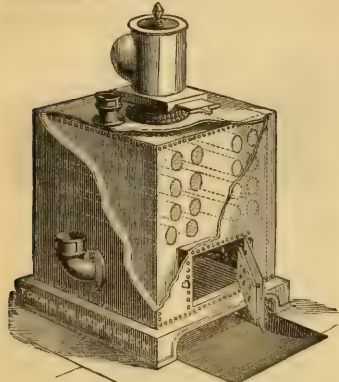
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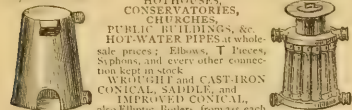
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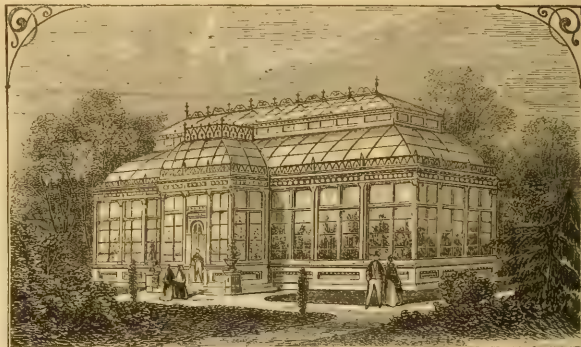


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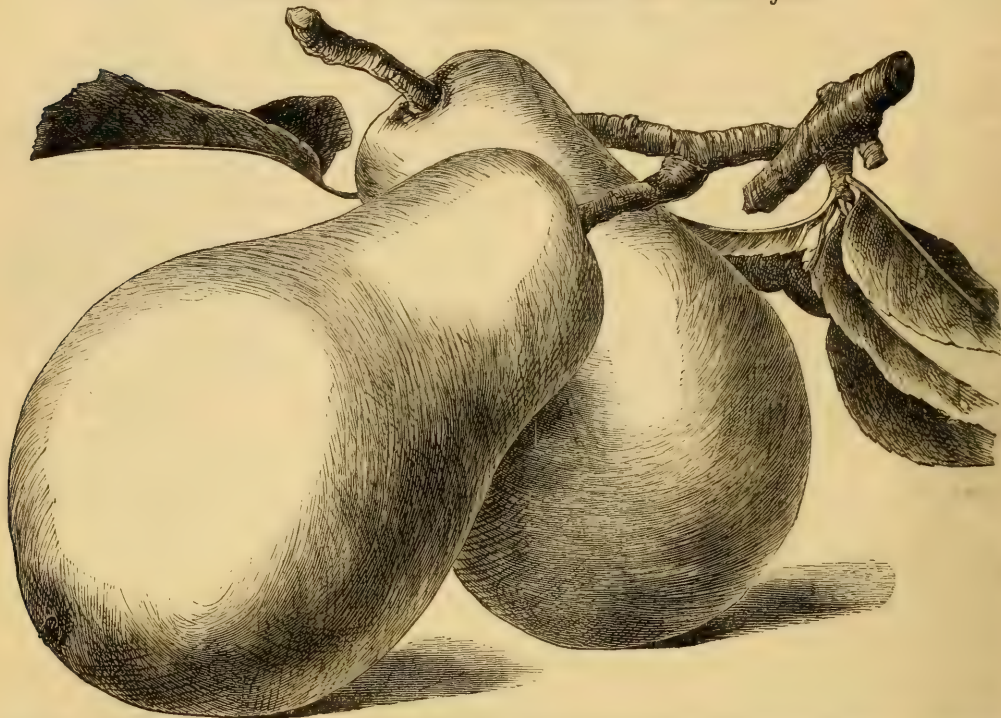
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Should be sown middle of July, and planted out in September, 18 inches apart. For succession sow in March.

Large Packet, 1s.; Small Packet, 6d. Free by Post.

"I consider the Cocoa-nut Cabbage the best I have ever grown."—A. PATERSON, *Pontypool Park Gardens*.

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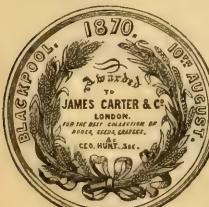
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while the remaining portion, which is not remov-

kinds, which very often grow weaker. When would a farmer get up an orchard of Golden Harveys or Golden Knobs? Why they would never dream of trying it; they require large growing trees, and the growers for sale supply such, procured by taking the heads off the strongest growing stocks and grafting other stocks with them. In this way they get fine trees to look at, but only one in a hundred that are worth room in an orchard; hence the medley and mixture of unnamed kinds, that are such a bar to correct nomenclature, especially as regards Apples. I could go into the orchards here and pick up dozens in an hour, not one of which, were anything like a recognised name. Tom Tree grafts those kinds, and thinks they have no equals. He induces Jack Gull to buy them, as being the finest kinds in all the kingdom, or anywhere else. A neighbour of mine told me he had got an Apple of surpassing goodness, and said he would think his equal existed, and he kindly gave me grafts, assuring me that everybody would buy it. I got a kite to examine, and certainly found it a good and beautiful kitchen Apple, but only the old Kentish Filbasket. I mention this, as it leads to great confusion with regard to the names of fruit. A man finds a good fruit in his orchard, and gives it to his friends as something excellent, and for want of a name one friend calls it Mr. Giveaway's Beauty, another Boue Bouche, and a third Giveaway's Incomparable, until the original name is so lost that it does not exist, hence the hundreds of synonyms that burden our catalogues not only in pomology but also in botany, and every other branch of natural history. I give one instance:—I received Hacon's Incomparable Pear in 10 different sorts from 10 different nurseries. We were puzzled to get it clear out. I planted all the trees close together, and as soon as the young leaves began to appear, I found I had 10 kinds under one name, two only were true; and this has taken place to a considerable extent with other kinds. I have now row upon row of such, now all the same. These were received from a large grower, and I thought I was all right as to names until they began to fruit, when my castle fell to the ground. What would you get of a large Bouré d'Amalins being sent to you for the Duc d'Aumale? I suppose the similarity of sound may have had something to do with the matter. It is a pity we have so few pomologists among us. One of our contemporaries the other day, in a somewhat bewailing tone, lamented that "we had a THOMPSON, and we have a HOGG, pomologists; but whom have we besides?" Why, I do not recount the names of all the pomologists in Flanders, Belgium alone. In all other branches of natural history I think we hold our own, but in pomology, ah! where are we? Only the good Mr. HOGG to do battle with such a confused labyrinth. We have hardly a respectable book on the subject, whilst the shelves of the Park libraries teem with works upon it. Where can we show a work like Mr. LEROY's 'Pomological Dictionary'? It is at once a marvel of research and cheapness, and within the reach of any one who can read French. I need not mention Mr. DECAISNE's splendid work; it is out of the reach of the many; yet there are so many other good and cheap works on the subject procurable on the Continent, that one can hardly regret not being able to get the learned professor's luxurious book."

—In reference to the paragraph relating to the SUPERINTENDENCE OF CHISWICK GARDEN, at p. 49, we are glad to be able to state that Mr. BARRON's services will be retained by the Royal Horticultural Society, although Mr. BARRON had been officially appointed Superintendent of Victoria Park, the horticultural relations relating to which proposal had led to the announcement of his severance from Chiswick. We are sure that at the latter place Mr. BARRON will find a field of operations far more congenial to his tastes and predilections; and we are glad to be able to add, in the words of our correspondent in the passage above referred to, that the Council of the Society had already acted in this matter as "men of business," and had "shown themselves worthy trustees of the Horticultural interest of England."

—The following noblemen and gentlemen have consented to act as judges to select paintings for the forthcoming INTERNATIONAL EXHIBITION of 1871:—The Countess, M.F.; The Lord Elcho, M.P.; Sir Curtis Lindsay, Esq. (representing the R.A.); Sir (representing the Royal Academy); Alfred Clint, Esq. (representing the Society of British Artists); Alfred Hunt, Esq. (representing the Society of Painters in Water Colours); Henry Warren, Esq. (representing the Institute of Painters in Water Colours); F. Dillon, Esq.; J. H. S. Marks, Esq.

—Mr. THOMPSON, of Ipswich, has forwarded us a handsome plate, by FITCH, of NEW ANNUALS, from North America, to be sent out by him. The most conspicuous is Godelia Whitney, which can scarcely be overrated as a showy border flower. Leptosiphon roseus, with rose-pink, and Gilia liniflora, with white flowers, will be useful annuals, if they prove amenable to cultivation. A. A. A. heterophylla looks like a dark-coloured C. bicolor, with the upper lip lilac, the lower purple. There are besides two yellow Composites—Ceropepis aristosa, a very promising-looking subject, with golden-yellow capitula, having very broad ray-florets, and Leptosyne maritima, a plant of moderate stature, producing many stems from the root, bearing pale yellow showy flower-heads, and though described on the best authority as a perennial, yet proving like the Ceropepis to be, in cultivation, strictly annual.

—An interesting example of the LONG PERSISTENCE OF LIFE in an apparently dried-up BULB is to be seen in the Museum of Science and Arts in Edinburgh, at present. In one of the cases lies a large

bulb marked as of Brunsvigia Josephine, a Cape Amyrillid (a great oblong mass, as large as two children's heads piled on end), from which have lately sprouted a couple of fresh, vigorous, thick, green leaves, the longest of which is about 8 or 9 inches in length. This bulb was sent by Mr. CURRIE, the Commissioner for the Cape to the Paris Exhibition of 1867. Professor ARCHER, the keeper or director of the Museum at Edinburgh, to whose discernment and energy it is indebted for many of its most remarkable features, saw and appreciated the gigantic bulb, and secured it for the museum under his charge, and it has lain as a dried specimen in a glass case ever since. To have been sent from the Cape in time for the Paris Exhibition it must have been gathered at the latest early in 1867, more probably in 1866, or possibly sooner, so that it has lain at least four years in a dried condition without losing its vitality. Can any of our professional readers tell us how long a Hyacinth bulb will keep with loss of life? Surely it is not long, and the bag of them must have escaped notice and lain over from one year to another. A still more remarkable case of prolonged vitality than that above mentioned is that recorded in our columns by Mr. MUNBY, 1870, p. 665, and in which the bulbs of Narcissus monophyllus retained their vitality for a period of 22 years.

—In a recent communication to the monthly *Florist and Pomologist*, Dr. DENNY, who is well known as a successful raiser of new PELAGONIUS, complains of the present INDEFINITE NOMENCLATURE of the different groups of this popular and useful flower. He suggests the following arrangement as the following, which we here reproduce, in order to present it to a wider circle of readers:—

- I. THE LARGE-FLOWERED or SHOW PELAGONIUS.—These would require to be divided into three or more classes, say:—
 - Class 1. The "Florists' Class," for perfection of form.
 - Class 2. The "Fancy Florists' Class."
 - Class 3. The "Decorative Class," in which should be included the "French," together with the irregularly-formed of the two previous classes.
- II. THE "CAPE" SPECIES.—These would form a group by themselves, so distinct are they from all others.
- III. THE "SCARLET" PELAGONIUS.—These should subdivide into classes as follows:—
 - Class 1. The "Florists' Class," for perfection of form.
 - Class 2. The "Decorative varieties, amongst which I should include Nosegays (as they are now termed), Semi or Hybrid Nosegays, as well as what are now known as Zonals, not being of sufficiently good quality to belong to Class 1, but of value for their colour or other points.
 - Class 3. The "Doubles."
 - Class 4. The "Bedders," for decorative flowering plants, to be judged by their brilliancy of colour and profuseness of flowering, and for their habit, as adapted for bed or border purposes.
 - Class 5. The "Zonals," for the class of Pelagoniuses cultivated for their foliage, as it can be to this class only that the name of Zonal correctly applies—and these I should subdivide into sections thus:—
 1. "Silver Tricolors."
 2. "Golden Tricolors."
 3. "Silver Bicolors."
 4. "Golden or Bronze Bicolors."
 5. "Golden Sells," if such a section should be deemed advisable.

—Both the pigs! The goats have destroyed the indigenous vegetation of St. Helena, and now we regret to hear that many of the most interesting plants of Norfolk are disappearing from their native soil. The worst cases, perhaps, are those of the noble Pine, Araucaria excelsa, and the Palm, Areca Baueri; for it is said that there is every probability of their disappearing altogether in consequence of the PIGS, which are allowed to roam everywhere, greedily devouring the seeds as soon as they fall to the ground. The result is, that there are now but few young plants to be found. It appears that the tropical plants, of which at one time fine collection was in cultivation in the island, are mostly dead, all that remains of them being a few unthealthy Guavas, Cherimoyas, Figs, and Grape Vines.

The pods of the GROUND NUT (*Arachis hypogea*), sometimes known by the name of "Monkey Nuts," and which are chiefly used for the expression of a light-coloured bland oil from the seeds, are reported to be used in America for making so-called CHOCOLATE. For this purpose they are beaten up in a mortar, and the mass is compressed into cakes, and is said to form a most agreeable chocolate, though without a particle of true cocoa. The Americans also prepare the seeds as a dessert sweetmeat, by parching them, and beating them up with sugar.

—On looking at the Meteorological Tables in another column, it will be seen that the temperature of Scotland, whether we take the highest, the lowest, the mean, or the average, the temperature of England during the week ending January 14. THE MAXIMUM TEMPERATURES in England ranged from 49° at Liverpool to 40° at Nottingham, with a mean for all stations of 43°·8, whilst in Scotland they ranged from 48°·7 at Leith to 45° at Dundee and Aberdeen, with a mean for the several stations of 46°·6, nearly 3° above the mean for England. THE MINIMUM TEMPERATURES in England ranged from 27°·5 at Liverpool to

12°·1 at Wolverhampton, with a mean for all stations of 21°·4, whilst the extremes in Scotland were represented by 29° at Edinburgh and Greenock and 21° at Perth, with a mean for the several stations of 25°·6. THE MEAN TEMPERATURE of the week, at most of the stations in England, was below 32°; but in Scotland the lowest recorded was 33°·6. In the southern country, Liverpool was much warmer than any other station; whilst in the northern country the same remark applies to Perth and Glasgow. In England the extremes are 36°·5 (at Liverpool) and 29°·2 (at Hull), with a mean of 32°·3; and in Scotland they are 39°·7 (at Perth) and 33°·6 (at Dundee), with a mean of 36°·1—3°·8 above the mean temperature of England. RAINFALL.—Falls of rain or snow, varying in amount, took place at all stations in the two countries, with the exception of Norwich; the largest falls in England took place at Portsmouth and Wolverhampton, viz., 0·73 inch, and the smallest at Bradford and Newcastle, viz., 0·02 inch, with a mean for all stations of 0·26 inch. In Scotland the falls were greater in amount, the largest being 1·10 inch at Greenock and the smallest, 0·14 inch, at Leith, with a mean for the several stations of 0·42 inch. (See Mr. GLAISHER'S Tables in our present issue.)

—A new preparation, which has been proposed as a substitute for carbolic acid, was exhibited recently before the Dublin Chemical Club, by Mr. HENRY DRAPER, of Dublin. It is named THYMOL, and is a derivative of the Thymus vulgaris, the Monarda or Horse-mint, and the Ptychotis, an East Indian umbelliferous plant. It is of a similar chemical composition to carbolic acid, but destitute of the caustic and the smell of this popular disinfectant. It melts at 44° C., and is soluble in 300 parts of water. It resembles carbolic acid in forming compounds with potash and soda, but differs from it in that these compounds are very unstable, being decomposed even by carbonic acid. The introduction of this preparation recalls to mind the fact, that oil of thyme was in past years a favourite popular remedy for the toothache, and it is only now we see efficient means of curing the complaint that have been manifest. The oil of thyme is prepared in large quantities in the South of France, where it is used for printing on china.

—In reference to the growth of the flower of the COMPASS PLANT (*Silphium laciniatum*, a Composite), Mr. THOMAS MEEHAN has recently put on record that the expansion of the ray-florets, in August, was observed to begin at day-break (4 A.M.); 40 minutes afterwards the florets of the disc began to open, and the whole of the corollas were expanded in about three-quarters of an hour, after which there was no further growth in the corollas, the stamens and pistils were gradually protruded beyond the corolla, the anthers of the stamens being out at 6 A.M. After 6.20 no further growth was noticed in the flowers, which were subsequently visited by insects, which caused the detachment of the florets of the disc and the scattering of the pollen on the stigmas of the ray-florets, which were fertilised accordingly. "We here see," says Mr. MEEHAN, "that there were three phases of growth, with a slight rest between each, the pistil taking the most time, then the stamens, and the corolla the least; but the whole growth of the day included within two hours."

—Some idea of the damage done to vegetation by locusts in tropical countries may be gathered from the following account of a raid made by them on East Indian Cotton in Ceylon. The locusts were sent to repel them was by recourse to the discordant sounds of native music—horns, tom-toms, and pipes—aided by the waving of flags and branches of trees. These measures, undoubtedly, saved the produce; for, judging by the performance of the very small number that succeeded in gaining admission to one of the finest fields unobserved, had a full complement effected a lodgment, one hour and a half would have sufficed to eat up the leaves, though the foliage was abundant, and the plants in one field from 5 to 6 feet high. The immunity which the native Indian Cotton enjoyed from the attacks was considerable, considering the avidity with which they devoured the exotic descriptions, and, true to their early traditions, the Egyptian was evidently an especial favourite. Some of the swarms that passed over the country at that time were exceedingly numerous. The arrival and settlement of the locusts was a remarkable sight. What was first observed was a sort of haze on the verge of the horizon, in a long line, as if a steamer had passed, and its smoke was rising into vapour; this was some hours before the insects arrived. The cloud gradually thickened, and rose higher as they approached. When they got fairly overhead the air became darkened as if night was setting in, it being yet mid-day, and the peculiar sound which accompanied their flight resembled the rustling of the leaves of the Peepul tree when agitated by light winds; but it is not until they have settled down that any idea can be formed of the immensity of their numbers, and the early dawn, before sunrise has warmed them into life and motion, is the time to witness this most extraordinary sight. In the instance now referred to the appearance the face of the country would be best described by supposing that a tolerably heavy fall of snow had taken place, only that the colour of it was a light brown, and this

extended for miles, as far, indeed, as the eye could reach. Trees were favourite perching-ground for the night, and the manner in which they contrived to crowd upon them, piles over piles, concealing every vestige of leaf and branch, gave the trees a singular appearance. At one spot a stout and wide-spreading branch of a Banyan tree had snapped at its stem from the incumbent weight of the insects.

New Garden Plants.

BARLERIA MACKENII, Hook. Bot. Mag. tab. 5866.

Claberrima, caule obtuse 4-gono; foliis recurvis anguste ovato v. elliptico-lanceolatis subacutis petiolatis, tenuissimis strigillosis integerrimis; floribus terminalibus paucis in axillis supremis; bracteis parvis subulatis; sepalis exterioribus amplis late-ovatis rotundato-cordatis obtusis venosis, interioribus parvis e basi ovato subulatis acuminate; corollis purpureis tubo in fundibuliformi calycem aequante, limbo lobis subaequaliter rotundatis basi atro-purpureis; staminibus 3, 2 lateralibus minus subulatis intermedio lato apiculato approximatis.—Bot. Mag. loc. cit. t. c. nostr. fig. 16.

This novelty is described by Dr. Hooker as being a near ally of the *Barleria Gibsoni*, which it resembles in the corolla (purple), but from which it differs remarkably in the form of the bracts and sepals. It was discovered in the Latin Goldfield district of the Natal colony, from whence fresh seeds were sent to Kew in November, 1869, by Mr. M'Ken, of the Natal Botanic Gardens. The plant from which our figure was taken was raised at Kew last spring, and flowered in June. "Like many of its congeners," says Dr. Hooker, "which inhabit the peninsula of Hindostan, it probably flowers in the beginning of the cool, dry season, and would, under proper treatment, form a charming acquisition for the winter decoration of a moderately heated house."

BUD VARIATIONS.

It has long been obvious to the writer of this, that it is not alone by seed that Nature produces new forms. He has often made the suggestion in scientific circles, and circumstances are often met with in Nature which seemed unaccountable on any other theory. But scientific men are not satisfied with circumstantial evidence. They must have the direct facts themselves.

Slowly we have been gathering these facts. There is, to be sure, the long standing case of the Nectarine. It was said this sprang from a branch of a Peach tree; it is generally believed to be a fact, but the date and time and the first observer are unknown. There is therefore not the "authority" for the fact, so necessary to a scientific man.

We will pass over many things we have noted which would only interest the botanist, to those facts in horticulture which any of us can appreciate. Take the Potato. We sometimes find a white Potato in a hill of red ones, or a red one in a hill of whites. Here, say we, is a case in point. A new variety has been developed without seminal intervention. But the hard-headed botanist disputes it; he charges that the theory is assumed, which is a very wrong thing to do; that most probably the pollen of a white kind impregnated the pistil of a red kind, and that somehow the influence was felt right down amongst the tubers. But is this not also assuming things?—an assumption of the most baseless character? But let this rest until we get the illustration.

There happened at Philadelphia, during the last meeting of the Pennsylvania Horticultural Society, to be collections of Pears from many different parts of the country; the same varieties, but grown in places widely apart. All of these had special characters of their own. Those from Rochester had very long stems. Everybody could tell a Rochester Pear by the length of its "leg." Certainly this is not brought about through seed.

But how about the occurrence of these variations? To be of much account as varieties, they should be able to maintain a separate existence when removed to other places. Well, the evidence is in favour of their permanence.

It is well known that the Isabella Grape grown about Reading, Pa., is not the same as other Grapes grown elsewhere of the same kind. It is also a fact

that Reading Isabellas retain these special characters when taken to other places. Yet this variety is not a seminal development, but a bud evolution.

So with the Penn Apple; this has characters which readily distinguish it from the Baldwin,—yet the first one was found among a lot of Baldwin trees; yet it is clearly like Baldwin, and was certainly not another kind accidentally mixed in. It also retains its distinctive characters when propagated. Is the Stark another such development from Pennock? Its history is not known as a seedling. On this, however, we will not dwell now, as we are dealing with ascertained facts.

This fall, a friend brought us a fruit of his Duchesse Pear; passing one of our own trees, we gathered one of our own. Our friend's was characteristic; the sweet, sugary juice was as it always is. To the surprise of both of us, the Pear from the writer's tree was of a delicious sub-acid. Only for the coarseness of the flesh, one might suppose he was eating a Beurré Superfin. Is not the somewhat frequent case of sweet and sour Apples on the same tree analogous to this? These two were undoubtedly Duchesse d'Angoulême, yet how wide the difference!



FIG. 16.—BARLERIA MACKENII.

But here we have before us, through the courtesy of the Editor of the *Prairie Farmer*, the most conclusive evidence that new forms can arise without the intervention of floral parts. This is a stock of sweet Potato, on which tubers of the Yellow Nansemond and the Red Brazilian are formed on the same stem. Now no mixing through the floral organs can occur in this case, because it does not flower here, nor is there any way by which any "mixing" could occur. It is a clear case of bud variation,—a development of a distinct variety, independent of any cross fertilization. There are other reflections in connection with this instance. We have in cultivation some ten or twelve varieties of Sweet Potato. But even in the Southern States this plant rarely produces seed under cultivation, and we have never known of an instance where any attempt was ever made to raise them in this way. There is little doubt all the varieties under culture are mere bud developments, as in this instance,—showing at once, not only the possibility of new forms originating this way, but of their subsequent permanence when under propagation. *American Gardener Monthly*. [We are glad to see our American friends turning their attention to this subject. It is said by some, that these bud variations may arise from the dissociation of characters blended, it may be, in bygone ages, but this is pure assumption. EDS.]

GRAPE GROWING FOR MARKET IN SCOTLAND.

THE eminence and success of Scotch horticulturists have long been proverbial. Various hypotheses, such as national idiosyncrasies, education, climate, &c., have been started to account for it. Some have contended that the worse the climate the more skillful of necessity the cultivator, and as skill is a more powerful factor than climate in the art of production, the better, consequently, the produce. Be that as it may, no one will deny that as good Grapes, or better, have been grown north, as south of the Tweed. This those most conversant with the Grapes on both sides will readily allow. The matter has also been brought to the test of direct trial at the International Fruit Show, held at Edinburgh, where old Scotia proudly held her own against all the world with such marvellous Grapes as perhaps have never been seen elsewhere in Europe. And such are not mere exceptional cases. In visiting good gardens in Scotland, first-class Grapes are the rule. Possibly Scotch Grape growing owes a good deal to soil, but more to extraordinary care and great skill.

At the very head of the Grape growers of the country has stood, for many years the honoured name of Mr. W. Thomson, of Dalkeith. If Mr. Fowler, of Castle Kennedy, and some younger men, occasionally exhibited finer bunches, there were few, if any, gardens in Scotland where a more regular crop of first-rate Grapes could be seen than at Dalkeith.

It seems that Mr. Thomson has now determined to leave the premier situation of Scotland, and to devote all his talent and energy to the production of first-class Grapes, Pines, and other fruit for market. On almost classic ground near Galashiels, in Selkirkshire, Mr. Thomson has purchased or leased, that is, taken on a very long lease, a large plot of ground, of first-rate quality, for Grape growing. The site is also well watered, and within easy access of the railway. These three brief statements—good soil, plenty of water, and facility of transport, constitute an epitome of characteristics that should command success. Although it seems but yesterday that the ground was secured, all the best modern appliances of horticultural productions have been got together, and a vigorous start is already made.

Messrs. Thomson & Meiklejohn, of Dalkeith, have been respectively architects and builders, and the houses are substantially well erected. The centre block consists of three enormous span-roofed vineries, each 200 feet long, 24 feet wide, and 27 feet high; spaces of 24 feet are left between each house to prevent their overshadowing each other, and to afford room for the roots. An arrangement which adds very much to the enjoyment of glass houses in cold weather, is adopted here,—one end of all these monster vineries opens into a large corridor, 125 feet long and 25 feet wide. The whole of the ventilation is effected from within this corridor, and to show the determination of Mr. Thomson to have all the latest improvements, patent ventilating gear has been supplied by Mr. Beard, of Bury St. Edmund's. *The Daily Review*, an Edinburgh newspaper, remarks of the ventilation:—"It is interesting to observe that this is done in as little time, and with as great ease, as an ordinary three-light frame, such is the perfection of the gear employed." Three Pineries are already built, one 200 feet long and 5 feet wide; a second, 145 feet long and 13 feet wide; and a third, 121 feet long, and 13 feet wide. Another Pine pit is in course of construction, 200 feet long, and it is hoped that, with this provision, at least 1000 first-class fruit will be sent to market annually. Mr. Thomson seems to think hot-water pipes, which have to be bought but once, are cheaper than coal, which has to be purchased every year. Hence all the houses are liberally furnished with 4-inch pipes; ranged in files of from six to twelve deep, they seem to say to John Frost at the outset, "No admittance here."

The whole of the Tweed vinery establishment, including, besides the houses here enumerated, large

Cucumber and plant houses, is heated with a huge steam-engine-looking boiler about 20 feet long, and large in proportion, which warms about 7000 feet of 4-inch pipe. It is the invention of Mr. Thomson, and is constructed of boiler-plates of wrought iron. A splendid stock of Vines, of all the most improved varieties, which were grown from eyes on the spot, have already made such progress that it is intended to fruit a number of the supernumeraries next season, while, of course, maturing the strength of the permanent plants for future and constant work for many years to come. Many will be grieved to learn that Mr. Thomson has determined to leave Dalkeith in May, to superintend personally the Tweed Vineyard. It will be somewhat a regret to fill his place with the same credit to horticulture as his projector anticipates, his ability to friends, were beyond all praise, his ability as a cultivator and his talent as a writer, won golden opinions in all directions. One could have wished that he could have been at his own vineyard and at the Duke's garden as well. I believe this option has been offered to him, but the undertaking is so vast in Selkirkshire that it seems to demand his undivided energy, and it is to be hoped that it will prove even more profitable to his projector anticipates.

Few men know better what Pines and Vines can do than Mr. Thomson. With soil and site of his own selection, houses planned and heated by himself, the means of speedy transport by rail close at hand, and his own skill and energy as the mainspring of all, success would appear to be certain, and failure impossible. The Tweed Vineyard may be said to stand on classic ground, within a mile of Aghelst, where Scott wrote the greater portion of "Marmion," from which he dated many of his cantos. It is to be hoped that many who love to wander over those spots will turn aside to see such a sight as Scott never saw—tropical Pines ripening by the hundred, and hothouse Grapes swelling into lusciousness by the hundred-weight, beneath the watery skies of Auld Scotia. I have often thought there is a bond of sympathy between the true cultivator and the poet. Both of us largely rely on beauty and utility—the one in fancy, and the other in And then, certainly is this common bond also,—both add to the pleasure and happiness of their species. Possibly, the Tweed Vineyard, by cheapening first-class fruit, and bringing it within reach of the suffering and the delicate, may confer as much pleasure and do more lasting good than Sir Walter's quaint or clever fancies and sweet poetry. Certain it is, it will take a host of pilgrims to Selkirkshire to make or renew acquaintance with Mr. Thomson, and to beat up the old quarters of Sir Walter Scott, who never otherwise would have gone. It is something for Scotchmen, and, indeed, for all gardeners, to be proud of, that one of themselves has had the spirit and enterprise to enter upon such a great undertaking; and I am confident that you and all your readers will wish Mr. William Thomson a hearty God-speed at the Tweed Vineyard. *David Tell Fact.* [Aye, aye! Eris.]

THE AMATEUR GARDENER.

Indoor Treatment of Hyacinths.—The cultivation of spring bulbs has greatly advanced during the last quarter of a century, yet even now it is capable of almost indefinite expansion, to the addition of floral pleasures and the benefit of the wholesale growers. In the town where we reside most persons take some interest in gardening, yet comparatively few will incur the expense of annually purchasing some good Hyacinths, and of these only one or two know how to grow them to perfection. Yet the task is easy if only studied a little, and when it is performed the labour is amply repaid by the pleasure it confers on the cultivator. We mention the Hyacinth in particular, because it stands at the head of the bulbs which can be grown indoors, such as Crocuses, Jonquils, and early Tulips. It has only one drawback, that of its powerful odour when in bloom—pleasant and fragrant in itself to most persons, but affecting many with headache, faintness, and other unfavourable symptoms. As the scent is exhaled chiefly in bright sunshine, this inconvenience can be in a great measure avoided, as the pots and glasses can be kept in halls, or in rooms only occasionally used.

Our remarks on the Hyacinth can now only apply to it midway, as it were, for it is far too late to purchase and plant in January. The natural growth of all spring bulbs begins early in the autumn, as may be seen by the slow development of the leaf, and every week they are kept out of the soil, or water, and it is injurious to them. Nurserymen know this well enough, and ought not to sell bulbs later than November, for if they do the purchasers are sure to be disappointed either by the decay of the bulb altogether or the weakness of its flower. But those who wish it can yet have the pleasure of growing Hyacinths indoors by buying them ready rooted of a respectable nurseryman. Our advice is to purchase in the open air, to doze bulbs in water in October, and to plant the roots in pots. Then, at any time when the glasses require refilling, we turn out the rooted bulbs, carefully wash away the soil, and put them in the glasses. We have some now treated in this way, and they look stronger and finer than those which were grown altogether in water. We may remark that it is a singular advantage in bulb

culture, that, provided the roots are tenderly treated, the bulbs will bear any amount of removal, and windows may thus be supplied with Crocuses, Hyacinths, and early Tulips through February and March.

Hyacinths in glasses should be kept in the dark till the roots are well developed, and the foliage begins to show, and then they may be placed in the glasses to the light the better. Unless the flower stems are brought up thick and strong at first it will never give satisfaction, being hidden with overgrown leaves, and unable to sustain itself upright. In frosty weather the glasses should be removed from the window during the night. The chief point of culture is the removal and fresh supply of water, which should take place once a fortnight. Our method is to pour all the stale water away, now and then, and to fill the glasses with water nearly foot-bath with tepid rain-water, and plunge glass and bulb together into it, retaining the former in its place with the finger and thumb of the left hand. We then shake the glass about with some water in it, as in cleaning a wine bottle, in order to wash the roots and remove any impurity from the sides of the glass, which is then refilled to within half an inch of the bottom of the bulb. This process does good to the growing bulb, and washes away the dust which must accumulate in rooms. In their natural localities in the open air Hyacinths are amply supplied with moisture to the growing foliage and flower, but are deprived of this when grown in glasses. On this account we let fall a few drops of water into the heart of the bulb occasionally during the earlier period of growth.

Hyacinths forced in water cannot be expected to produce good flowers the next year, yet careful treatment will make them a valuable addition to the borders. A warm south aspect should be chosen as a nursery for the plants when they have done blooming, and they should be put about 4 inches deep in light sandy soil, when they will complete their growth; and if the bulbs are taken up in summer, and put in borders where they are to remain, the offsets being separated, they will have some value in future years. Those grown in pots should be treated in the same way, and when the flowering is over, the pots should be kept in a cool place, and the bulbs well supplied with water, and the bulbs will suffer in consequence.

Those to whom expense is not an object, can gratify their floral tastes by growing the finer, that is, the newer sorts of Hyacinths, but this is not necessary for a satisfactory result. For many years we have given no more than 4s. the dozen for the bulbs, and have seldom found a bad flower, though an inferior root has now and then found its way into the parcel. The purchaser can avoid this if he selects for himself, when he should put aside every bulb which is light in weight, and feels spongy. *H. B.*

PORTRAITS OF GARDEN PLANTS.

CALANTHE SIEBOLDII, Gartenflora, t. 635.

This hardy terrestrial Orchid has smooth, broadly lanceolate plicate leaves and flower-spikes, taller than the leaves, bearing a raceme of pretty yellow flowers, having a trifid lip. It is native of Japan, and was first introduced thence to the Botanic Garden of St. Petersburg.

LILIU TIGRINUM SPLENDENS, Flore des Serres, xviii., 48, with fig.

A magnificent variety of the well-known Tiger Lily, growing to twice the ordinary size, and having taller and more vigorous stems, longer leaves, and a grand panicle of numerous large flowers, which are of a brilliant orange-red colour, with black spots of larger size than in the ordinary form. It is no doubt Japanese, and was first communicated by M. Leitch to M. Van Houtte.

PASSIFLORA HAHNEI, Rev. Hort. 1869, 439, with tab.

A distinct and elegant greenhouse species of Passion-flower, of slender habit, furnished with petate oval leaves, of a bright green above and reddish beneath, and bearing axillary flowers, which are white, 3 inches across, with a yellow corolla. It was introduced from Mexico, and is called *Disemma Hahnei* in the Paris Jardin du Muséum, to which it was first introduced.

PUNTA CARNEA KERMESINA, Rev. Hort. 1870, 130, with tab.

A showy stove plant of sub-shrubby habit, differing from the old and well-known *Pentas carnea* chiefly in having the flowers of a lively carmine-red, tinted with a greenish coat. It appears to have originated in the French gardens.

PLECTRANTHUS COLOIDES, Bot. Mag. t. 5847.

A weedy, soft-wooded stove herb, with ovate-lanceolate green leaves, and an elongate panicle of cymes of purplish flowers. Native of India. It is of no value as an ornamental plant.

POSOQUERIA FRAGRANTISSIMA, L'illust. Hort. ser. 3, t. 27.

The figure represents this as a magnificent glabrous stove shrub, with divaricate branches, opposite ovate-oblong coriaceous shining green leaves, with the pinnate veins yellow, and bearing its white and very fragrant flowers, which have a slender cylindrical tube 6 inches long, and reflexed, elliptic-oblong segments, in sub-corymbose panicles at the ends of the branches. M. Linden has had the good fortune to import it from Brazil.

SERAPIAS CODRIGERA, Bot. Mag. t. 5868, A.

A handsome, hardy terrestrial Orchid, with rounded tubers, ligulate-lanceolate leaves, and erect spikes of several flowers, of which the lip is broad, heart-shaped, and of

a deep dull crimson. It is found throughout nearly the whole Mediterranean region, and in Algeria, and is cultivated at Kew.

SERAPIAS LINGUA, Bot. Mag. t. 5808, B.

A pretty, hardy terrestrial Orchid, with rounded tubers, ligulate-lanceolate leaves, and erect spikes of flowers, smaller than in *S. codrigera*, with a tongue-shaped, rosy red lip. Its geographical range extends from Syria and the Taurus to the Azores and Algeria. Cultivated at Kew.

SPATHOPHYLLUM CARNI-POLICUM, Gartenflora, t. 630.

An interesting stove perennial, which belongs to the Orobanchaceae family, and is furnished with thickened, oblong acuminate leaves, and tall spikes bearing large green leaf-like spathes, which are white internally, and enfold a long white spadix. It is the *Pothos canaliculatus* of gardens, and comes from South America.

SPATHOPHYLLUM MINAHASSEI, Gartenflora, t. 637, fig. 1-3.

Another fine species of Orobanchaceae, of perennial growth, introduced from the Sunda Islands to the Botanic Garden of St. Petersburg. It is furnished with oval, long, glabrous, deep green leaves, elevated on long stalks, which are sheathing at the base; and produces tall scapes, which bear the elliptic-oblong, nearly flat, white, cuspidate spathes, by which the short oblong white spadixes are protected. It thus becomes a rival in beauty of the well-known African or Trumpet Lily.

ZEPHYRANTHUS SENSILLIS, Pelles, Bot. t. 212.

This Amarylidiaceous greenhouse bulb produces narrow linear leaves 8—9 inches long, and two or three single-flowered scapes, bearing each a largish pink funnel-shaped flower. It is cultivated by Mr. Wilson Saunders, by whom it was obtained from Mexico.

THE BLACK WALNUT—JUGLANS NIGRA.

THIS is one of the largest and most beautiful of our forest trees. It is indigenous from Texas to Massachusetts, and from Massachusetts westward to Missouri. When growing in open grounds, it has an erect form, and large spread of limbs, with light green delicate foliage. Its limbs are not thickly clad; hence it does not form a dense shade. Its leaves are sometimes 15 inches long, with from 15 to 21 leaflets, which are unequal on the midrib, and also often unequal at the base. They are sessile or nearly so, and the midrib is frequently slightly curved downward. The bark is dark grey, rough, and scaly. The wood is of a dark brown, becoming blackish brown with age. It is close grained and susceptible of a fine polish. It is much used for furniture and the inside work of houses. The large organ in the Boston Music Hall is made of Black Walnut. Its wood is very durable; posts made of it have been known to last more than a quarter of a century. Its growth from the seed is rapid—I have known its trees to bear 15 to 20 feet high, and bear fruit, at the age of seven years. Its fruit is round, and sometimes 7 or 8 inches in circumference. It, however, varies much in size, according to the age and luxuriance of the tree. Its nuts are somewhat compressed at the sides and furrowed. Its kernel is sweet and very oily, so much so that it is not universally esteemed. The Black Walnut ought to be extensively planted, especially in the prairie regions, because we have few trees of greater utility for growth, or more valuable for timber. It also affords us nuts, which are an agreeable food to many; besides, it is decidedly ornamental.

The demand for its timber is such that the large trees are fast disappearing. The following are some of the largest which have come under my observation—the measurement at 3 feet from the ground, unless otherwise stated:—One in Kusk county, Texas, was 15 feet 9 inches in circumference. In Wilcox county, Georgia, was one 11 feet 3 inches in circumference, and another 13 feet 8 inches. These two last were from 60 to 70 feet high, and fine stately trees. A hollow section of one was exhibited some years ago in New York, the interior of which was 10 feet in diameter—this was from Indiana. Near the base of Cold Mountain in North Carolina, not far from the residence of a Mr. Thompson, I measured one which was 16 feet 8 inches in circumference. Another in Wayne county, North Carolina, was 16 feet 8 inches in circumference. On Clear Creek, a branch of Cattaraugus Creek, in Cattaraugus county, New York, I measured a stump 20 feet 8 inches in circumference at about 3 feet from the ground. This was in the summer of 1865; the tree had then been cut down 16 years. It was in the Indian reservation; I was told by an Indian that he assisted in cutting it down that it was 3 feet in diameter, and had to be split into four parts to be sawed. When I measured the stump it was destitute of bark, and the sap wood had rotted away. On Silver Creek, in Cattaraugus county, New York, a Black Walnut blew down in 1818 which was 27 feet 9 inches in circumference at about 3 feet from the ground; it was hollow, and a section of it was used for a grocery, first in Buffalo, N. Y., then in Utica, N. Y., from which it was taken to New York City, where it was used for the same purpose. It was finally taken to England. The tree was nearly solid, and sound at the height of 6 or 7 feet. I obtained the above information from a man who owned the tree and sold the grocery section. *Prof. S. B. Buckley, in "Southern Horticulturist."*

NEW AGAVES.

WITH the exception of *Agave americana* and its varieties, which have been admitted as formal and characteristic objects for the ornamentation of terraces during the summer months, the Agaves can scarcely

as yet be said to have attained to the position of popular garden favourites. The tide of public opinion, however, seems to have been turned in their favour; and since 1866 especially, when some effective groups were shown by our Continental neighbours, they have become somewhat more familiar. At Hillfield, Reigate, the residence of W. Wilson Saunders, Esq., where every plant of interest or beauty finds a welcome home, the collection of Agaves and other succulents is a considerable one; and we may refer to another collection of note, still nearer London, in that of W. B. Kellock, Esq., of Stamford Hill. Both these afford abundant evidence that a house of succulent plants is one full of interest to a lover of natural objects, and is invested, moreover, with interest of a more permanent character than that to be derived from many other groups of cultivated plants. The noble succulent house at Kew, and its unique contents, may be cited as another illustration of the massive beauty, as well as singularity of aspect, which many of these plants display.

The figures we here introduce, borrowed from our contemporary the *Florist and Poinsettist*, represent two new species, which were introduced in 1868 from Mexico, by Mr. Besserer, a traveller and collector, and which are put into commerce by Mr. H. Laurentius, of Leipsig. The illustrations are from drawings made from the living plants, by Mr. Thieme, of Leipsig.

Agave horrida (fig. 17), which, as a new species, has received the imprimatur of General Jacobi, the learned monographer of the genus, is "a dwarf stemless plant, with broad ovate-lanceolate somewhat concave leaves, which grow rosette-like, and are about 4 inches long, and from 1½ inch to 2 inches broad at the widest part, of a lively and tender green, terminating each in a long, stout, dark chestnut coloured, spiny point, and armed along the deep maroon-brown margins with large and somewhat irregular hooked dark-coloured thorns. The var. *lævis* (fig. 18) has rather longer and narrower leaves, of a pale green, with fewer and more slender marginal thorns, the margins, thorns, and terminal spines being chestnut-coloured, changing to silvery grey. Both are free-growers, and are decided acquisitions amongst plants of this character."

Agave Bessieriana (fig. 19), and its var. *glauca* (fig. 20), though less bulky are not less interesting, nor

will they be less welcome in a group of *planta græce*.

"As will be seen from the figures, they are considerably smaller than *Agave horrida*, and would form very nice additions to a collection of these interesting succulents. They have the leaves nearly of equal breadth throughout. The characteristic marginal

and not quite so much so with the other. Tourists' general expect "nothing for nothing" for if they anticipate aught else, they are woefully disappointed. The smallest attention by the smallest attendant must in some way remunerated, else farewell to the so-called comforts of living and travelling in Ireland. The gardening tourist is treated a little differently, not only in Ireland, but throughout the three kingdoms.

To the honour of the craft be it said, there is a hospitality manifested which is not only cheering of itself, but adds very much to the pleasures of a journey. "Come and see me," is the prevailing invitation, if you meet at a great show, or incidentally, or otherwise, "and I will arrange your journey for the day. There is Lord This, or Squire That, whose gardens and grounds you ought to see, and, after having something to eat, I will give you a drive over. So-and-so are fine fellows, and they will be delighted to see you." Such invitations are irresistible, and they are generally accepted. It was some such one that induced the writer, and an esteemed friend and brother in trade, to accept Mr. Grieve's invitation to see Mount Stewart, and

some other places to be hereafter named. Leaving the Imperial Hotel, Belfast,—one of the first in the country, and too good by half, looking to the tariff of prices, for the reception and wants of common gardeners—only we lived, or might have lived, for 24 hours at the Belfast Botanic Company's (Limited) expense—we took an early train to Newtonards, formerly and correctly spelt Newton Ardes. True to his colours Mr. Grieve met us with the famous "jaunting car" of the nation, and drove first to the

Nurseries of

Messrs. Dickson & Sons.

These nurseries lie quite in the basin of Lough Strangford, and are protected inland by a great conical hill, which rises over 500 feet above the sea level, called Scrabo Hill. The land is marly, and of good tilth, such as is to be found generally in the garden farming of Ulster. One is very much struck with the general fertility of the land from Belfast, in a northerly direction along the sea-board line, which contrasts very favourably with what is to be seen in the opposite direction, towards Dublin. Comfort seems to

reign in a marked degree, if we are to take an observation from comfortable, clean-looking farmsteadings, fair workmen's houses, and fine fields of Turnips. There is less wonder, then, to see the nurseries in question so well clothed with nursery stock. Conifers were in grand health, and so were the majority of evergreen and deciduous tree and shrub Roses, however, are the feature of the establishment, and such yearling Roses as must delight all who see and buy them. Great quantities are annually



FIG. 17.—AGAVE HORRIDA.

spines are but slightly developed, but the apex is terminated by a very strong and formidable dark-coloured spine of considerable length. There are two varieties, the one having green, and the other glaucous, leaves." No doubt they are wild seminal varieties, since a batch of seedling Agaves often presents con-



FIG. 18.—AGAVE HORRIDA LÆVIS.

siderable variation, as we have noted in Mr. Bull's establishment, in the case of the very pretty dwarf-habited *Agave Seemannii*. T. M.

IRISH GARDENING.

TOURISTS travelling on unknown ground have to adapt themselves very much to circumstances. There is this much, however, between tourists general and gardening tourists, that it is all pay out with the one,

budded, and almost without a single failure. The *nodus operandi* here is to bud about 1 inch below ground, in August, such Manetti stocks as have been planted one year. The buds remain dormant in winter, shoot away with vigour in early spring, and are like two-year-olds in autumn, clean, stocky, and vigorous. The soil seems to suit them admirably. Instead of the stocks having lanky roots, they are as big as the head and full of fibres as the head, as we had an opportunity of seeing by several being lifted in various positions. Nor are the evergreen Oaks one whit less remarkable. Lines upon lines of them had roots like a Lilac, and capable of being transplanted without the slightest danger of want of success. When we look to the many places where they are compelled to keep them in pots, one is at a loss to know whether soil, situation, or some knick-knack of the cultivator has most to do with it. A celebrated Scotch nurseryman, to whom the writer was making an observation of the above kind, replied, "Keep them in the nursery rows till they are of some size before transplanting, and you are in possession of the secret." Another well-done group of plants in this nursery was the Ericaceae. The health, vigour, and flower-shoots of many of them were very striking to those who are in the habit of seeing English and Scotch nursery grounds. The double-flowering *E. vulgaris* and *E. Alportii* were objects of great beauty in their bushy masses and the freshness of their flower-spikes. But time speeds on, the nag is called into request, and we are off through the somewhat spacious streets, with chequered sandstone houses, passing the famous market square and the lofty cross, raised on a rather ambitious pedestal, which was much defaced by the rebels in 1653. Round Strangford Lough we go for miles, and then suddenly plunge into the wooded policies of

Mount Stewart.—The Marquis of Londonderry, to whom this and a large portion of the surrounding country belongs, like many of the Irish noblemen, does not reside much at this well-wooded seat, consequently the garden keep is one of the first of the matters that suffer reduction. To retain matters in *status quo* would be desirable, but the pinching hand is apparent. There is a good old kitchen garden, nicely walled in, and a good range of houses that were built prior to the beginning of the century; but nothing in the shape of new buildings or extensions of any kind have been gone into for many years. Mr. Grieve has managed to improve the shedding and both department, and is endeavouring to put the best face upon things practicable with the resources placed at his disposal, but it must be an uphill battle. One of the great features in the range of houses, which had been one of the most extensive in the country when first erected, is the large Syrian Vine, covering the entire roof of the house, and bearing a full crop of medium-sized bunches, with fine berries of exquisite colour. In front of these houses is a considerable breadth of lawn dotted over with fine Conifers, specially the Cupressus macrocarpa, which is in gorgeous style, and some other deciduous plants which give character to the groundwork. At the north side of the houses is the sloping kitchen garden, of fine tilth, bearing good crops of vegetables and small fruits. Beyond that again is the orchard, completely run out with age. Trees are lichenised as profusely as if they had been decorated with a greyish white fringing mantle, while the fruit is plentiful in number, but, as usual in all such worn-out grounds, deficient in quality. Mr. Grieve is rooting out the lot by degrees, and introducing fresh plantations of well-known and approved sorts. Partaking of a *déjeuner*, and washing it down with the "mountain dew" of the country—an agreeable refresher—we were all the better fitted for travelling over the wooded grounds and admiring the many beautiful peeps of undulating scenery that were presented to view. We were too near the coast, however, for seeing the best specimens of timber trees, but for evergreen Oaks and Conifers there was scarcely a step to be taken without eliciting some spontaneous mark of admiration. Cupressus macrocarpa is a distinguished tree in and about the locality, thriving on a par with evergreen Oaks, which do wonderfully along the coast of Ireland, characterised as it must be both by mildness and humidity. As usual, the choice specimens crop up before your eye in contiguity to the mansion—*Picea nobilis*, *Araucaria*, Cupressus of sorts, are individualised, and find the shelter so very desirable for preserving, or rather encouraging good habits.

The mansion itself is set in position to command some delightful views, comprising the watery expanse of Lough Strangford, the foreground, out of reach of woody confines, and carrying the eye round the chain of the mountains of Mourne and Scrabo Hill.

We cannot exactly see the model of the "Temple of the Winds" from this point, although it is a most conspicuous object from many parts of the demesne, and is an object of interest for inspection to any tourist. The site, indeed, has been admirably chosen to command prospect without being too much exposed to the prevailing winds that sweep with a fury from the west, as the tall headed trees with their branches arching eastwards so abundantly testify. The house itself is comparatively modern, and is a square block with abutting wings, after the Grecian order of architecture. This



FIG. 19.—AGAVE BESSERERIANA (REV. P. 74).

has enabled the landscape gardener to introduce a spacious lawn parterre, suitable for decorating with the modern style of bedding-out. Chain borders, gaudily decorated, flank the one side, and a sort of detached system of bedding, with now here a clump and there an individual—sometimes a noble Elm or Beech, a Spanish Chestnut, then a Picea or an Araucaria or a Cupressus, all interwoven on the ground scenery, and form growing material that one is compelled to notice in passing along, from the variety that pass before the eye. These, along with Rhododen-

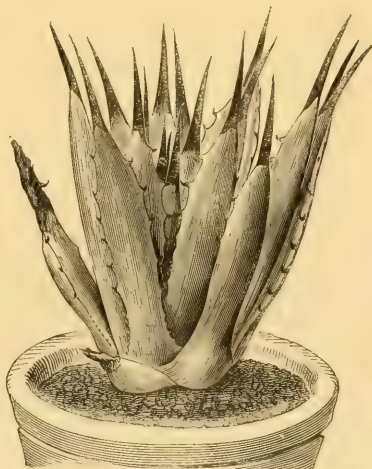


FIG. 20.—AGAVE BESSERERIANA GLAUCA (REV. P. 74).

dron clumps, Rose beds, and American shrubs, make a pretty *tout ensemble*, and don't mar the foreground even where a Grecian type of architecture is present. But our watches are scanned, time presses, and the invaluable car with the hardy roadster, which we afterwards found, judging the distance that was traversed, to have a constitution, or "bottom," or "staying powers," superior to the brood nurtured and grown on the sister island, is again in requisition, and we are off a five or six miles run (for I have lost all calculation of mileage on Irish ground), to John Malholme, and is situated almost upon the shore line, sufficiently high to be commanding, and yet sheltered

with the timber that has been growing for centuries. This is quite a modern residence, with the grounds of modern character. The landscape gardener has left this, considering the extent of the ground, in something like good style. The entrance lodges are in keeping with the house and offices, and the drives are skillfully drawn, and not offensive in their "curves" or "straight" to the critical eye. Going ground towards the front by a fine bold sweep, and an easy gradient, we can observe a magnificent grass panel,

on which is a flower garden and the usual accessories of walks and a little statuary. Flanking it on the one side is a spacious conservatory, in keeping with the somewhat baronial character of the mansion. In respect of its dimensions, its interior fittings and its exterior appearance, it might for all purposes be considered a model one, no expense having been spared to make it what a house of the kind ought to be—elegant in outline, and also fit for the reception and growth of plants. But it is something like a magnificent room ill-furnished. The plants were by no means either the plants or in the condition that one expects to see, and although we have no right to go about private places which we are allowed to inspect, fault finding, still we may be permitted to notice the desirability of employers studying the furnishing a little more, and *employés* doing their best endeavour to have them, in point of health, as unexceptionable as possible. In many places the sanitary operations necessary to promote and secure plant health are sadly neglected. Let the army of gardeners once correct this thoroughly, and the half of the success at least of indoor gardening is secured. Mr. Rudemur, the gardener, has been but recently appointed, and he seems to be a purpose-like man, capable to cope with any department of gardening, as could be well seen by the general order that prevailed. Bedding-out here is well looked after, and so is shrub and tree cultivation. One could not see better plants for their size than *Abies Morinda* and *Pinus insignis*. These two Californian Pines do most magnificently on the sea coast line, protected from direct sea breezes. Nothing could exceed the beautiful symmetry of the specimens of *Morinda*, growing like pyramids; they gave it one character to this pretty modernised demesne, or domain, as the Irish

people have it. Then the evergreen Oaks were very remarkable. The planters of a century, or two or three centuries, ago, if we are to judge from the gigantic specimens propped up for protective purposes, knew well what to plant, with the climate and the exposure they had to deal with. We have no idea of wind influences from the sample of equinoctial gales we experienced throughout the day of our tour in this division of Ulster, in one of its important maritime counties, and can easily imagine what kind of protection need be forthcoming to prevent a general uprooting of choice trees. The most remarkable evergreen Oak had six limbs, and each limb was the size of the limb of a horse, and the trunk tree, quite 40 inches in circumference. Grand as a tree of this kind is, as being one of the veterans of evergreen forest tree life, and covering a large area under its shade, you have but a faint idea of the beauty of the tree upon the general landscape. Here it was only an individual among many others in "the wood," but yonder, where there were something like a wavy line of them stretching for quarter of a mile, and the wind influence fairly heaving and upturning their myriads of leaves, the effect was grand, and could not be reproduced by any other forest tree. It looked like a living wall, quite 50 feet high, of *Gnaphalium lanatum*, or *Cerastium tomentosum*, in their gayest days. Plant it by the acre, we say, on all maritime coasts, and give it a good soil to grow in. Limes do well, and reach great size and age. The Ash, too, luxuriates in suchlike localities. The Cupressus macrocarpa cannot be too highly recommended; not a shabby plant of it was to be seen, and it was rising quite column-like, wooing the sky in

fluences. The Irish Whin (*Ulex hibernicus*) forms a grand bush, quite ornamental even for lawns or for mixing, or for covers. It was in a beautiful style here, some of the bushes we measured being 14 feet in diameter, and as dense and green and sturdy-like as Whins could possibly be. The kitchen garden here is separated from the dress ground by a sunk fence, in which, by the way, the Pampas delighted to grow, and so would the *Arundo conspicua*, if it were there, we would guarantee; and then something like a nice dwarf wall, surmounted with quite an ornamental railing, barred admission, unless by the hands of some elaborately designed gates. The garden itself is limited, but from the way in which Pear and

Mr. Berkeley recalled the circumstance that Mr. T. A. Knight had produced the disease artificially, by allowing a stream of cold water to play upon the branches.

Mr. Alfred Smeë exhibited specimens of Lemons imported from Sicily, and attacked by a coccus on the scale, and simultaneously by a Fungus at the roots. These portions of the rind of the fruit were the only parts that remain green, and do not ripen, and it was found in consequence that it would neither absorb the solution of salt, or that of sugar, in which it is immersed by the confectioners for purposes of preservation. The Lemons were on this account, and from their unsightly appearance

source of obtaining new varieties. Equally barren is the Pompon section. Not so, however, the Japanese section, for Messrs. E. G. Henderson & Son are busy with these, and Mr. William Bull has succeeded to a legacy of seedlings from Mr. Salter, and both have produced some good new flowers. Bismarck, cinnamon-orange, with large and bold well-coloured flowers, and Erectum superbum, pale magenta-red, came from the former, and were awarded First-class Certificates; and so were Jane Salter, rose purple, with a hue of blush along each floret; and Renown, deep yellow, but when incured the flowers have a cinnamon hue. Both these were seedlings of Mr. Salter, shown by Mr. Bull.

Year by year we gain additions to the class of fine, free-blooming hardy Clematises. Several attempts at hybridisation have originated varieties that bloom from the early summer till the close of it, giving fine, well-formed flowers, free blooming habits, and considerable variation. Messrs. Thomas Cripps & Son have Crippsi, with reddish mauve-coloured flowers, somewhat dull in hue, but very free blooming; Sylph, with large bold white flowers tinted with mauve; and Victoria, lilac-purple, deep in hue, and yet bright and lively. To the two last named First-class Certificates were awarded Gen. (Baker), a light mauve-coloured variety, in the way of C. lauginaosa, and apparently a variety of that species, received the same award; so did Lord Lonsborough, one of Mr. C. Noble's seedlings, having large bronze-coloured flowers shaded with blue and red, very fine and striking. R. D.

(To be Continued.)

THE WEATHER.

STATE OF THE WEATHER AT BLACKHEATH, LONDON,
FOR THE WEEK ENDING WEDNESDAY, JANUARY 18, 1871.

1871. MONTH AND DAY.	At 9 A.M.									
	Reading of		Hygrometrical Deduction from		Barometrical Deduction from		Wet Thermometer.		Dew Point.	
	Barometer reduced to 32 Fahr.	Dry Thermometer.	Wet Thermometer.	Wet Thermometer.	Wet Thermometer.	Wet Thermometer.	Wet Thermometer.	Wet Thermometer.	Wet Thermometer.	Wet Thermometer.
January.										
12. Thurs.	29.69	32.1	31.3	28.5	31.3	31.3	31.3	31.3	31.3	31.3
13. Friday	29.81	32.1	31.3	28.5	31.3	31.3	31.3	31.3	31.3	31.3
14. Satur.	29.82	32.1	31.3	28.5	31.3	31.3	31.3	31.3	31.3	31.3
15. Sunday.	29.81	32.1	31.3	28.5	31.3	31.3	31.3	31.3	31.3	31.3
16. Monday	29.81	32.1	31.3	28.5	31.3	31.3	31.3	31.3	31.3	31.3
17. Tues.	29.81	32.1	31.3	28.5	31.3	31.3	31.3	31.3	31.3	31.3
18. Wednes.	29.81	32.1	31.3	28.5	31.3	31.3	31.3	31.3	31.3	31.3

1871. MONTH AND DAY.	TEMPERATURE OF THE AIR.									
	Highest.	Lowest.	Range.	Mean.	Mean of Mean.	Direction.	Horizontal Movement.	In inches.	WIND.	RAIN.
January.										
12. Thurs.	32.3	23.9	9.3	28.8	28.8	W.S.W.	145	0.00		
13. Friday	38.0	18.3	19.7	30.0	30.0	W.S.W.	215	0.00		
14. Satur.	41.8	30.8	11.0	36.3	36.3	W.S.W.	315	0.00		
15. Sunday.	41.0	19.7	21.3	30.4	30.4	W.S.W.	315	0.00		
16. Monday	46.7	34.8	11.9	40.3	40.3	W.S.W.	160	0.58		
17. Tues.	40.7	33.9	6.8	37.1	37.1	W.S.W.	435	0.50		
18. Wednes.	45.7	35.3	10.4	40.3	40.3	W.S.W.	210	0.05		

TEMPERATURE OF THE AIR AND FALL OF RAIN AT DIFFERENT STATIONS.
DURING THE WEEK ENDING SATURDAY, JANUARY 14, 1871.

NAMES OF STATIONS.	TEMPERATURE OF THE AIR.									
	Highest.	Lowest.	Range.	Mean of Week.	Mean of Highest.	Mean of Lowest.	Mean Daily Range.	Mean.	FALL OF RAIN.	
January.										
Portsmouth	45.2	20.8	24.4	33.0	33.0	27.4	5.6	30.6	0.71	
Blackheath	45.2	20.8	24.4	33.0	33.0	27.4	5.6	30.6	0.71	
Bristol	44.8	18.3	26.5	31.7	31.7	28.2	3.5	30.0	0.68	
Birmingham	43.5	21.0	22.5	32.3	32.3	28.6	3.7	30.4	0.66	
London	43.5	21.0	22.5	32.3	32.3	28.6	3.7	30.4	0.66	
Leicester	44.0	18.7	25.3	31.3	31.3	28.1	3.2	30.0	0.73	
Norwich	45.2	20.8	24.4	33.0	33.0	27.4	5.6	30.6	0.71	
Sheffield	42.7	18.3	24.4	30.5	30.5	27.4	3.1	30.0	0.66	
Liverpool	41.0	27.0	14.0	34.0	34.0	28.0	6.0	30.0	0.14	
Manchester	41.0	27.0	14.0	34.0	34.0	28.0	6.0	30.0	0.14	
Belfast	41.0	27.0	14.0	34.0	34.0	28.0	6.0	30.0	0.14	
Bradford	41.0	27.0	14.0	34.0	34.0	28.0	6.0	30.0	0.14	
Leeds	41.0	27.0	14.0	34.0	34.0	28.0	6.0	30.0	0.14	
Hull	41.0	27.0	14.0	34.0	34.0	28.0	6.0	30.0	0.14	
Newcastle	41.0	27.0	14.0	34.0	34.0	28.0	6.0	30.0	0.14	
Edinburgh	47.7	29.9	17.8	38.8	38.8	32.0	6.8	36.8	0.20	
Glasgow	44.0	24.5	19.5	34.3	34.3	29.0	5.3	31.7	0.68	
Aberdeen	43.5	21.0	22.5	32.3	32.3	28.6	3.7	30.4	0.66	
Greenock	43.5	21.0	22.5	32.3	32.3	28.6	3.7	30.4	0.66	
Leith	43.5	21.0	22.5	32.3	32.3	28.6	3.7	30.4	0.66	
Dublin	41.0	27.0	14.0	34.0	34.0	28.0	6.0	30.0	0.14	

JAMES GLAISHER.

Garden Operations.

(FOR THE ENSUING WEEK.)

PLANT HOUSES.

TROPEOLIDS, of the tricolorum section, should now be regularly trained to the trellis-work as they continue to grow; if neglected, the young shoots soon become so entangled as to make it almost impossible to separate them without materially injuring them. It would be better if the young shoots were so attended to that the peculiarly clasping petioles of the young leaves might be encouraged to clasp the support offered, at the moment when they are capable of so doing. From observation, I have formed the opinion that to loosen the hold of these "leaf-tendrils," or to injure them, however slightly, after they have once become naturally attached to any kind of support within their reach, is to check the growth of the whole shoot. Doubtless others have noticed this peculiarity in other subjects possessing a liberal capacity. *Gardenias*, which now show signs of activity should, if means are at hand, be encouraged by additional warmth, and a material increase of atmospheric moisture. Those who possess a vacant pit may turn it to account by filling it with stable litter of but moderate sweetness, into which the pots may be plunged in such a manner that the heat which is in direct communication with the litter should not exceed from 60° to 70° Fahr. steam arising from the body of fermenting materials be rather rank, it does not matter even if it bathe the foliage with teeming moisture, if a slight outlet be left for its egress at the apex of the lights, and provided a larger supply of air be afforded on favourable opportunities, so that the leaves may be dried moderately once in every 48 hours. If scale pests, or, what is worse, mealy-bug, exist on any plants, decided means should be taken to destroy them early in the season. Let all soft-wooded pot-plants, whatever structure they are in, be carefully gone through, removing dead leaves and all forms of decay; turn each round, so that it enjoys an equal amount of light on all sides alike. Proceed with the necessary staking and tying-out of *Indian Asclepias* in all cases where not done as previously suggested. Look through the whole stock of bedding plants, and note whether sufficient of each class exists for the purpose intended. If scale pests exist on any existing stock, forthwith a few stout rods into heat, so as to induce an early growth and the production of cuttings. Preparations should be made besides for striking a plentiful supply of cuttings, as, after the past severe and trying weather, the early spring months will now approach with rapid strides. Where convenient striking pits do not exist, a heap of fermenting materials, consisting mainly of dead leaves mixed with stable litter, to be got together, and piled up over two or three times for the purpose of dispelling excessive steam, and so sweetening it that the most delicate form of young soft-wooded cutting may live within the area of it without injury. The bed should be made up some 3 or 4 feet in height, and the frame placed thereon some four or five days at the least before it is required for use. The surface within the frame should be turned over lightly every other day until the steam arising can be tasted and felt, and when the smell, and a nice but not excessive warmth prevails. When ready for use, the pots containing the cuttings may be partly plunged into these leaves, &c., so as to encourage the more full emission of young roots. Care should be taken not to shut the lights down close for a week or two. Steam, which may not injure when somewhat moderated by air giving, proves very injurious when boxed in, by shutting up all apertures, and so barring a ready egress.

FORCING HOUSES.

Those who have delayed the pruning of *Vines* should perform the operation at the earliest date, as this is the object to be attained by postponing the operation to a later period, indeed, on the contrary, indirect injury will be the consequence. *Pot Vines* perceptibly moving may have the bottom-heat advanced from the cautious standard of commencement—70° to 75°, to be further advanced another 5° in the course of a week or two when they show bloom. The main object in connection with these and other plants similarly forced, should not only be to keep up a reciprocal action between roots and branches, or, what is more to the point, between roots and leaves, shoots, &c., in active growth; but there should be an endeavour to push on the roots somewhat in advance of these latter organs. If at a later date surface growth or branch and leaf formation become powerful incentives to additional root formation, so now does a healthy preliminary root formation afford vigorous inducement to the tree to make a good start in the matter of early growth. When the frost vanishes, a softer, more genial air may be looked for, when all subjects which are being forced will answer more freely to the inducements applied. During the last month all forcing operations have had to withstand a severe test, and only those who persisted in maintaining a safe minimum will have satisfactorily withstood its injurious tendencies. I know the anxiety occasioned during such periods by all who are compelled to be again time, yet, depend upon it, there is more to be gained by using moderation during such trying periods, and pushing things along more vigor-

ously at a later date, than is generally supposed. Excessive forcing during very severe weather (and this would only constitute very moderate practice if the weather was mild) weakens the vigour of the young growths, and induces a loss of vitality which is not possible to correct by any means. The maintenance of a healthy vigour now permits, to say the least, of a rapid development at the end. *Cherries*, and in a measure *Apricots*, should be started very gently at a temperature of 45°, to be advanced very gradually. The former will not submit to fluctuations of temperature so well as most other subjects that are forced.

HARDY FRUIT GARDEN.

Do not longer delay the necessary pruning of all outdoor *Vines*, as the sooner this operation is performed the better. In pruning them back very much depends on the age of the plants and whether they already occupy all the space allotted to them, or are required to extend further and cover a larger area of wall. When the *Vines* are old and the area is limited, the young shoots of last year's formation and fruit production may be cut back close into the old wood or main stem, as even when pruned thus closely flower-buds will issue forth with the young shoots, which will readily push at the proper season. Shoots upon younger wood may, if further space is to be covered, be cut back to within 5 inches in length, and then nailed on the necessary spurs, whilst young shoots upon parent main-stems or rods which are but two or three years old, should be spurred back to two prominent eyes. It is often these that produce the finest fruit. Besides pruning, let the wants of the roots be attended to. Afford them a good mulching of any kind of manure at this time, it will find its way down below to the roots, and aid them materially during the ensuing summer. Out-door *Grapes* are now very fine as has been shown of late by Mr. Penn, and in the competition afforded by the offer of Mr. Kemp's liberal prizes at the meetings of the Royal Horticultural Society. Cuttings made now from the prunings, and stuck in at the foot of any sunny wall, will readily form plants, and these will become fruiting plants after the second year. Attend now to the staking of *Raspberries*, removing such as are partially decayed. Before placing the new stakes in the ground it is a good practice, in view of better preservation, to char the pointed ends by slightly burning them in the fire.

HARDY FLOWER GARDEN.

Those who intend "turning" their *Walks* this winter should do so at their earliest convenience, as if left too late into the spring there is a chance that they will not be so thoroughly soaked through with superficial rains as they should be to induce the gravel to "bind" to the necessary degree. This undertaking is not performed one time as often as it should be. The operation is not at all a lengthy one, and is easily done by all the corner stones, exposed on the surface in process of sweeping, &c., to the bottom. A slight sprinkling of fresh gravel (or, if you will, none at all) makes the walks look fresh, new, and lively all the summer; whilst it prevents weeds from growing thereon for the first season following, and admits of very few the succeeding one. These are three weighty reasons for turning walks more frequently.

KITCHEN GARDEN.

If the ground should be very wet, the only thing I would suggest in this department is to simply let it alone. If at all moist, or, what is equivalent, tenacious in its nature, every foot-plant will become a source of future mischief. In case the late severe frosts have injured materially autumn-sown *Cabbages*, let a little seed be sown without a moment's delay in pans or boxes, for the purpose of making them good. This I advise should be done last week in the ordinary course of practice for a succession to the early spring crop. Seeing how crops have suffered, I advise that the present sowing should be made of Atkins' Matchless, as being a quick grower, and the seedling plants may be coned along a little more rapidly. Sow also a little *Celery* seed for the earliest row or two. Sow also seeds of *Tomato* to produce strong plants for standing well. This I advise should be done last week in the ordinary course of practice for a succession to the early spring crop. 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Heath, Neal Chesterton

the return had been estimated. In addition to these items, there is a receipt of £150 for hay and straw sold annually. The upshot is, that a total receipt, rather more than £500 short of the estimate, has been realised. The year 1869 was not especially good for Kirtlington and in particular the Oa. crop was £300 short of what it usually is, though grown, as it always is at Kirtlington, after the sheepfold, the land being then too rich to produce a good sample of Barley.

The only differences between the estimate and the fact, as regards expenditure, to which reference must be made, are the sum, larger by £300 than the estimate, for rent and rent-charges of various kinds, and the somewhat diminished amounts, on the other hand, under seeds and seed-corn, under charges connected with the flock, and for steam-threshing and transport of bills, which together bring the total amount of the estimate and of the actual expenditure into very nearly agreement. We may calculate from the results, that interest to the amount of from 12 to 14 per cent. is thus made annually at Kirtlington on the farm capital employed.

Mr. F. W. BIGNALL, in his letter in another page virtually says, that if the award had been made in favour of Kirtlington instead of Ashgrove, not more than one farmer in a thousand would have cared to inquire further into the subject—knowing well that not above one in a thousand could follow Captain DASHWOOD'S example. We submit that the sooner the odd 999 on Mr. BIGNALL'S list proceed to investigate the lessons of the Kirtlington experience, the better for themselves.

— PRICES have been stationary at Mark Lane, with a slow slide during the week.—At the Metropolitan Cattle Market supplies have exceeded the demand, and prices of all kinds of stock are lower.

—At the general meeting on Tuesday last of the HIGHLAND and AGRICULTURAL SOCIETY, 60 new members were elected. The salary of the Secretary was raised £150 a year. The fee for admission to membership was reduced to 10s. annually in the case of all tenant-farmers and proprietors farming the whole of their own land, whose assessment on the valuation-roll does not exceed £500 a year. Thanks were voted to a number of gentlemen for their services at the Dumfries show. Kelso was adopted as the place for the show in 1872. It was stated that district shows in 260 different localities, and cottage competitions in 22 parishes, had been assisted by the Society. The report of the chemical officer was read. The prizes awarded in 1870 for essays and reports were announced. A list of premiums offered in 1871 was reported. The Transactions of the Society, it was stated, would be published in February. And a report was made on the attempts, hitherto unsatisfactory, which had been made to use THOMSON'S road steamer in the direct draught of two and three-furrow ploughs.

—Mr. MCINTOSH, of Romford, President of the Essex Agricultural Society, will offer a prize of £100 at the ensuing annual meeting of this Society for COMPETITION by SHORTHORN BREEDERS. At the last Essex show he had exhibited a yearling heifer, which took the 1st prize. The same animal was shown at the Show at Oxford, where it also took the 1st prize, and it was sold on the ground for 500 gs. The same day a bull calf, a month old, was sold for 600 gs., and it occurs to Mr. MCINTOSH, that he may be very well satisfied with pocketing the prize, which is a special prize at the odd hundred guineas as a special prize at the last Essex show. Probably the prize will assume the shape of a challenge cup, to be taken three or four years in succession before becoming the property of any exhibitor, but the conditions are not yet determined.

—The following is a very abridged report of the discussion which took place at Wolverhampton last week at a meeting of landowners and farmers convened to meet Mr. JENKINS, the Secretary of the English Agricultural Society, for conference on the CONDITIONS on which the FARM PRIZES of that district were to be offered:—

Mr. JENKINS said that the Society, in conjunction with certain landholders of Staffordshire and Shropshire, were to offer prizes for the best and second best arable and dairy farms, they must be situated in Shropshire or Staffordshire. The two first prizes were to be £100 each, and the two second prizes £50 each. The second prizes of £50 were given by the Society, who also took upon themselves all the expenses connected with judging the farms, giving the prizes, which would be considerable. These points being fixed, he was deputed to take the views of the meeting upon the minimum size of the farms to be admitted into competition; on the distinction between an arable and dairy farm; on the amount of entrance fees, so as to shut out competitors who had little chance of success; and as to the definition of a tenant-farmer.—The Chairman (Mr. R. H. MASSEN) laid before the meeting the complaints of the Cheshire people, that though their county formed part of the area of the show, and was that part of it where dairy farming was

more especially cultivated, yet were excluded from a competition in which prizes were offered for the best cultivated dairy farms. The money for the prizes, £200, was found by noblemen and gentlemen of Staffordshire and Shropshire; and it had been said that they who found the money had a right to prescribe the way in which it should be distributed as prizes, but that £200 formed but 25 per cent. of the total cost of the farm prizes to the Society, and the Cheshire people complained that the Shropshire and Staffordshire people were putting their hands into an exchequer from which they had no better right to draw than the men of Cheshire.—Mr. KEARY said that the money was subscribed for the two chief prizes upon the understanding that they were to be competed for by farmers of Staffordshire and Shropshire only.—Mr. JENKINS said the district of the show embraced North Wales, and if all of it was admitted to competition the task of testing the relative merits of the competitors for these prizes would be impracticable. Moreover, the propositions as they now stood were agreed upon at a meeting of the Council preceding that at which the instructions for advertising them were given. The proceedings of that prior meeting were reported in all the agricultural papers, so that if the Cheshire people had had any objection to the terms of the competition, they had had ample time to make known their desire to the Council of the Society.—The meeting then proceeded to consider the points on which Mr. JENKINS had desired to consult them. The minimum for arable farms was fixed at 200 acres; for dairy farms at 150 acres, with 50 cows, and cultivators of dairy produce, with the understanding that the milk might be sold off the farm. The entrance fees for both classes of farms are to be as at Oxford, 3 gs. for non-members and 2 gs. for members of the Society.—The meeting next considered to whom the competition was to be open, and after considerable discussion it was decided that the qualifications of the competitor should be that he rented under another person at least two-thirds of his land, and that he had occupied it for at least two years; and that where the farmer was the tenant of one or more of the committee he was to enter any one of his farms, but should be required to enter all that were situated within the limits of the area of competition. It was also agreed that the entry should be made on or before March 25.

The *Mark Lane Express* has published a list of returns on the CHARACTER of the GREEN CROPS of 1870. The following Table contains the usual condensed statement of the several classes of produce:—

Conditions.	Turnips.	Mangel.	Potatoes.	Hay.
Fulures ..	70	2	8	51
Two-thirds to five-sixths under average ..	48	8	1	181
Half under average ..	25	2	4	8
One-third under average ..	1	1	1	1
One-fourth under average ..	1	1	1	1
One-fifth under average ..	1	1	1	1
One-sixth under average ..	1	1	1	1
One-seventh under average ..	1	1	1	1
Average ..	69	274	105	116
Over average ..	1	1	1	1
One-half over average ..	1	1	1	1
One-third over average ..	1	1	1	1
One-fourth over average ..	1	1	1	1
One-half over average ..	1	1	1	1
Totals ..	518	423	492	475

—Lord VERNON, the chairman of THE FRENCH PEASANT FARMERS' SEED FUND, has addressed the following letter to noblemen and leading country gentlemen in their several districts:—

"I have the honour to submit for your consideration some particulars of the benevolent purpose which it is desired to carry out by means of the committee in whose name I now write. The progress of the war on the Continent has left the peasant-farmers in many districts of France without the means of cultivating or sowing their land. The approaching period of spring sowing is an opportunity which, if prompt and vigorous action may be seized to avert the famine that otherwise seems inevitable; the committee are therefore desirous of collecting donations in seeds and money for this purpose from those whose interest in land, whether as owners or occupiers, naturally induces sympathy with the French farmers in this emergency. It appears unnecessary for me to urge the magnitude of the wants of the French peasant-farmers, as the newspapers have made every one acquainted with the subject; but I may remind you that the tract of country which has been laid waste has been estimated probably not less than one-sixth of the cultivated area of France. Application has already been made to the French and German authorities, through their representatives in England, to assist the committee in carrying out the objects they have in view. Any donations entrusted to the committee will be utilised in such manner and at such a period as will best ensure their proper application in those districts of France where seeds are required, and to which they can be transported with the greatest safety. I earnestly hope that you will feel yourself at liberty not only to support the committee in carrying out the objects they desire to carry out, but to use your influence amongst those resident in your neighbourhood in making the operations of the committee known as widely as possible.

—The Bishop of MANCHESTER thus spoke of THE AGRICULTURAL LABOURER the other day at Oldham, in the centre of the Lancashire manufacturing district:—Before coming to Lancashire he had lived all his life among that class. He would freely admit that, if an agricultural labourer were set up to discuss with one of the shrewd Lancashire operatives upon political or social questions, upon the rights of labour and capital

for instance, the operative might puzzle the poor brains of the labourer very much; but, on the other hand, if some of the operative class were to visit some of the rustic population which the Bishop had left behind him, he thought a narrow or two could be found on which the agricultural labourer would rather puzzle them. In all districts, even among such labourers, there was a great deal of the stuff that made good Englishmen. For instance, in farms around his late parish a number of steam ploughs were used, and the engineers who drove these and managed them were all native agricultural labourers, not including one imported man from Yorkshire or Lancashire. Every parish within at least 5 miles of the one with which he had been connected had its night school, at which the minister attended, and was glad to teach the lads who came to be taught. With regard to the attendance at such schools, it might be mentioned that he had had 35 scholars out of a population of 370, and he thought not more than one out of the whole number missed getting one of the prizes he offered to all who attended upon 40 out of the 48 nights of the session. It would thus be seen that there was a desire, even the bosom of the agricultural labourer, to learn something that might be both useful and ornamental to him in after life. He had observed that most of the prizes now awarded were for rather abstruse objects, connected in general with the daily avocations of the competitors. Students in such a locality were perfectly right to place these studies in the front rank. He wished that we in England had more places generally open to the masses of the people for healthy and innocent recreation. Although human nature was by no means all one could wish it to be, he believed that if an innocent and a vicious place of amusement were put side by side, nine out of ten young men who had been at all decently brought up, would choose the innocent recreation.

—On Friday of last week a very handsome service of plate was presented to Mr. HENRY TOMPKINS by the tenantry of the Ammesdown estate, near Bath, as a TESTIMONIAL of the high esteem in which he is held, both personally and officially, as agent over the property with which he has now been connected as agent for 42 years. "Forty-two years ago this week," Mr. TOMPKINS could say, "I commenced my duties here. I then had a large and an interesting line to adhere ever since that I would endeavour faithfully to do my duty between man and man, be the man landlord or tenant, neighbour or friend. Well, that rule has, I believe, brought me a greater treasure than that of silver or gold—the satisfaction of my own conscience, and the friendship, as testified to-night, of those among whom I have lived so long."

OUR LIVE STOCK.

CATTLE.

A FRENCH authority's opinion upon the best conformation for cattle, with reference to an ad. vexed, for yet intended, subject, is interesting. Mr. Magne, in discussing the form of body indicative of the various useful functions developed by art among cattle, says:—"Some agriculturists have wished for a narrow and deep chest, with narrow shoulders and withers, as best befitting an animal intended for work, while a large chest and thick shoulders would be the signs of excellence in the animal intended for fattening purposes. By this is not meant that the ox intended for labour should have a narrow chest, but that the chest, as they have simply wished to point out the necessity of a different arrangement of thorax between two distinct or specialised types. The race of Durham cattle, and all those which resemble them, step much less freely than those of Bazas or of other districts, where they trot as quickly and willingly as many horses. These varieties are far from wanting in chest (*manquer de poitrine*), according to the vulgar expression. The region is differently conformed than it is in the true grassland breed. It is less spacious, certainly, but it is sufficient for the definite exigencies for which the animal is required. Although the vast proportion of these parts in the Durham are amongst their strongest points, their large chests would not constitute them perfect beasts for draught, would make them sluggish walkers, too heavy, and too short of breath. Freedom of respiration rests not alone in great volume of lung. The size of these organs has less to do with the breathlessness, but its state and the physiological conditions which affect it.

"All horses remarkable for endurance and swiftness," says Mr. Magne—"the Arabian horses and those of Persia, are distinguished by ample chests. Why, then, are similar anatomical conditions hurtful to the ox? The example is badly chosen. The conformation of chest is not by any means the same in the light horse for rapid work, and some powerful runner, which heavily step the road, as in the pure bred horse and that of the London brewers, the difference is immense. In both one and the other the capacity of the chest is grand, but different. It is just the same in comparing cattle suitable for work or for grazing only. When the two extremes are placed side by side the first would find himself much hindered with the chest of the other, which renders him (the grazer) the more able to turn his food to good account, and the fattening beast would

be far from perfection, with a chest sufficient and well suited for the draught animal. Each, then, has his kind of beauty, his proper form well appropriated, and justifying once more the axiom of the ancients, 'Beauty is only the visible form of good.' The conclusion comes to after much patient weighing of evidence seems to be that what is now universally recognised as more beautiful of cattle, since it is the process of developing, fattening, and milking properties, must tend to unfit it for hard work. Hence, as improved cattle spread over this and other countries, it will be found most profitable to employ other powers for performing work, and to restrict the cattle to the more congenial work of growing beef."

We take the following paragraph from Mr. Duckham's *Hereford Record*:—

Messrs. Livingstone, Learmonth, Ercildoune, Victoria, New South Wales, whose herd of Herefords now numbers about 1000 head, laid its foundation in 1839 by the purchase of heifers from Mr. Toosey, the then manager for the Cressy Company, Tasmania, who imported direct from England. Their bull was selected from the herd of Mr. Cox, which was also a colonial bred animal. It was not until 1858 they imported Herefords from England. In that year they purchased the "Heather Bell," after his winnings at the Cardiff meeting of the Bath and West of England Society, *THANKFUL* (1407), by *TRADER* (1101), dam *Stately* by *MONARCH* (504), from the herd of Mr. Taylor, Showle Court; and *EGREMONT* by *GRATEFUL*, bred by Colonel GORDON (454), after his triumph at Knighton, in a class of sires, and in that year they had no slight achievement, seeing the importance of the Monaghty herd. *EGREMONT* was bred by Mr. Stedman, Bedstone Hall. In the same year they sent to them from the herd of the late Mr. Rea, of Monaghty, in the "Kaffrarian," *TRUD* (944), by *REXWATER* (501), dam *Gentle* by *REGENT* (861). Seeing the valuable properties of these selections and the great aptitude of their progeny to fatten under ordinary keep, the only difficulty experienced being that of the heifers becoming too fat for breeding purposes, they resolved to make further importations, and in 1865 visited England again and purchased *PATRON* by *DEMETRIUS* (2494), dam *Patroness* 8th by *DUKE OF MARLBOROUGH* (1974), from Mr. S. Good, (Vintonbury); *PRINCE REGENT* (3352), dam *CREAMTART* (15), from Mr. B. Rogers, The Grove: unfortunately the latter died on the voyage.

POULTRY.

ARTIFICIAL INCUBATION OF OSTRICHES.—I have just received by Cape mail a copy of *The Farm*, published by Grahamstown, containing an article on the successful results of an incubator I constructed for the purpose of hatching ostriches, and as the report may prove interesting to your readers, I beg to forward an extract. I believe this is the first instance on record of ostriches being hatched artificially. The Editor, under date November 10, 1870, says:—"At the Jubilee Exhibition an improved incubator was shown by A. Douer, Esq., Hilton, near Grahamstown, and we hear of Mr. Douer's success after a few alterations and the exercise of the little patience he has got the machine into capital working order, and finds it answer admirably, having hatched a troop of ostriches with it, which—with we suppose the help of the artificial mothers—have grown up all good-sized chicks. We would merely add, for the information of any one who may wish to know about this operation, that the eggs are kept up to a temperature of about 100° to 105° by the aid of an oil lamp, at the cost of a little over a penny for the 24 hours. We think this mode of rearing young ostriches, when it comes to be understood, will be pretty generally adopted."—*H. Thick*, 188, *West-ington Road, Kentish Town, N.W.*

AN UNDECORATED FARM.

THE last few weeks have not furnished many days on which one could make a satisfactory farm inspection. On Saturday, however, the frost and snow had gone, and a sunny afternoon afforded an opportunity of seeing the roads and fields and yards once more, and had the pleasure of walking over those of Mr. Thomas Deane at Huttons, near Henley-on-Thames. This was one of the farms which were entered for Mr. Mason's 100 g. cup last summer; and although no mention is made of it in the Prize Farm Report, there are several points in its management well deserving notice.

Huttons lies on the upland level of the chalk district of South Oxfordshire, which is here furrowed by occasional valleys running to the Thames. Below it, sheltered in one of these valleys, is the delightful village of Hambledon, with its noble church, its manor, and its cottages, the very ideal of a picturesque collection of comfortable houses of all classes. The chalk hillsides, with their hanging beechen woods, lead here to a higher level, where the chalk is masked by a covering of clay and flints, and where frequent plantations show by their occasional Oak trees a different kind of soil. Mr. Deane's farm, the property of C. R. S. Murray, Esq., lies on this thin calcareous flinty clay soil, the bed of clay varying from 1 and 2 to 4 and 5 feet deep over the chalk rock. Where the clay is deepest, land drainage is required, and this is done in the ordinary way with 2-inch pipe tiles, covered with broken flints, leading, however, not to main drains, but to swallow holes dug through the clay into the chalk.

The farm is barely 300 acres in extent, in fields of various sizes, bounded often by plantations and occasionally by rather bushy fences. There are good roads kept in capital condition, giving access to the several fields, and the cultivation is carried close to the roadside. But the access to the farm itself from the public road in the valley is very steep and difficult, and that is one of the drawbacks which the tenant suffers. There is a considerable purchase of hay and of manure every year. London dung being brought from the Henley Railway Station, 4 miles off, and all this carriage is difficult and laborious. It is for this reason, and because of the stiffness of the soil, that a farm of only 270 acres of arable land requires no fewer than 12 horses to work it. The cost of horse-labour must be almost another rent! Another difficulty belonging to Mr. Deane's position is the want of water. There are no land springs on this level. Ponds and tanks are the only water supply of the country. A well deep enough through the chalk to reach the water level would of course be a never-failing supply, and there are such wells at some of the farmhouses of the neighbourhood; there is, however, none at Huttons. The soil is not well adapted for green crop cultivation, and it is a great grower of Charlock, Thistles, and Poppies, which can be kept in subjection only by long fallowing. On the other hand it is a fair Wheat soil: it is a capital soil for Clover, and all kinds of sainfoin: it is healthy for stock; there had been no veterinary bill, I was told, for several years. The land lies well for harvest work; corn ripens early notwithstanding the land lies high, and even in wet harvests there is no difficulty. It may be added that though the country seems uncommonly well adapted for game preservation, there is little or no game, except partridges, on the land.

There are very comfortable farmhouse, fair farm buildings, with several slate-roofed barns, and sufficient stable accommodation and other shedding. The stack-yard is full of large well-built corn racks, placed on iron saddles—some of them old Wheat; and there is plenty of other evidence that the management, whatever it may be, is successful. Mr. Deane, who has long occupied the farm himself, is of the third generation of his family who have been tenants here, and who for these years have held the farm in yearly tenancy.

Of what, then, is the farm an illustration? Not of extraordinary stock management; a small flock of Shropshires had, indeed, prospered in Mr. Deane's hands; but it is not Turnip-growing land, nor well adapted for winter folding, and the last year's crops had been such a failure as regards food for sheep, that he had concluded to sell his sheep stock altogether off the farm, and to have no very large number of cattle kept. From a few cows the calves are yearlings, and others are bought, and it is the practice to fatten off 20 or 20 dozen bullocks. These are fed on hay and cake and meal of every sort, in a small square yard, with wide thatched hanging roof on all sides of it, thus covering more than three quarters of its area, and forming a most comfortable shelter. These, also, had been sold in the Christmas; and excepting a few yearlings in a yard behind about the straw, in which they lay without other shelter, evidently, however, in a good condition, and doing uncommonly well, I saw no stock. No store stock of any kind is sold. Everything is fattened off. In addition to what has been already named, the produce of three or four breeding sows is fattened. Thirty-three large fat hogs, weighing 10 to 20 scores, are thus fattened every year. Last year the amount got from pigs was £184.

This dry-land farm is, however, an example, not so much of stock-keeping as of good tillage, in which, moreover, the leading tillage agency is chalk. The whole of the land is being, has been, and will be chalked. Instead of dressings of 100 cubic yards per acre at long intervals, half that quantity at shorter intervals is preferred; and there are fields here which have been chalked very often; a considerable area was lying under chalk freshly cut and spread abroad this winter. What stubble, for fallow or for green crop, and land in all conditions—receives chalk dressings. Even young seeds, where one would think a chalk dressing must puzzle the scythe next June, had had a fresh dressing. Mr. Deane, however, has had experience to prove that if he can spare his teams for the purpose in the summer time, a chalk dressing then is more immediate in its fertilising influence than at any other season. If it can be put on the land in a shatter and rotten state when dry, it is of little use, and it is said to be so, and when the soil also is dry or for green crop, it is beneficial than under any other circumstances. All the clay got in digging drains through the heavy land is burned with large quantities of hedge-wood, making excellent ash, a capital fertiliser of the heavy soil. The grand principle kept in view is to make the light land heavier and the heavy land lighter—putting burnt earth close to the clay, and clay and heavy loam to the thin, light, chalky soil.

Another feature in the arrangement here is the gradually altered practice of the tenant as regards green crop cultivation. The 45 or 50 acres which fall to be cultivated each summer for the succeeding year's Barley and Oat crops are more and more becoming bare fallow. Common and Swedish Turnips are a very doubtful crop. Mangel Wurzels do not prosper either, and the grain crop after them is not good. Even Vetches, which can be grown without difficulty, are an unkind

crop for anything to follow, and thus the four or five years' rotation of crops, which is adopted, is becoming, more and more bare fallow, Barley, seeds, and Wheat; or, more generally, bare fallow, Barley, seeds, Wheat, and winter Oats or Peas, followed perhaps by Vetches, and then receiving a good manure fallow for the Barley crop of the second rotation. A considerable area is every year in Sainfoin, which is kept down for three or four years, and then broken up, and the land followed for a succeeding Barley crop. The Sainfoin crop is quite adapted for these soils, sending its roots often right down to the chalk on which the clay bed rests.

Last year's cropping included 54 acres of Wheat, about as much Barley, 33 of Oats, 9 acres of Peas, 50 acres of fallow and fallow crop, 25 acres of Sainfoin and 50 acres of Clovers, and there are some 20 acres of old pasture. A large quantity of corn and cake and hay is consumed every year upon the farm, chiefly in the yards. As much as 500 sacks of Barley, Oats, and Peas, and 1000 of hay, and 1000 of cake, and 100 of bought hay, are every year consumed in this way. And thus a large quantity of manure is made, enough, with what of London dung is bought, to enable all the seeds broken up for Wheat, and all the fallow land for such Turnips as are grown, to receive a dressing every year. From 7 to 10 loads per acre, over probably 100 acres, of manure is added to the land. When I was there, the cattle and the labour bill for the farm amounted to about £550 a year—perhaps £150 of this being annually devoted to what may be considered works of permanent improvement—ordinary wages being 11s. to 12s. a week, and sometimes without a cottage; that piecework payment is the rule as far as possible; that rent, and rates, and tithes amount to 25s. an acre in all; that 4 q. of Wheat, 5 q. of Barley, and 6 or 7 q. of Oats are the average crops; that the farm implements are the ordinary ones—King ploughs, iron harrows, Smyth's corn-drills, Coleman's cultivator, Cambridge rollers, steam threshing-machine (hired), and a mowing-machine for the first time employed last year;—I have said enough to show that here, too, is an instance, if that be anything to its credit, which cannot be called a "model farm," but which is, nevertheless, a case where clay land experience has gradually taught its tenant a number of important lessons, of which the preference of bulky strawy manure for such land, the use of frequent dressings of chalk as an alternative of texture, the preference of fallows to fallow crops, and the abandonment of folding, are the chief. It seems certain, however, that some of the advantages thus obtained would be better got by the use of steam power for cultivation, if the extent of the occupation be large enough to make so large an expenditure profitable. To this I may add that Mr. Deane's farm could hardly compare with any fairness with the others in the competition. It was the only one of the series situated on the Chiltern Hills; all the rest were more or less vale farms. Of the 30 years that Mr. Deane has occupied it, 1870 was by far the worst, he tells us, that he ever experienced. The general agriculture of his neighbourhood may be gathered from the fact, that in a parish of nearly 7000 acres, there is not one single farm over 300 acres in extent. *F. C. M.*

SWEDISH DAIRY FACTORIES.

[A letter to the Editor of the Royal Agricultural Society's Journal. By M. Juhlin-Dannelfeld.]

THE greater part of the land of Sweden is divided into small farms, which are cultivated by the peasants owning them, and on which the number of cows kept for breeding, or for the production of milk, seldom exceeds 10 or 15. The quantity of milk obtained on these farms is therefore small, especially as the animals generally receive insufficient nourishment during the long winter. One consequence has been that, as large quantities of milk are indispensable for a regular and rational method of dairying, this branch of husbandry has not until lately been developed to any considerable degree, although the climate, the nature of the country, and the manner of living of its inhabitants, are all favourable to its advancement. In order to further this object, various measures have been taken during the last 10 years, both by the Government and by agricultural societies, and efforts have been directed towards drawing the attention of the small farmer to the advantages to be gained by the application of the principles associated with this branch of husbandry. These endeavours have, however, as yet, not succeeded, and have as yet produced any very obvious results; but from what has already been gained, it is evident that the dairy factories constitute the most powerful means of obtaining on small farms a considerable revenue from dairy produce. The price which the milk has realised by such associations greatly exceeds what the small farmers—especially those in the northern provinces—thitherto been able to obtain for their milk. The system is, therefore, gaining ground daily, and is exercising a beneficial influence on this class of farmers, as well as stimulating a more careful treatment of the cattle; and this influence is already reacting in a salutary manner on other branches of agriculture.

The modes in which dairy factories have hitherto been arranged varies in different places. In some districts a person—generally some tolerably wealthy farmer

—purchases, at a certain price, the milk produced on neighbouring farms, and subsequently prepares butter and cheese from it; the owners or tenants of the farms taking no part either in the profits or losses. In other places, on the other hand, where more agreement and confidence prevail between neighbours, several persons residing within the same village, or in each other's neighbourhood, have established a dairy factory, which is worked on the account of all the proprietors, and the profits of which are divided *pro rata parte*. The best results have been obtained by the latter method; and it will, beyond doubt, become the more general, being of incomparably greater advantage to all concerned.

After these brief introductory remarks, I now proceed to answer your queries.

1. *Average Number of Cows.*—From 50 to 200; the average number about 100. Experience has, however, proved that wherever a factory has been established the number of cows has speedily increased.

2. *Size of Buildings.*—This depends to a great degree on local circumstances, and the system followed in the management of the milk. Most of the dairies are managed according to the so-called cold-water system; by which expensive cellars are avoided. Such a dairy

3. *Capital Invested.*—In most cases the requisite capital for the construction of the buildings and the purchase of the machinery, is obtained by loans from the respective agricultural societies. These loans vary between £60 and £300, and are to be repaid by annual payments within five or ten years, being partly exempt from interest, and partly not. In the case of a company raising the loan, all the shareholders are liable for the same.

6. *Workpeople Employed and Wages.*—For the management of a dairy factory one woman and a maid are generally sufficient. In some dairies a man-servant is employed besides, to perform the more heavy labour, and to convey the products to market; this, however, is an exception. The wages of the dairy-woman amount to from £6 to £9 per annum, besides 12 bush. of Rye, 12 bush. of Barley, several bushels of Potatoes, and 1½ bush. of Peas, and milk, butter, and cheese sufficient for her own wants; or, in some cases, a certain amount of the two last-mentioned articles. The wages of the maid amount to from £3 to £4 10s. in money, and somewhat less than the dairy-woman in natural products.

7. *Quantity of Milk Received.*—This quantity has hitherto varied greatly, being from 10,000 to 25,000

The quantities of cheese and butter obtained from the above, amounted to—

1640	English pounds of Cheddar cheese.
6650	" " Swiss cheese (Emmentaler).
1795	" " skimmed-milk cheese, and
1385	" " butter.

With regard to the dairy factories in the northern provinces, it is stated that on an average 2 "kannor" of milk (1.15 galls.) are needed for 1 Swedish pound* of fat cheese, and 5 "kannor" (2.8 galls.) for 1 Swedish pound of butter. While the cattle are feeding on the rich pastures of the mountains no more than 3½ "kannor" are required for 1 lb. of butter, and 1½ "kanna" for 1 lb. of fat cheese.

10. *Charge for Making, and made in which the charge is made.*—In the north, where the cost of fuel is not reckoned, this charge is stated to amount to from 1 to 2 öre; in the middle provinces to 2½ öre; and in the southern to 3 öre per "kanna" of milk†, all the costs of the management being included in this.

11. *Disposal of the Whey.*—In the north, where whey is of very little value, it is used for making butter and cheese, which fetch from 12 to 15, and even 18 öre per pound (1½d. to 2½d.). In other parts of the country the whey is mostly given to pigs, and in that case realises



FIG. 21.—SIDE ELEVATION AND ENTRANCE OF A DAIRY FACTORY, WORKED ON THE COLD WATER SYSTEM, AT MARIELUND.

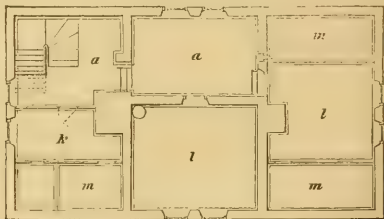


FIG. 23.—PLAN OF THE FIRST FLOOR.

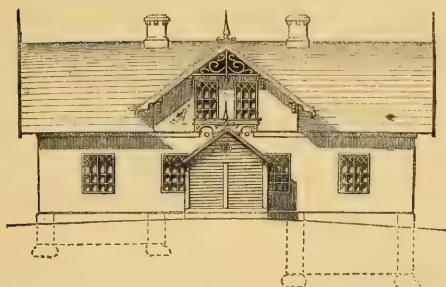


FIG. 22.—BACK ELEVATION OF THE SAME.

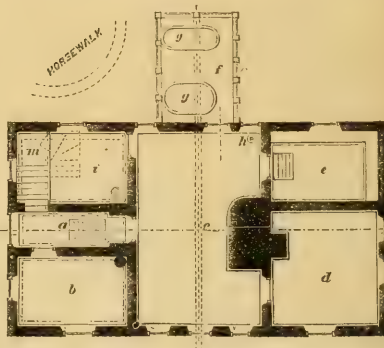


FIG. 24.—PLAN OF THE GROUND FLOOR.

REFERENCES TO PLANS:—a, Entrance, landings, &c.; l, Dairy-maid's room; e, Dairy; d, Cheese-room; c, Butter-cellar; f, Milk-room; g, Water and ice vat; h, Pump; i, Churn-room; k, Dairy-maid's kitchen; l, Workroom, cheese-curing room, &c.; m, Closets, storerooms, &c.

generally consists of a building from 50 to 60 feet long, and from 25 to 35 broad, containing a milk-room (being either a cellar, on the Holstein system, or, where the cold-water system is introduced, a room with splint walls), a water reservoir; a curd-kitchen, where the cheese is made; a cheese-room, where the ready-made cheese is kept and ripened; a butter-cellar, and one or two dwelling-rooms. There are, besides, in several dairies, a churn-room, and a room used for the sale of part of the milk, where either the skimmed or new milk, or the butter-milk, is disposed of directly from the dairy. Most of these dairy-houses are built of wood.

3. *Cost of Buildings.*—The cost of such a building greatly depends on the price of the timber and the labour, the disposition of the interior, &c. Thus, in the northern provinces, where there is an abundance of timber, and where the labour is generally performed by the associates themselves, it is stated not to exceed £50 to £70; but in the middle and southern provinces, on the other hand, it probably amounts to from £120 to £150.

4. *Cost of Machinery.*—The machinery is generally exceedingly simple, especially in the northern provinces. There it is stated that this cost amounts, at the most, to only £15; in the middle provinces, to from £30 to £50; and in the southern, to as much as £100, in which, however, are included a boiler, with a system of tubes or pipes leading to a double-bottomed curd-tub, a hotwater tub, &c., a churn with a horse-gear, English screw-lever cheese-press, &c.

galls. a year. A considerable quantity of the milk produced on the farms of the partners of the factory is consumed in their own households, especially during the summer, when milk is the general drink of the people. The quantity delivered to the factories is, however, continually on the increase.

8. *Distance, Maximum and Average, from which the Milk is brought.*—The average distance is about one English mile; maximum, 10 miles. When the making of butter is the chief object of a factory, it has been found that, in order to obtain a good result, the milk should be carried to the dairy, and not conveyed in a cart, because less butter is always obtained from milk that has been shaken. The distance should, therefore, in such cases not exceed one mile. When cheese is to be made, the milk may, on the other hand, be brought from far greater distances, taking care only to let the milk get well cooled previous to transporting it.

9. *Quantity of Cheese made per annum.*—In general, nearly whole-milk cheese is made during the summer, and butter and skimmed-milk cheese during the winter. By one of my reporters it has been stated that, on an average, dairy factories at present produce from 500 to 4000 lb. of butter, and from 2000 to 8000 lb. of cheese.

By one dairy factory it was stated that, in 1868, 3820 galls. of milk were used in making butter; 9830 galls. of milk were used in making new milk cheese; and 2430 galls. of milk were used in making skimmed-milk cheese.

a much lower rate, scarcely 1 öre per kanna (1-7th of a penny for 0.6 gall.). It has, however, of late been used also for feeding calves.

12. *Average Dividend to the Proprietors of the Factory.*—The average price of the milk sold at the factories owned by companies has amounted to 20 öre per "kanna" (5d. per gall.); and sometimes to much more, having exceeded 26 öre (6½d.).

The above answers to your queries are certainly incomplete, but they are such as it has been in my power to give you. In order to give an idea of one of our best dairy factories, I have procured a drawing of it (see elevations, figs. 21, 22, and plans, figs. 23, 24). This dairy is managed according to the cold-water system—a method, the more general introduction of which has exercised an extremely beneficial influence on the rational management of the dairy in our country. Supposing whey-cheese to be unknown in your country, I have, likewise, taken the liberty of forwarding you a sample of it, which, however, is of a better quality than the whey-cheese generally occurring in the market, and which would fetch about 50 öre (7d.) per lb. It is prepared from the whey of cow and goat milk. In those parts of the country where fuel is cheap the preparing of the common cow-milk whey-cheese conduces essentially to raise the price of milk. As it

* The Swedish pound is equal to about 15 ounces avoirdupois.
† Seven öre are equal to one penny; and 12 kanna go to an imperial gallon.

chiefly consists of milk sugar, it constitutes a wholesome food for the lower classes, among whom it is largely consumed.

THE AGRICULTURAL CLASSES.

[The following address was lately delivered by the Right Hon. Wm. Cowper Lytton, M.P., at the Remsey Labourers' Encouragement Association.]

I HAVE great pleasure in distributing the premiums that have been awarded, for I know they have been given with the utmost fairness and discernment by the judges who had to decide. It is always pleasant to see a number of persons who have done well in their respective positions in life. Each of the premiums is the evidence of well-doing, a proof that the persons who receive them have been careful to learn their duty, and have been faithful in the discharge of it. It is pleasant to see an example of right-doing proceeding from right feeling, whether on a large or small scale. It does not depend upon us what position in life we should be placed in. It depends upon circumstances, upon the complications of society, the orderings of Providence; and these, again, depend upon us in the way in which we act in the positions in which we are placed. Shakespeare has said, "All the world's a stage, and all the men and women merely players." When a play has to be acted the parts are distributed among the actors, and it is not of much consequence to an actor whether he has to play the part of a king or a citizen, a general or a soldier, whether he wears insignia and gold crowns or a simple buff jerkin; what is of importance to the actor and to the audience is the manner in which he plays his part. And so it is in this great theatre of the world. It is not of so much importance what position is allotted to us, whether it be one of wide power or small extent; but what is of importance—and of the utmost importance to each person—is whether they do their duty in that particular position in which they are placed or not. The well-being of society itself depends upon everybody doing his part in the particular part of the social scale in which they happen to be placed.

All of us here belong to the agricultural class—the class whose business it is to bring out of the soil that food which God fitted it to produce. The agricultural classes may be divided into three chief branches. First, the landlords, who prepare the land for cultivation, who divide it into farms and fields, who drain the land and build the farmhouses, stables, and cottages; secondly, the farmers, who are the persons who are turned to good account for the general good of the nation. The second branch are the farmers, who have to provide the plant of the farm, the implements, machinery, wages, all the outlay that has to be made; they have the risk, and we hope sometimes they have the profit. The third class are the labourers; they plough, sow, hoe, dig, reap, and do everything in manual labour that is required for the productions of the farm. About three weeks ago we had some competitions in this town among the farmers as to which had done best in producing articles worthy of admiration. We had a very splendid show, and several gentlemen who are present to-day were successful in getting prizes. There was Mr. Hoddinott, who got the 1st prize for 10 acres of Swedes; then there was Mr. Withers, who got the next for a most admirable field of Swedes; Mr. Swanton, Mr. Hunt, and I myself got a prize; and among the plants that Broadlands Home Farm produced most beautiful pigs, which also got their prizes.

Now to day it is the turn of the labourers; they have been competing for prizes, and I am pleased to see so many people who, by the decision of the judges, have got the rewards which they well deserved. The first class of shepherds is, in many respects, the most important of the lot, for upon them depends much the amount of the flock and ewes—upon their management, care, and constant attention. We have six or seven shepherds who have been strongly recommended for good conduct, and special skill in the work which they have performed. In the class of teammen prizes have been given to three men who have deserved them by a considerable number of years' services. A great deal, we all know, must depend upon the care of the man who drives these animals. He has got not only to feed and water his horses, but to be kind and considerate in his treatment of them. A good carter is a man who tries to manage his horses by kindness, who understands what they are able to do, and who does not overdrive them; and he is especially one who, when he has to bait his horses at a public-house, does not bait himself to any extensive degree, but is moderate in the refreshment he is required to take. The other class is that of the ploughmen; these are they who require the most skill, and whose skill is the best tested. We have had a great number of ploughing matches lately; they have been well contested, and there have been furrows drawn in this neighbourhood as straight and even as any in the country. You must therefore think well of William Fieldler, who is the champion of you all. The other class is for seedsmen and drillmen, and upon their work a great deal of the success of the farming depends. It is a matter of considerable skill, and I am glad to see there are so many who are worthy of the premiums. So also with the rickmen and thatchers. This is an employment not so well carried out as it

used to be, and it requires all the attention that can be paid to accomplish it in the best way. Then there is the class for domestics. These have received at home a much greater reward than the association will be able to give them, for a servant who gives satisfaction to her employers has the reward not only of doing her duty, but of receiving the approbation, affection, and regard of her employers. As to the class of cottagers, we have the pleasure of seeing the mistresses as well as the misters, and I am sure these prizes are earned as much by the wife as by the husband. These have an ample reward in keeping their husbands at home, and making them contented with their lot. I should like to see a prize given to the wife who could make the best pudding or soup for her husband. We have a great many vegetables, and I think it is a prize for the gardeners, and I think again it is not necessary for me to dwell much upon the usefulness of the premium, because a well cultivated garden is the best reward that can be given in itself; and in many places they reckon the produce of only half a quarter of an acre is worth about £4 a year.

Then there are the special class of prizes awarded to those who, from long service, have been able to bear a very good character, and these several of them deserve great credit for what they have done. Finally, we have those who have received the Bible, awarded by the present Bishop, as by his predecessor, and the prayer-book, and these will both be great proofs of good conduct to the owners. I do not think it necessary for me to give you advice, because your presence here to-day shows that you are each of you in your respective positions well behaved, honest, and respectable people, but there is one thing I have the fathers and mothers will do, and that is to take care that their children go to school. Since this meeting last year, Parliament has been very busy, and it spent 20 days in the course of the session last year in providing that the education of the working classes of this country should be such as it ought to be. A law is passed now by which a seat in the schoolroom shall be at some time or other provided for each child. In this neighbourhood there are plenty of good schools, and it is not the fault of the schools if the children are not educated, but it will be a hard thing if, while all the country is thinking about the education of the working classes, the fathers and mothers, who are most interested, are the only people who do not care about it. I therefore hope all of you, so far as your influence extends, will do what you can, so that the poor children growing up will not be left without schooling. Next year I suppose we shall have Parliament considering the question of licensing public-houses, and trying to arrange that men may get their beer in the least inconvenient way, getting what they want without being exposed to the temptation of taking too much or being led into bad company. For my own part I am a great advocate for what are called working men's clubs—places where men can go of an evening if they have to leave their homes; of course it is better, if they can do so at home, so far as the proper place for a man is by a open fire-side—but it would be a great advantage to young men, at any rate, if they could always have a room well lighted and warmed, where they could go and sit of an evening with the newspapers, and be allowed to smoke a pipe without the necessity of drinking beer in the house. In a great many villages, as well as towns, in this country there are flourishing places of this sort, where working men go and sit in a room of which they are the masters. But the chief thing that depends upon the husband, and which is so comfortable and attractive to the husband, and I hope the wives present set a good example in this respect. On behalf of myself and the friends and subscribers of this Society, I may say that we are pleased to see you here to-day. We hope many of you will be here to get premiums another year, but whether that will be the case or not we are exceedingly pleased to know that the friends of this neighbourhood, so large a number of persons who have done so well, and who have set us an example to their neighbours, friends, and acquaintances.

HOW ARE WE TO FARM?

THIS is question which, at the present moment, I have no doubt, presents itself to many minds. One of the one hand public attention has been called to the reports of the judges of the Oxfordshire prize farms, and to the opinions which have been pretty freely expressed thereon in the different agricultural journals. On the other hand, we have recently had very prominently brought before us the system practised by Mr. Prout, of Blount's Farm; and the extremely opposite style of management which is carried out by our irrepressible friend Mechi, is perpetually obtruded upon our notice. The farms, therefore, which just now offer the most salient points for comparison are those of Captain Dashwood, Mrs. Millington, Mr. Prout, and Mr. Mechi.

As the latter gentleman is the senior farmer of the lot, at all events before the public, I will give him the first place. He is an advocate for covered yards, irrigating his land with liquid manure, and analysing his stable by composting manure to lie on sparrow floors, so that he may be enabled to sell a portion of his straw with hay, to make up his rent.

This, combined with a little market-gardening, has enabled him to bring out a balance-sheet—not a very startling one either, considering the capital employed. If the majority of English farmers did no better, they must keep their children at home to do the work while they pay rates to educate those of their neighbours who are engaged in the system generally desired, not only landlord out of a hundred would turn to machinery and buildings suitable for carrying it out; and no sane tenant, even had he the means, would do it on another man's property. We may, therefore, I think, leave Mr. Mechi "alone in his glory," and conclude that his is not the example farm to be generally followed.

We will next in order take Captain Dashwood's farm at Kirtlington. Here, so far as we read, the buildings and accommodation generally are all that could be desired. A large capital is employed, and everything is carried on at high pressure. Large sums are annually expended in purchased food and extraneous fertilisers, and yet the results, when all these advantages are taken into account, are very meagre, and the judges came to the conclusion that even these were produced at the cost of alternate depreciation of the land. On other words, that the system practised was exhaustive.

We will now just glance at Mr. Prout's, of Blount's Farm. His practice is to crop all and sell all. No stock is kept, but hay, straw, and corn all disposed of by auction, the only dressing used for the land being artificial manures. So far, his receipts have annually increased, and looked at financially it is a great success, and he distances all his competitors. But the question presents itself, Will it last? Most people think not, and in that opinion I concur; at all events, were I a landlord, I should take care that no tenant practised it on my estate. Mr. Prout farms his own property, and can do as he pleases. The most striking difference in the systems of Mr. Prout and Mr. Mechi is, that if one were generally practised the country would be inundated with straw, if the other plan were to become common we should be glutted with beef.

Finally, we come to the now celebrated Ashgrove Farm, which has received the first mark of distinction from the Royal Agricultural Society. Here we have a farm of very moderate agricultural value, managed in a very ordinary fashion, its chief claim to distinction lying in the very excellent manner in which the details are in every particular carried out. In fact, it is a system of farming which, with little variation, is generally carried out in the district; but, judging from the figures which have on various occasions recently been brought before us, this even, notwithstanding the mark of honour it has received, cannot be the model or example farm for us all to follow. It should, however, be remembered that the figures and estimates are most of them fanciful. Mrs. Millington herself has not spoken, and probably does not think it worth while to do so. If she did, there would most likely be a good deal of fresh light thrown upon the matter. The figures which have been put forward for the country employed, the result ought to be something more than a mere livelihood; but this some of our calculating friends do not accord to her. The method pursued at Ashgrove is one that is pretty generally, with some modifications to suit varying circumstances, pursued in the Ardley district, and few districts can boast of a more respectable class of tenant-farmers than are to be found in that neighbourhood. Having gone to Kirtlington, and having seen the details of its management, not one tenant-farmer in a thousand would have thought it worth a moment's criticism. As a rule, all would have felt that they would never have such buildings, and other external advantages, as are found there. The ordinary tenant-farmer is obliged to take his farm as he finds it, and make the most of it. Few landlords are disposed to make much outlay on premises, and as a matter of fact, if they did, the country would be turned into a huge meat manufacturing factory, producing beef and mutton chiefly with purchased food, the trade would destroy itself. Extravagance in fancy farming may do as an exception, but not as the rule; and, so far as we are let into the secret, the results are not very dazzling as it is.

The late Mr. Grey, of Dilston, who knew as much about land as most men, once said, when speaking of artificial manures, that a good leg of mutton would show itself with its own system. I think so, but, unfortunately, all legs of mutton are not good legs of mutton, neither are all farms good farms. I incline, however, to the opinion that the man who makes the most of the natural produce of his land, and uses extraneous food and fertilisers only as auxiliaries to eke out his ordinary and more natural means will be found at the end of the year with a better balance than one who has practised a more showy and expensive system. You may whip the old mare too much, and so you may the land. The Scotch farmers who have, with long leases, farmed very high, begin to find that they must resort to the old bare fallow system. The worst of this is, as one of them pertinently said, if the land stopped bearing the rent should stop also.

In conclusion, I have shown that neither Mr. Mechi's nor Mr. Prout's systems will do for general adoption. Neither is the country at present prepared for the splendid style in practice at Kirt-

lington. English farmers must be content to make the most they can off their farms at the least outlay consistent with keeping up cleanliness and fertility. It is a plan which enables them, if they do not make fortunes, to pay their rents punctually and to bring up their families decently, as well as to bear all the taxation which successive legislatures in their wisdom may devise; and I for one think that the Royal Agricultural Society's judges have exercised a wise discretion in acquitting themselves of a very difficult task. *F. W. Bignall, Loughton, Stoney Stratford.*

WASTE OF FORCE IN AGRICULTURE.

[The following is a report of the discussion which followed Mr. D. T. Fish's excellent paper on this subject, referred to last week, and given in our last number of 1291.]

MR. HITCHCOCK: They had heard a very learned paper; but when people climbed high they must expect to hear the wind blow, and if an amateur came there to address practical men, if he heard anything contrary to his own opinions he must take it kindly and as being all in fair play. It was quite evident from the paper that he heard that Mr. Fish had sat at the feet of his grandfather, Mr. Mechi, to some purpose; but whether they would agree with his views was another matter. First as to the £4 per acre produced by each English and Irish acre of land annually [under the present "wasteful" system]. Mr. Mechi's remedy for this was to break up the twenty-two million acres of pasture existing in the country; but if this plan were adopted, what, he should like to know, would become of the 1500 Irish bullocks which came weekly to St. Ives market? Where would they get the raw material to feed them upon? A great many of these fancies, which were the hobbies of enthusiasts, and some of which had been spoken of by their friend, when tried in the crucible of common sense and experience were found to be of the same material as dreams—airy nothings.

As to the philosophy parts of this lecture on the waste of force, Mr. Fish would have them believe that there was a great loss in having the horses at length, and that two loads of manure as much as one, would be as three at length. This argument did not apply to the spindle of an engine; it did not matter whether it was 70 or 60 feet long, or quite close, the driving power was the same, and in threshing machines the work was done better with the engine at a little distance than when quite close. If the horses were steady pullers and well-trained, he did not think there was much waste of force. As to the unnecessary weight of their implements he quite agreed with Mr. Fish, and it would be much better and less expensive if they could do the same work with a wagon weighing 15 cwt. as they did with one weighing 25 cwt. Mr. Fish evidently agreed with them that politics should not be excluded at their discussions, for he had touched upon something said at one of their meetings, that whether Manchester was in ruins or not their farming would go on just the same. But did not Mr. Fish himself say that they had lost customers everybody, including all the kind of the earth, and would not these customers still exist, whether the Manchester chimneys smoked or not? He (Mr. Hitchcock) did not say that Manchester was not a capital customer to them, but then those people never inquired where the Wheat was grown before they bought it, and they would not pay more because it was grown here. They carried out the principle of political economy, to buy in the cheapest market, and quite right too. But if this principle was applied to the manure of a meadow for the question of their labourers too. He could quite understand in a bygone time that things were different, when the landlord petted the tenant, and the tenant his labourers; when a labourer was born on a farm, as his father and grandfather had been before him, and he hoped and wished to work and die there. Now, however, things were different, for the men had learnt political economy, and would not work for 2s. a day when 3s. 6d. could be got anywhere else. If they had wanted half a dozen men to mow a meadow for a week, and they could not agree as to price, the master might mow it himself, for the men would not do it; and if men kicked up their heels and would not work, he did not think masters were bound to study them. As to what had been said about where the men lived, it might be that the men would have more comfort in their homes if they did not stop at the public-house on their way home and spend their money. Then again about leases, they were very good things, but the thing that Mr. Fish and gentlemen at the school, who were talking about leases, wanted, was fixity of tenure.

MR. FISH: Not I, sir.

MR. HITCHCOCK said this idea meant that those who had once got possession of land were to keep it. Some of the advocates for this measure—such men as Mr. D. T. Fish, of Leicester—said it was not fair for a man to possess half a dozen men, and a whole country, but that it should be divided, and that they should have proprietors. They might just as well say that the Bank of England had no right to have eighty millions of sovereigns when there were eighty millions of people wanting money. Let it be divided, and give them a sovereign apiece! It was glad to find, however, that what was said at their meetings took hold, and was treasured up, although brought forth again in the for-

midable appearance they presented that evening. He would, in conclusion, just refer to Sugar-Beet. Mr. Mechi once referred to a farm where they cultivated by steam 3 feet deep, and where a walking-stick might be thrust down to that depth. He (Mr. Hitchcock) was at that farm on the previous day, and found that the Sugar-Beet last year as a maximum, and this year he had 1850 acres ready for Sugar-Beet, while next year he intended to grow 2000 acres.

MR. HAWKINS said there were many practical points touched upon in the paper which had just been read, and the one to which he wished to allude was that of the waste of force in labourers doing some distance to their work. One of the evils of the existing system of tenure was the great difficulty there was in providing cottages for the labourers near the farm, and it was a difficulty which the tenant could not overcome unless the landlord would step in to help him. In the neighbouring county of Norfolk Lord Leicester had built good substantial cottages upon the farms, the tenant paying him 5 per cent. interest upon his outlay. He himself as a tenant should be pleased to guarantee his landlord 5 per cent. on his outlay if he would provide good cottage accommodation. He believed there was a great deal of truth in what Mr. Fish had said, but he hoped that no labourers in the neighbourhood had to come 4 miles to their work, although it might be so near Bury, because there the farms were larger. He believed himself that there was no tenant who would not gladly guarantee his landlord 5 per cent. for good cottage accommodation near or on his farm.

MR. TALBOT said he did not know what Mr. Fish got his estimate from, that the land in the Kingdom yielded on the average £4 an acre. He thought only produced on the average £2 an acre. He would do him the justice to say the land did not produce more was a very great absurdity. As far as his experience—which extended over 20 or 30 years—had gone, he must say he never heard the estimate put so low. He quite agreed with what had been said about improving the land, while believing that many farms were so well cultivated at the present time that they grew all the corn possible. He might be told that the great quantity of manure from Turnips, but then where was the equality? It had been proved at the Barking farm that sewage was not good for Sugar-Beet, and he would have them bear in mind that it was the forcing system which was pursued at this farm. As to the £4 an acre, it should be observed that Mr. Fish was quoting from authorities who were interested in keeping the amount down rather than putting it up. Speaking only from his own practical experience, he should put it at £6. Any gentleman who quoted results arrived at other than by his own experience did more harm than good. As to the skill required in farming he thought a great deal more might be exercised than was at present shown. Farmers who had sons should send them to the best agricultural school that could be found, as nothing was of more importance than a sound practical agricultural education. The boys should be taught chemistry, botany, and geology, especially the first, as it was essential that they should know what the manures and fertilising mixtures were composed of. He was quite sure there was a great waste of force in the men. The better they were paid and fed the better they would work. He certainly should like to see their men better paid than they were, but he could not believe that their wages were so low as had been represented. He could not believe that men in some parts of the country were only paid 8s. or 9s. per week. It was a great deal more. He would not like to see any men on their farms who were only paid 8s. or 9s. per week, but he would ask them whether those very men were not the dearest men they employed. He remembered the time when there was an identity of interest between the landlord and tenant, but this had been altered now.

MR. FISH: It is always there at election times.

MR. TALBOT said they went upon the commercial principle now. Who ever heard of a landlord making a manure of his rents?

MR. HAWKINS: It is very rare.

MR. TALBOT said he never experienced it himself. However bad the season, there never was any kindly sympathy shown him. He himself did not want there should be, and he never asked his landlord to reduce his rent when he had a bad year, and therefore a farmer now-a-days must consider his wife and family before his labourer. As to the amount of capital employed in the soil, he was quite sure he was not to make money by farming was one who was not a good farmer, and who had a fair fortune to begin with; and he was always up at four in the morning attending to his men, and that man always said if money was to be made by farming, they must, when they got a good year, button the money up in their pockets, and not spend it for cake and other things.

MR. HITCHCOCK, alluding to Mr. Fish's remark about the election times, said, for his part, he did not see why the landlords were to be the only class silent at election times.

THE CHAIRMAN said everybody except farmers seemed to understand farming. Mr. Fish had been advocating high farming; if they met with losses, as they were likely to do at present prices, they were to meet them by putting more money into the land. But

was this the case with those lights of the world, the cotton manufacturers? Not at all. If cotton fabrics got low, they reduced their expenses and put their hands on half-time, and farmers must do the same, and they must observe that those who had made most money by farming were not what were called high farmers. The next question which had been touched upon was tenant-right. Whenever scientific men had anything they could not account for, they put it down to electricity, and so all the ills of the farmer were put down to tenant-right. For his part he never could get anybody to define what it meant. He did not think the customs of the country were at all perfect, but when they agitated for an improvement it was well for them to know clearly what they wanted.

MR. FISH: Leases, I say.

THE CHAIRMAN said he thought a six months' notice would do, and that one of those things that length much too short to better farming. He agreed with some of Mr. Fish's points; their implements were much too heavy, but in advocating a light steam-engine for the land he was two years behind the manufacturers, for it had been tried and given up, more power being required in drawing the engine across the land than in drawing a certain quantity of rope. As to Mr. Mechi, although one of the pleasantest men he ever met, he thought that him to have authority, and an argument, should not be backed up by his statements. He would not take Mr. Fish's authority than his. In feeding animals, too, he believed that there was a great deal gained by keeping them warm. By doing so, however, he did not think that they fattened quicker, only that they did not take more than half the quantity of food. Some good observations had been made with reference to labourers living at a distance, for if a farmer had to walk a mile and a half to his work he wasted a quarter of day's strength before he was at his journey's end. This was a thing, however, over which a tenant had but little control. He did not agree with the remark that the employers did not know where their men came from, and cared less. He challenged Mr. Fish to show a body of men who cared more for their men than the farmers. The manufacturers only looked upon their men as so many hands. The question of wages was a very delicate one, but he thought a gentleman holding Sir John Lubbock's opinion, that a man should buy in the cheapest market, and sell in the dearest, should not hold them up to scorn for getting their labour as cheap as they could. As to a partnership between tenant, labourer, and landlord, he did not believe it would ever answer, for those who had money would draw back from it, while those who had nothing to lose would join to see what they might get. He should be glad to see the labourers better off, but they could not expect a man with capital to join a man who had none. If he did he should think of his head and brains and the other had not. There was one matter in which he should like to see experiments tried, and that was the effect different manures had upon different crops. He was trying some experiments himself, and he thought very likely some manures were better suited to some crops than others. There were many things in Mr. Fish's paper which would afford them matter to think over before their next meeting.

MR. FISH said he did not come there without expecting to have many of his views controverted, added to, and explained; but with reference to the opening remarks of Mr. Hitchcock, he must say that he did not hold himself responsible for the views of Mr. Mechi, or any other person. He should be sorry even to hold himself responsible for what some of the Liberal party might have said about land, or the relation between landlord and tenant, or tenant-right. He only held himself responsible for his own words, and what he had said was that in order to draw more capital into the land, it was necessary that the tenant should have the protection of a lease. He had no sympathy with fixity of tenure; he did not believe it was practicable to give two persons a fixed right in the same land for an indefinite period. But if they wanted to draw out the productive powers of the land, they must give those who invested capital security, that they might recover it. The system of leases had worked, and he believed, with a good system of leases the tenantry would be contented, and that the prosperity of Ireland would date from the extinction of tenancy-at-will. As to the Sugar-Beet grown at Barking, he always contended that sewage was not the proper manure for them, as it gave size, but not sugar. The success of the Beet at Barking was entirely due to the very hot summer. He did not think he should be twitted with being an advocate for horticultural response. He was not a farmer himself, and he had been given great interest in all agricultural matters. Therefore he did not consider himself one of those mad-brained enthusiasts who were constantly propounding their peculiar theories. He believed everything he had said was correct. The land was suffering from a want of capital and of skill, and he would go further and say suffering from a want of labourers' skill, and most of all from a want of farming skill. The more skill they put into the land the more skill they would get out of it. As to starving the land, because the manufacturers when they were losing money put their hands on half-time, the analogy would not hold good. The simple question was whether by putting more capital, skill, and labour

paid for this kindly care. He fed some five or six first-class bullocks, but he especially boasted of his breeding sows, of which he kept 10 or 12, fully realising the profits reported in your issue of Dec. 3, 1870, p. 1617. He frequently spoke with laudable pride of the profits of his poultry yards, pigeon lofts, and even his bee-hives. His root crops were something really prodigious, of up to 12 1/2 tons of turnips, and even "topped and tailed," and of Mangels from 60 to 70; but it is to be distinctly understood that everything was managed to the highest point of perfection as to deep, clean, careful cultivation, artificial and animal manures, liquid as well as solid, "unwashed." His whole soul was in his farm, all the operations of which he personally directed and superintended; and when I say he forked and trenched most of his arable land, it follows he employed most labour still, he should be given plough and liquid-manure cart vigorously, when called for. I am of opinion the proper tenants for such holdings are men of the stamp of the gentleman whose operations I have endeavoured to describe—men who feel pride and pleasure in the work, with capital and skill to give practical effect to it. The great difficulty is to find such farms;—there is plenty of first-class land to be had in patches—if I may use the term—but very few with suitable cottages and farm buildings. It only appears to me that large landowners and their agents would act wisely to encourage such spirited small holders, and facilitate their settlement in suitable places. A pretty rustic cottage, with its corresponding farmery, may be made highly ornamental; and these may now be erected in a way not to press heavily on either landlord or tenant; indeed the tenant might annually defray the instalments if the rent of the land was measured with this view; but the chief object is to secure really first-class land, the system of cultivation and feeding combine to secure vast quantities of manure, and, as far as human agency can do it, enormous crops, such as you cannot reasonably expect on farms of 500 to 1500 acres. The article manufactured in my friend's dairy was a perfect delicacy, viz., cream cheese, which he sold wholesale at from 3s. to 4s. per lb. All that was done by him could and would, I feel confident, be done by hundreds of men like him if suitably encouraged. *H. C. S.*

Scientific Farm Book-keeping.—I find reviewed in the *Chamber of Agriculture Journal* the system Mr. Prout is pursuing on his farm, and the Editor places before his readers an account of the several mineral ingredients contained per acre, representing the soil and subsoil to a depth of 12 inches, given by Professor Voelcker from analysis made in 1865. No doubt the unusual circumstance of a farm year by year increasing in productivity, when every item considered by able practical men as absolutely necessary for the maintenance of the fertility of the soil is thrust aside as of no value—rather an incumbrance than otherwise—will attract considerable attention from an agricultural point of view. Hay, straw, roots, &c., are not taken into consideration, regarding the monetary value they may actually be being sold away from the farm. It would appear we are verging on what Baron Liebig, in his letter acknowledging the receipt of a copy of my system* of farm book-keeping, mentions as requisite, "that an account should be kept of what is taken from the fields or soil in the various crops grown, and what is returned in the manures applied." In Mr. Prout's case we find, on the authority of Professor Voelcker, that the soil contains, to the extent of 1 foot, 1 lb. of mineral matter, constituents than can possibly be required for years to come; at the same time he has up to the present time considered it advisable to add to this immense store. He returns to the soil (in the manures applied with the Bean and Barley crop) in the 7 cwt. of superphosphate, about 156 lb. of phosphoric acid, the 7 cwt. of bone dust supplying 188 lb. of phosphoric acid—together about 344 lb. of phosphoric acid per acre; while the three crops above referred to, the superphosphate alone contains about 30 per cent. of sulphatic lime, equivalent to 18 per cent. of sulphuric acid, and in the 7 cwt. of superphosphate are applied about 141 lb. per acre of sulphuric acid, while the three crops abstract only 156 lb. The question which naturally arises in one's mind is, having such an abundance of all the mineral constituents requisite for full crops of Wheat, Beans, and Barley, why should more be added, knowing (as in this case, a clayey soil) that an abundance does exist, and that deep and thorough tillage, and aeration of the soil and subsoil, are preparing for, and adding to, this already rich store, the mineral food of plants. By

their physical characters, clayey soils prevent the access of air and moisture, and by opposing a ready drainage often conceal their fertile powers. A really scientific system of account keeping, suggested by Baron Liebig, alluded to in the review of "The Annual Farm Account Book," in the *Times* (Feb. 9, 1869), can "be carried up to the minutest standard Table of the chemical constituents in all the different kinds of vegetation grown on a farm, and of all manures used; and the farmer, by multiplying according to the weight of crop removed from a field, of manure applied, or green crop ploughed in, could state with approximate correctness the chemical debitor and creditor account of each portion of his land." *Alex. Fennell, Murrell Hill Farm, Binfield, Berks.*

Profits of Prize Farming.—I see Mr. Edmonds objects to the figures at which "W. G. D." has arrived with respect to the Kirtlington farm, and it must be admitted the data on which they were founded were not very full, at the same time I think they are as correct as the information given will allow of. As the opinion of Mr. Edmonds, being that of a known influential practical man, will have weight with your readers, I should like to call his attention to the figures again to the figures on p. 1713 of last year's volume. The pigs that he wants to charge £900 for, were, I apprehend, born on the farm, brought up on offal and Vetches, and fattened on the lightest of the corn, and which latter is, I expect, included in the £2247 charged for purchased food. If Mr. Edmonds will add this item of purchased cake and corn to the feeding value of nearly 200 acres of roots, and 200 of hay, &c., consumed yearly on the farm, he will find it amounts nearly to the value of the meat and wool sold, after deducting the price of stock bought in, amounting to something over £4000, leaving a small margin of profit beyond the manure made. Now, if he will turn to the Ashgrove accounts, and make a similar calculation, he will find that the £1200 expended in cake, with the addition of a larger acreage of roots and hay, produces only half that amount of meat sold, or a little over £2000 nett, leaving only £800 as the return from 400 acres of roots and hay, and 200 of straw, and the wages of shepherds, &c. It was the miserable return from this amount of food grown that first induced me to call attention to this farm. Well may Mr. Edmonds ask "how this can be possible." I have tried in vain to find that the mistake is in "W. G. D.'s" figures, which he suspects. *J. B. M.*

Societies.

ESSAY.

At the annual meeting of the members of this Chamber, held at Chelmsford, last, Colonel Brise, president, for the year, in the chair, the Secretary read the subjoined report of the Council:—

The Council desire to lay before the annual general meeting this report of the proceedings of the Chamber. In the report presented to the members at the beginning of the past year, the Council were enabled to express their satisfaction at the progress made in the usefulness and extent of the Chamber, and they now feel that it may fairly lay claim to having made still further exertions for the benefit of agriculturists. In the last report we had to deplore the time and labour absorbed in Parliament by the question of the Irish Church Bill, and during the past session the two very important measures of the Irish Land and the Education Act. However, we have so much engrossed the attention of the Legislature as to exclude many topics of deep interest to agriculture, such as local taxation, equalisation of weights and measures, the further regulation of beerhouses, the Malt-tax, and many others. No doubt, having discussed such subjects at their different meetings, the Chamber would have objects to some resolution on them, which resolutions they would have brought before the representatives of the county and boroughs of Essex, urging on them to give effect to the wishes of the Chamber, if possible, by promoting their views.

During the past year there have been five general meetings, namely:—February 5, at Saffron Walden; subject of discussion, "Adulterated manures and cattle food," introduced by Mr. A. Johnston, M.P.—February 25, at Colchester; subject of discussion, "Corn laws, and the effect of fluctuations on payments to farmers," introduced by Mr. Young, M.P.—"The corn returns as they affect the tithe average," and "The desirability of selling all kinds of grain by weight instead of by measure," introduced by Mr. J. S. Gardiner; and the subject of providing for the education of the industrial classes, introduced by Mr. James Round, M.P.—March 26, at Colchester; adjourned discussion upon the best mode of providing for the education of the industrial classes.—April 29, at Chelmsford; subject of discussion, "The desirability of making tithe rent-charge a fixed instead of fluctuating payment," introduced by Mr. A. Henson; "The Game Laws," introduced by Mr. W. Brown.—June 3, Chelmsford; adjourned debate on "The Game Laws," discussion on "Tenant-right," introduced by Mr. J. S. Gardiner; "The constitution of the Central Chamber," introduced by Mr. Smith.

Farmers' Clubs.

LAVENHAM.

Agricultural Labourers' Cottages.—At the December monthly meeting of this Farmers' Club, Mr. William Biddell, Vice-President, in the chair, the subject of

labourers' cottages was referred to by Mr. F. T. BARKWAY. He said:—

The remarks he intended to address would be taken chiefly from the report of the Commissioners appointed to inquire into the cottage accommodation of the English labourer, and he went on to argue that the majority of cottages that now exist in the parish were deficient in almost every requisite that should constitute a home for a Christian family in a civilised community. They were deficient in bedroom accommodation, few having three chambers, and in some parishes, the larger proportion, only one; they were deficient in drainage and sanitary arrangements; imperfectly supplied with water; such conveniences as they had were often situated as to become nuisances; they were full enough of draught to generate any amount of rheumatism, and in many instances were lamentably dilapidated. Whilst great strides and improvements had been taken in almost everything during the last 30 years, yet the matter of accommodation for the labourer, excepting in isolated cases, had received little, if any attention. In some places, comfortable cottages had taken the place of miserable hovels, and a comfortable cottage seemed to act like a charm, improving the manners and habits immensely. His opinion it tended more to improve the condition of the labourer than anything else, and if landlords did not get so much percentage for the outlay, they would reap it in another and more satisfactory way; having men more equal to a hard day's work, there would be less sickness, and consequently less expense in the shape of poor-rates.

Adverting to Lincolnshire, which he characterised as a new county, he described the vast improvements that had been effected, and how the land being brought under cultivation, and he said everything necessary had been provided for excepting the human machine, by whose labour all this change had been brought about. The labourer must find lodgings miles away from his work. The report of 1867 stated that there was an absence, not only of villages, but almost of cottages also, consequently the labourers were all congregated in larger towns. The same report stated that there were women as well as men who took an hour's walk every day, and that men and women, and children in the dark, to obtain the privilege of selling a hard day's work for a shilling. He gave instances in which whole families were found huddled together in miserable hovels, long distances from their work. The Lincolnshire cottages, however, as a rule, were not altogether bad in quality, but the insufficiency in quantity was the cause of evils quite as destructive of home life, and perhaps more so, than anything else. Overcrowding was, of course, attended with the worst results, and the people would take lodgers. He instanced many cases of overcrowding—in one instance the floor of a cottage being so packed with sleeping people, that it was almost impossible to open the door. In Norfolk, what had modern civilisation done for the labourer? In that county of agricultural progress the labourer's lot was worse and worse. The several reports show the character of the cottages in certain localities, old, broken, and shapely, with patched floors, and full of cracks and damp. He gave some glaring instances of overcrowding, adding that he was sadly afraid that we, in the county of Suffolk, could not put in at all a better appearance. If time permitted, he could bring before the notice of the Club cases equally bad and horrifying. He might enumerate many instances of whole families sleeping in one room, consisting of father, mother, and six, seven, and even more children. Could we wonder that vice and immorality should stalk through the land? And could we wonder at the want of decency, morality, and virtue?

What must be the state of health with this overcrowding brought on? It was easy to guess what was the state of the air in the room of a cottage where ten or eleven persons had slept, and it was a wonder that they breathed at all. With this state of things, we could not hope to have a healthy agricultural population. If these evils were mitigated, we should find the labourer in a few years, as he is now, a better and a wiser people, as they became better housed, would become more provident, more careful, and would endeavour to lay up for a rainy day. He felt that he could not omit one parish which stood out nobly, and presented a pattern which other parishes might most beneficially imitate. He alluded to the parish of Shimpling, where, under the fostering care of the lady at Chadacre Hall, many cottages had been erected, giving a good amount of comfortable accommodation, and, in addition, at the same time, produced a corresponding amount of care and self-respect amongst the occupants of these comfortable homes. He wished there were more ladies like Miss Halifax, willing and able to assist their poorest neighbours, and then the complaints constantly arising would in a few years disappear, and we should be tempted to exclaim, "Could such miserable hovels ever have existed as homes for honest, working men?"

Mr. Barkway then spoke of Nottinghamshire, Derbyshire, Shropshire, Hertfordshire, Worcestershire, Warwickshire, and a host of other places, giving a vivid description of the cottages and habits of the people; and in the course of some remarks on pauperism, he said he found that the increase of pauperism in 1868 over that of 1867 was 54,619, and

* The following is the letter:—

"Munich, Nov. 9, 1868.

"Worthy Sir,—I have received your 'Farming Account Book,' and I think it will be very acceptable to many farmers; but its expression in my reply refers to the system in which the title should be made concerning the ingredients of manures and the nature and keeps them. The farmer harvests Wheat and Barley, and sows and keeps some; he buys and sells cattle. With each quarter of Wheat, he carries off the tillage, and the quantity of soil, and gets it back through the food of the animal he sells. The account book that I mean should give an accurate account of what the farmer has lost in the process of soil, and has been made good by the manures he must have bought. The account book must include and specify the analysis of the manure so consumed, as well as the analysis of the soil, the produce of the fields; in what condition the fields are after harvest; and with what manure the farmer can reproduce fertility. The prices of the crops of manure, and the value of the labour, and the system you can extend your account book in this direction, and easily realise my idea.—Yours, J. LIEBIG."

in 1869 over 1868 it was 36,063. The number of paupers charged to the poor-rates on January 1, 1870, was 1,083,532, while their cost to the country amounted during 1869 to nearly £7,700,000. In conclusion he said:—"The question of decent homes for the labouring classes cannot rest. It stops the way. Education itself is an impossibility when the nursery from which the scholars are drawn is a school of vice—school and home in antagonism. The victory, if possible, to the former would be a doubtful gain; and unless some stir be made, the Act for the promotion of national education will be largely inoperative, if it is not generally followed by some remedial measures for the improvement of the cottage homes in England. I would ask, who is responsible for this sad state of things? Are the people who are born with it, who are dragged up in it, who are debarr'd by ignorance and poverty and the iron chains of habit from getting out of it? No; every family in this land is responsible for it. Think not that our duty is done by merely enjoying the comforts of life, and shining like a bright, warm spot in the cold, cheerless desert of life. You know that home is the congenial soil of every virtue. You know that upon the condition of the homes of England everything depends—that if they are corrupt we shall surely ruin our country and ourselves, and we shall grow Let us not rest, then, until this evil is put away from us, until at least it shall be a man's own fault if his home becomes the abode of sin and misery.

DISCUSSION.

Mr. R. HAWKINS expressed his great regret that Mr. Barkway did not suggest a remedy for the deplorable state of things he had depicted as existing in the various counties of the kingdom, and said it was perhaps because he did not take his hearers into the more immediate neighbourhood, about which he must have had a more thorough knowledge. As to the cottage accommodation in this county generally, there was no doubt there might be some very deficient cottages locally, but he thought that on the whole the labourers were better cared for than in very many counties. He did not recollect that there had been remedies suggested, but it had been said that this was a landlord's question. There was no doubt but that the owners of the land were in a position to give the labourers that accommodation which was requisite for the locality in which they resided. The county of Norfolk had been instanced as being one with grave deficiencies in regard to cottage accommodation. The tenantry of the Earl of Leicester, he said, had 3000 or 6000 acres each—required better accommodation, and the noble earl most liberally offered to find bricks and mortar on receiving 5 per cent. And if other landlords would but act in the same way, the wretched state of things depicted as existing in some counties would be obviated. The lower standard of the rate of rent, and the fact, other, and this subject of deficient cottage accommodation had long been mooted, and why no remedy was provided was a most astonishing thing. The landlords knew they had a duty to perform in this respect, and arrangements could easily be made for putting the matter to rest, so that the required house accommodation for the poor would crop up easily and satisfactorily for all parties. Some of the difficulty arose in this way:—Certain individuals by industrious habits acquired a small estate, and they had the land bought and built on, and ground, and where there was only accommodation for two cottages they placed six, and let them for a given sum of money. The question, as a whole, must be taken up by the landlords. The tenant-farmers could not do so, and this was the evil to be remedied in the next. At the same time they would assist their landlords in every way in their power to make the requisite provision.

Mr. T. P. HITCHCOCK said he did not understand why the Commissioners should not have looked into the dens of Liverpool, Manchester, and other large cities and towns. The fact was, the Commissioners wrote their reports to order [?]. They wrote them, and then went out to obtain promotion. Dr. Fraser had been made Bishop of Manchester, and no doubt he wrote his reports to order. What was the object in view in this case? There was a law, and there was a system of legislation, and it was intended that the agricultural labourer should have equal comforts to the men who were better off? He did not wish it to be understood that he deprecated lodging the poor with the labourers of other countries. Having said that, what he spoke against was the system for the purpose. We must compare the wages of these people; and why was it they did not earn better wages? Because they could not, inasmuch as they had to compare with the labourers of other countries. Having referred to what had been said, and that there ought to be overcrowding—in the course of which he instanced Ireland, where families had only a single room in a cabin, and where there were thousands of such cases as had been referred to, but those people were exceedingly chaste—he said in regard to England, and that there ought to be more and better houses provided. Was Milden larger than it was 100 years ago? Was Lavenham more thickly populated than then, as well as many other places that might be named? The population in many of our villages would be the same, but we should see good houses provided, but let us have no legislation on the subject. It must be left to the good spirit existing between the landlord, the farmer, and the labourer. If some inducement could be offered to the landlord to build the houses, well and good; but in the meantime

he would caution persons not to exaggerate the case. It must not be forgotten that you could not, from a variety of circumstances, make all people live in good houses alike. The agricultural horse that was turned out at night into the strawyard might as well grumble because it was not kept up as the man who is turned out of his market. It was quite right to ventilate the subject in this way, but it must be borne in mind that before much could be done there must be some return for the order. He, however, did not like these things written to order, before he could get one side.

Mr. BARKWAY said Mr. Hawkins had asked for a remedy, and he could do no better than refer that gentleman to what had been done at Shimpling. Mr. Barkway also alluded to what Mr. J. E. Wright, Mr. Munford, Mr. Hunter, and Mr. Haden had done in the cleanliness and neatness and alteration in the habits that these improved cottages had produced in the people was remarkable. As to the cottages in that neighbourhood, it was, of course, easy to point to some that were as bad as could be; and as to Mr. Hitchcock's remark about the reports being written to order, was hardly like that gentlemen like those would write anything wrong in order to claim power upon it.

Mr. J. E. WRIGHT said he had done a little in cottage building, but he did not and it very properly. His opinion was that each landlord or farmer must take up some special circumstances into consideration. It was impossible to lay down a general rule, because various persons' circumstances varied considerably. He himself could only found an individual case. He did not find anything like a general profit, but there was perhaps an indirect benefit in having the cottages closed by living, however, as he did near Lavenham, there was not the necessity for cottage building which existed in some places. Mr. Barkway had referred to what had been done at Shimpling. Mr. Haden had not only taken a great deal of interest in the subject, and had spent a large amount of money. There were many others who felt equally well disposed towards the labourer, but it was not everybody who had Miss Halifax's purse. With regard to the concentration of the population, and of another class of persons must be found to inhabit the cottages.

Mr. HAWKINS said that the late Earl of Leicester built some excellent cottages with good-sized rooms above and below, and he had done so, but he never encouraged it for his family, and the tenant-farmer paid £5 rental.

The CHAIRMAN inquired who bore the direct loss, the landlord or the tenant?

Mr. HAWKINS said the tenant-farmers paid the rent. There was no loss.

The CHAIRMAN: Did the tenants pay the £5?

Mr. HAWKINS: Yes.

Mr. BARKWAY: If the same kind of cottage was built here, could you find men to pay £5 rental?

Several members said they wished they could, and one remarked that a tenant was not a tenant unless he had a good man in his employ, would not make a little sacrifice with a view to that man's welfare.

Mr. THOMAS P. HITCHCOCK observed that one important question was whether it would suit the landlord's clerical staff to go out and find out what was the matter with the sun which had been named. Every case must, of course, be dealt with on its own bottom. It was impossible to lay down a broad general principle. It would not answer the tenant's or the landlord's purpose to find out what was the matter with the sun, and then to say that the sun was gradually being remedied, and in support of this view he pointed to a number of excellent cottages which had been built within a few miles of Lavenham during the last few years. Mr. Marquis of Bristol had paid particular attention to the housing of the labouring class. He also added his testimony to the liberality of Miss Halifax, and said it would be well if every parish possessed a lady of excellent benevolence.

The CHAIRMAN said that few, if any, would deny that the landlord ought to be held responsible for the cottages, but it was seen that a certain thing ought to be done, we should know on whom rested the blame if it was not done. He thought they were apt to talk as if the landlord should do everything. We found this sort of thing in every class. Owners of a house of a happy nature, or of a large estate on his own land, he could get an abundance of labour at a low rate without building cottages; and if he looked at the question in a business-like light, he would never build them. How had this yeoman, for instance, been treated by the Legislature? He had been treated as a miser. He told him clearly, that "You must buy in the cheapest market and sell in the dearest, for that is the maxim on which we mean to go to work. We don't buy of you because your labourers have a little meat and another little drink, but we buy of you because you can't get it cheaper." If a man bought an estate for £10,000 and sold it, and put the money into the funds, there was no doubt but that that person was equally bound to see after the poor of this kingdom as when he was the owner of the land, and was worth £20,000. Why was the landowner to bear the brunt in this matter? Why were two apt to speak of landowners as rolling in wealth, and as having at command almost any amount of money. No doubt numbers of the landowners as great difficulty in getting the position of a legislator. In many others, and even labourers under a great mistake when we said the landowners had money in almost unlimited amounts. Mr. Barkway had most effectively portrayed the evils under which the labouring classes suffered in not having sufficient cottage accommodation. (The speaker's opinion was that those evils were greatly exaggerated.) At the same time there could be no doubt but that the evils arising from unsuitable dwellings were very great. Very few of these, doubtless, were more uncomfortable than a straw rafters, a small fire, and a low diet; but when we consider the habits of the labouring class, and how pigsties so sure, all other circumstances considered, that these draughts were entirely against their physical well-being, and it was quite possible that if they had air-tight windows it might prove, instead of a blessing, a serious

evil; and though this state of things might be exceedingly uncomfortable for the time being, yet he did not consider them altogether unmitigated evils. Mr. Barkway had named many counties which were as badly, if not worse, off than we were in Suffolk in the matter of cottage accommodation. Human nature was such, that if we could find others as bad as ourselves, the knowledge of this fact produced a certain amount of comfort. It was somewhat difficult to understand why this should be, but such was the case. It ought not to be a consolation for us, but it was a consolation for them, and was no worse off than Suffolk. We must have all been convinced of the fact that in Suffolk the dwellings were anything but first-rate. We found as great, if not greater, intelligence amongst the fens and uplands of Lincolnshire, for instance, as amongst the fens and uplands of Suffolk; and the habitations of the former, bad as they were, did not appear to have seriously affected their respectability or morality. The great point was the percentage question. There were formerly objections raised against the enclosure of commons, for many small persons would get a piece of land, and somehow run a building up on it, and thus bring an additional incumbrance upon the parish. In some instances this had been the case, and you would find that the cottages of certain classes under circumstances which admitted of difficulties, awkward to unravel. There were needy people who built good cottages, and who would not build them unless they got good cottagers. His own experience of cottages was that a fine but patriotic would build them unless there was a certain amount of accommodation for the labouring class, and those of course were places where cottages ought to be built. There was no doubt but that the dwellings of the poor had been very materially improved during the last 10 or 15 years. A certain Act against the enclosure of commons, and an encouragement to cottage building, proved to be one of great use—he alluded to the "Small Tenements Rating Act." The evils had been vividly portrayed, and he confessed he wished that the subject of the remedy had been gone into more fully, and that some of the remedial measures, probably some remedial measures might eventually be suggested. Close by there had been some excellent labourers' cottages built. They were after the plans which obtained the £5 prize offered by the Suffolk Agricultural and Horticultural Society, and the committee appointed on the subject (a copy of which he held in his hand) would be found some useful hints.

Mr. BARKWAY replied, and a vote of thanks was passed to him for the paper.

Notices of Books.

The Agricultural Gazette of India. Vol. II. No. 1. Wyman & Co., Calcutta.

We lately called attention to the publication of a new journal intended to promote the interests of a particular branch of English agricultural industry. The "Milk Journal" will appear monthly, published in London. We have now to call attention to a new agricultural journal published in Calcutta, devoted to the improvement of the agriculture of Hindostan.

As we understand, from the position of a mere department of the Government, it is impossible to appear as an independent monthly publication; and the number before us gives fair promise of a very useful future.

Commencing with an elaborate discussion of corn yield per acre in England, in various parts of India and America, a set of articles follows on the effect of low rents, which it may interest our readers to know is everywhere declared to be prejudicial to agricultural improvement, and the possibility of improving agricultural processes for India on the actual agricultural condition of the country—and then come official papers on Rice, Cotton, Tea, and Coffee. The whole is a most readable and instructive agricultural journal. We extract a passage descriptive of agriculture in a north-western district of India, with the editorial comments on the advantages of a sufficiently high rent.

"The detailed account which Mr. Grant gives of the husbandry of the district is as follows:—

"The principal implements of husbandry now employed are the 'bulkhuk' and the ordinary plough. The former is a kind of scarifier, having, instead of a share, a broad iron blade set horizontally and at right angles to its body. It is used in preparing the land for the rain crops, twice if possible before the setting in of the rains, and once afterwards. The seed is sown broadcast, and a heavy beam of wood is dragged across the land to crush in the seeds and to break the clods. For the winter crops a little more trouble is taken. The 'bulkhuk' is used for about four times before the conclusion of the rains, and then a heavy beam of wood is used in preparation the land is furrowed by a regular plough, to which a simple apparatus is attached for dropping the seed as the plough goes on. Another plough follows, marking its furrow a little to one side of the last, and the earth thus turned up covers the seed deposited by the first plough. This rude process, effected by implements of the lightest and most elementary construction, is all that is done for the soil, which is expected to produce an unfailing crop of Wheat.

It has been already remarked that the unbroken succession of Wheat crops returned by the same land is often surprising, but sometimes the soil shows signs of complete exhaustion. In these cases Gram or some of its tribe is usually substituted for Wheat two or three years. The cultivators are apt to leave the land fallow, even for a single year, for the vacant land is immediately occupied by rank 'Kans' grass, which no exertions can eradicate till it has run its appointed time. This is, in the best soils, 10 to 12 years—in poorer land proportionately less.

At the expiry of this time of forced rest the land is restored to the cultivator, refreshed and re-invigorated, but so much is the long fallow feared, that landlords will take up, even at a loss, lands unexpectedly thrown out of cultivation by their tenants.

Manuring. Irrigation is almost unknown, except for Sugar-cane and vegetables. There is a fine tract, containing 50 or 60 villages, lying on the borders of the Gadurwara and the Narsingpore pergunnahs, the rates of the rent and revenue paid in which show how profitably both processes might be adopted. The staple produce of these villages is Sugar-cane, irrigated from unlined (kutchas) wells, by means of the Persian wheel. The favourable lie of the sub-strata gives unusual facilities for irrigation here, but there is nothing to prevent the general use of manure being brought into the country. In the adjoining Abubulph district the practice prevails to some extent. In assessing the Narsingpore pergunnah, I came to one village, the rent rates of which seemed unusually high, and yet there was nothing to indicate that they had been felt as oppressive. The revenue was therefore adjusted accordingly, with the result that a rate village is assessed higher than many first-class villages. It afterwards came to light (the village was one of those which had been inspected by my predecessor), that it was an instance, perhaps the solitary one, of a village where the employers of labour are the cultivators. I rarely held as *farmers under a large proprietor, at a rent heavy enough to force them to exert all their facilities, and instead of succumbing, as most would have done, they had turned the occasion to positive advantage.*

It is to be regretted that so important an adjunct to agriculture arises probably rather from apathy than from any want of means. In Upper India, with a far greater deficiency of ligneous fuel, it is found possible to manure a very large portion of the cultivated area. Here, although the general excuse for non-manuring is that all the available cattle manure is required for the rest of the country, are candid enough to admit that the process is too laborious for them. One comparatively enterprising cultivator informed me that he had given it a fair trial, but found that it was no use after the first or second year. He had, however, expected that manure, once put in, would permanently improve the soil, and he had not realised the possibility of burdening himself with a new and vexatious labour.

"The nature of the soil has something to do with this apathy. It is deep, retentive of moisture, and most tenacious in its texture. The amount of the manure, and irrigation, which might amply fertilise lighter soils would here be thrown away. It must be, as in the case of Sugar-cane, kept constantly irrigated to prevent the rapid induration, and subsequent fissility, which characterise it. The long standing water, hence irrigation, here necessitates more labour and expense than lighter soils. It is, however, though by softening the soil cultivators would avoid two great sources of damage to which they are now subject, viz., loss of the seed which drops into the fissures of the earth, and occasional loss of the land, which dries up before they can plough it, they prefer the present easy system, under which they are certain of a maintenance, to a life of laboriousness which would neither suit their habits, nor seem required by their necessities."

"We trust the reader will observe carefully the passage we have here noticed, and wish to be observed to observe people to exert all their facilities" was all that was necessary to introduce "the liberal employment of manure." What more striking testimony could we have to the impolicy of our late settlement proceedings, in fixing the rent and revenue everywhere at a quit rent of 9 or to annas per acre? Hence the natives, wherever they are, everywhere, I have not," says Arthur Young, "seen an instance of rent being very low and husbandry at the same time being good. Innumerable are the instances of farmers living miserably and even breaking on farms at very low rents, but are obliged to leave the land at the expiration of their rents who make fortunes. Throughout my journey I have universally observed that such farms as were the most wretchedly managed were very much underlet." The chief grievance of agricultural authorities recorded this conclusion as the result of his observations throughout his tour in the north of England, 1770-80. He remarked upon the same fact subsequently in his Irish tour, and modern observation confirms its accuracy. "Estates that are under-rented," says McCulloch, "are almost uniformly farmed in an inferior style compared with those that are let at a fair value." The same remark is made by our settlement officers all over India. By fixing the land revenue for 30 years at the low rates adopted in the Central Provinces, we have done our best to stereotype the slovenliness of their husbandry, while by creating a false middlemen between the cultivator and the state and the cultivator, we have sown the seeds of a harvest of difficulties in the future."

Farm Memoranda.

LAMMERMUR SHEEP FARM: Jan. 5.—While we write a severe snowstorm covers the ground, and although a fresh from the south set in last night and continued till the morning, the wind has veered further west and north, and the frost again resumed its hold before the snow was dispatched, except on portions of exposed ground which previous high winds had drifted. These portions of bare ground have some assistance to hill flocks during a snowstorm, furnishing a picking of heather and rough grass, which has to be supplemented with hay carried to the stalls or sheltered places. Fortunately the Turnips have been pretty well protected by the snow and their own leaves, which were still rough and strong. Our Turnip crop has turned out a good one in the hills, although very considerable portions had to be resown. The season at which this resowing was done was still early, so that Turnips have had the best of the winter; and, added to this, the benefit of an open back-end of the

year, during which they continued to grow till an unusually late period.

Our corn crops in this high district were affected by the summer's drought, but have yet turned out well. Although the harvest period proved a lengthened one in regard to weather, still, from its having apparently broken in the midst of it, undue haste was made in securing the outstanding corn, and the consequence was a good deal of heated feeling—stacks having been put up with corn in a middling condition, and some days of foggy weather setting in immediately after, rendered a good deal of turning and stooking out again necessary, especially where wooden bosses had not been used in the centre of the stacks. This misadventure (the harvest season in reality proving protracted enough even for great deliberation) is not a marvel in a high country, where we are so often caught in harvest by rotting rains. It however proves not only the occasional utility of putting bosses in the stacks, but urges their regular use, as, their presence is always beneficial to the stacks, and, in many seasons, absolutely necessary.

When there is a command of good oat-straw we fancy the services of the chaff-cutter might often be brought into requisition in the feeding of mountain flocks during snowstorms or hard winter weather; but new practice is always difficult to introduce, and the sheep seem to have a strong objection to the chaff. The sheep, under their charge would be something like an affront, though why it should not be as good and rather better than frosted heather and withered grass, we don't just see. Certainly, cattle and horses devour good oat-straw in the autumn and early winter almost as greedily as they do hay. Innovations in this and other matters are, we notice, generally introduced and forced upon us by necessity. The rage for cross or half Leicester sheep will, if persevered in, render it impossible to arrive at any definite conclusion, other than we have a necessity, although from our own experience we are inclined to think that, as an old stockman lately pitifully expressed it, "less breeding and better feeding" would do more for us. Half Leicesters are all very well in good winters, but when you come to count the extra numbers of the hardier breeds, their plainer keep, and great diminution of risk, we are very much inclined to believe in what is the safer and less precarious practice. Half-bred ewes are very heavy eaters, and their lambs bring no more money than the first cross from the Cheviot ewe. The draught half-bred ewe does bring about 10s. more money than the Cheviot, but as the half-bred ewe lamb costs all that more than the Cheviot ewe lamb, to begin with, there is no profit on that score. The supposed advantage lies in the extra weight and price of the wool, and in the additional number of twin lambs, many of which, however, are frequently of inferior quality, and in unwelcome seasons. Against the above advantages must be set the extra numbers of the Cheviot—we should say five for four—fewer extras in the way of keep, and far less risk. The active Cheviot bestirs itself in hard weather, hunting for its coarse and sometimes scanty living, when in similar circumstances the half Leicester is very apt to stand still and look for something to be brought to it. In fact, with them it has to be Turnip keep nearly all the winter through.

"We are disposed to put a good deal of stress on the item 'risk,' which we believe is often lost sight of or undervalued in calculations.

Leicester and other tups are now generally being brought in from the hills—six weeks being the usual time they are out. It is not unusual to allow the Cheviot and Black-faced tups the run of their several hirsels for a week or two in the end of the season, after the Leicesters have been out for a month. We are this year taking the precaution to corn the Leicester tups, and keep them in from the hills, in order to continue giving them corn, as the shepherds have been carrying it daily to them when on the hill) as before their previous pampered feeding when in the breeder's hands there is great risk—we may almost say certainty of loss, the change from Cabbages to heather being past endurance.

Jan. 6.—Fresh weather again prevails, and half the snow has disappeared. J. S. B.

HAMPSHIRE: Jan. 10.—The past three years have each been difficult and adverse to the occupier of land, but 1870 will long be remembered as the most disastrous for agriculture generally which has occurred during the past forty years. Nothing seemed to thrive except the Wheat crop, the plant of which, however, was very deficient. All the summer months there was no grass, no hay crop, no root crops, except Mangels. Barley and Oats were very deficient, scarcity of water on the hill farms severely felt, even on the best Vale farms and root market gardens; nothing could grow, vegetation being at a complete standstill for several months. Potatoes, however, were somewhat an exception, for the late varieties proved a good crop, and of excellent quality.

The only favourable result of the extreme drought was the excellent opportunity for cleaning and preparing the land by fallowing for future crops, and there is no doubt that a long and extended breadth of Wheat has been sown during the past autumn under the most favourable circumstances; for although much of it is scarcely above ground, yet Wheat is a very hardy

plant, and we have often noticed that the crop has proved good when the seed has lain in the ground for five or six weeks without vegetating. The prices of corn have not been satisfactory, considering the scanty crop. Foreign importations are the chief cause, no doubt; but the price at which Potatoes are selling has its effect. Large quantities have been selling at 50s. to 70s. per ton. At this price, however, they have proved a boon to the poor and the unemployed artisans.

The supply of fat beef and mutton has been much better than might have been expected, both in London and in the provincial towns. The general scarcity of cattle food has not, however, so much to do with the Christmas supply as formerly, for since the local cattle exhibitions have so much increased, the competitors hold on stock for the purpose of exhibition, and fatten them for the most part with artificial food, like cake, corn, &c., using but a very small portion of roots, so that there has been a liberal supply of first-class meat. Still, however, prices have been high, and it seems likely that the summer scarcity of food will tell more upon prices and supply during the coming spring than it has done during Christmas. The severity of the weather prevailing for some weeks past will severely tax the resources and ingenuity of those farmers who have large breeding flocks, as to the best mode of feeding and pasturing. Much of this work has been done. Most of the Vale farms are in want of chalk more or less, and it is worthy of note that there is an increasing desire on the part of both landlords and tenants to arrange for its application by charging the unexhausted value from tenant to tenant.

Owing to the failure of roots there are not many horned ewes kept in the South Hants district this year; in fact, there were very few offered at the fairs, many thousands being sold off for mutton, instead of being held on for pasture. Much of this work has been done. Most of the Vale farms are in want of chalk more or less, and it is worthy of note that there is an increasing desire on the part of both landlords and tenants to arrange for its application by charging the unexhausted value from tenant to tenant. Owing to the failure of roots there are not many horned ewes kept in the South Hants district this year; in fact, there were very few offered at the fairs, many thousands being sold off for mutton, instead of being held on for pasture. Much of this work has been done. Most of the Vale farms are in want of chalk more or less, and it is worthy of note that there is an increasing desire on the part of both landlords and tenants to arrange for its application by charging the unexhausted value from tenant to tenant. The whole, very fair luck, and this may be expected, there being less disease amongst the ewes than for many years, owing to the severity of the winter, however, much care is needed to save the lambs when young. The Hampshire Down flocks upon the chalk hill farms have scarcely begun to lamb yet, February being the chief period for them; but through the failure of roots and the great scarcity of fodder, more than usual care will be necessary in the management of the in-lamb ewes, as their health and that of the lambs also depend so much upon the treatment and feeding of the ewes during pregnancy. On hill farms, for the most part, cabbages are grown, and these are considered the best food for breeding ewes. Many farms have had a quantity planted during the past autumn, but they will require constant care in severe weather to prevent larks and wood pigeons from eating out the heart of the plants. Joseph Blundell.

WEST GLOUCESTERSHIRE: Jan. 12.—The frost set in rather suddenly, and found us somewhat unprepared for it, for there is a considerable amount of ploughing yet to be done. It has, however, been most favourable for the farmer, as water on both pasture and arable land. The extremely fine autumn gave such a rare opportunity for thoroughly cleansing the surface of the stubbles, that most farmers pushed on with it most vigorously, and thereby got a little behind with fallow ploughing; which, however, a week or two of open weather will put all right, and the land will then be in first-rate order for spring seeding.

The Wheat plant has not been seen much of during the past month, owing to its having a light covering of snow upon it (for which it will be none the worse); but, judging from its appearance before the frost, nothing could be more promising than the early sown—it had well rooted and was sticking very closely to the ground. The late-sown was not sufficiently up to say much about, but the snow will preserve it considerably both from the larks and the frost.

The management of stock creates no small amount of anxiety amongst us—how to eat out the very scanty crops of hay and roots is a question of very grave moment, especially in the face of such inclement weather, when all kinds of stock so much need more and better food than is necessary in a milder time. To half starve them would be acting upon the maxim of "penny wise and pound foolish"; therefore, we have no alternative but to give (judiciously) artificial food, for which the stock will spring with pleasure.

Fattening cattle and sheep cannot be kept but upon the best of everything the farm produces, and must

necessarily have the most of the hay and roots. Therefore, the stores must put up with something rough.

Our store cattle are doing very well upon straw chaff, scalded with boiling linseed tea, with a few cow Cabbages chopped up and mixed with it. If we find one amongst them whose constitution cannot stand this hard fare, we contrive to give it a little oilcake extra.

Fortunately we have for the sheep a fair supply of roots, upon which, with hay, chaff, and a liberal allowance of acorns, the fatting sheep are doing well. The stores get straw chaff, a few roots, and some acorns, and keep in very healthy condition. The ewes are now getting heavy in lamb, and require great attention as regards regular feeding. We are this year compelled to give them hay and straw chaff (one of the former to two of the latter) instead of all hay, but in order to make up the deficiency we add a few Oats and acorns. They do very well, and look very fair for a fall of lambs. Beef has been, and is, selling at extraordinary prices, best quality is said even now to realise 8s. to 8s.4. per cwt.; best wethers 8s.4. to 9s. per lb. Bacon pigs are somewhat unsteady, ranging from 3s. to 3s.4. to be made; porkers, 11s. per score. Cheese has sold lately at 70s. per cwt.; but even at this seemingly high figure dairymen will be great losers, as the produce per cow is in most cases very little a third below the average. This is the third midding season farmers have had to contend with. Let us hope that the year 1871 may be one of prosperity and peace to us all. *F. W.*

ISLE OF ELY: Jan. 13.—The winter of 1870-71, since us of the winter of 1860-61. The severe weather commenced about the same time both winters, and the continuance of frost, with abundant skating and closed navigation this year, recalls similar events of 10 years ago. At the former period the frost was more intense and the cold more bitter, but there is nevertheless great similarity in the two seasons. Some fears have been expressed as to the safety of the Fen Wreaths. In many localities there has been a good crop of snow, in some places to a depth of 6 or 8 inches, whilst in others there has only been one or two; this all disappeared a week ago, and there seemed the appearance of a general thaw, but since that time frost has again set in, and the ground is once more slightly covered with snow, but not sufficiently deep to afford much protection to the Wheat plant. The flag is cut a good deal, and presents a brown rusty appearance, but we must wait until the frost is gone to ascertain correctly to what extent the plant is injured. The continued frost makes work very scarce, and it is with great difficulty that labourers can be kept employed. Threshing-machines and manure-carts may be seen working in every direction; a great move is being made amongst the corn-stacks, and the increased supplies at market are operating unfavourably upon prices, from the producers' point of view. Spring corn is realising less money than the short hay crop led one to anticipate. Early and Oats are very nearly the same price per ton, although the respective feedings value are so very different. Green food is going rapidly into consumption, and ere spring rains will be getting scarce, and flockmasters will not unlikely be driven to great straits, unless the early spring months are unusually propitious. Meat has sold at high prices, and although the trade just now is dull, there is nothing very cheap to be found. Lean animals are very dear, and fetch high prices. *Your Pen Reporter.*

Miscellaneous.

THE FARM AND THE MAN.—It may be important to consider which is first and most important, the man or his farm. It is certain that the farm, as land and water, rock, and manure, existed long before he did; but it may not have been a farm till he made it so. If he is the maker of the farm he is evidently the most important, for the thing made cannot well be superior to its maker. The maker must hold the first rank. But it strikes us that there is a mutual relationship between the man and his farm which should be recognised, and which makes each partly dependent upon, and partly the maker of the other. The man must return to make the farm what he will; he must return to make the man—that is, if he cultivates it intelligently, thinks, reasons, experiments as becomes a rational being, improves his soil, his stock, his grain, his fruit; learns the nature and habits of the things he cultivates; knows why he does everything—such attention to his farm will remodel the man and cultivate him as much as it does the farm. When a man studies law and practises it intelligently, the profession will give strength, culture, force, and power of will to the man—thus, his profession will make him—make him a man of a different stamp than he would have been without the study and energy put into it. The study and practice of medicine makes the physician. Divinity makes the divine. In each of the professions men are made by them, because they each require study in their acquirement and intelligence in their practice. Our great men are chiefly from the learned professions as they are called—and it is so simply because they are learned professions. They require a great deal of mental labour and reason; they exercise the mind; they stretch the muscles; they harden the sinews; they solidify the bones. The professions do much towards making the great men that

are found in them. So it should be with the farming profession. The farm should make men—great men—as well as the bar and the desk; and it will, if it is regarded and treated in the same way. Let our young farmers be taught and prepared for their duties. Let them study the profession; read the authors on the scientific farming, on agricultural chemistry, on the earth, the soil, stock, fruits, grains, vegetables, and then on the practice of farming; and when they are thus well prepared, let them continue their researches in all their practical operations, and the farm would soon turn out more great men than any other one place of human exertion. When as much intelligence is exercised on the farm as in the other professions, it will produce as many great men as the other professions will, exercised in any other way. The lawyer, doctor, and divine have each their library—where is the farmer's? Those farmers who have good agricultural libraries are among our best men. Let the farmer make his farm in the light of the best intelligence that relates to the subject, and his farm will make him a man of the first stamp.

The Week's Work.

JANUARY 21.—*Lime Compost*, where required for early spring application, should now be in readiness. The large quantities of bone manure, superphosphates, and artificial fertilisers containing calcareous matter, now used in arable husbandry, supply lime to the different crops grown in rotation; but land lying in permanent pasture may need to be supplied with lime to supply what is annually taken from it in the hay and corn consumed by cattle. If lime, therefore, is naturally deficient in the land, it must be supplied artificially; and this, in the majority of cases, is best done in the form of lime compost applied in early spring, just before the grass begins to grow. In forming such compost, all sorts of earth containing vegetable matter is collected into hills and mixed with lime. Thus, the earth which the ploughs bring out on the lower land's end accumulates first when the field lies at a considerable inclination, affording a spit deep in a few years; when in frosty weather is carted into a hill, where it lies, and when mixed with the scourings of ditches and parings from the road-sides, may require to be turned once or twice before it is mixed with lime in the process of turning. There is no rule as to the quantity of lime required for a cubic yard of earth, such depending upon the nature of the land and the effect the farmer wishes to produce. Some mix a bushel of shells from the kiln to a cartload of earth—some less, others more. In the form of compost a very small quantity of lime will produce a favourable effect when applied to grass land in need of it, and well harrowed in to the roots of the grass. In those cases where previous liming has been neglected, and where much Moss and effete vegetable matter accumulates both above and below, with bottom sours, the effect the farmer may require to be early half-and-half, the compost having a whitish appearance when spread. Some apply large doses of lime compost, well harrowed in, before sowing spring corn, and on soils requiring lime, which are generally infested with insects and weeds, it often has a very beneficial action in keeping down both pests, as well as in promoting the early growth and ripening of the crop. Unless for some cold soils, a small quantity of coarse salt should be mixed in the compost, at the rate of 5 cwt. to 10 cwt. per acre, and even at the rate of 20 cwt. to some poor soils.

Ribbing or Rafter-ploughing and Cross-ploughing have become exceptional practices in spring following, both having been superseded by smashing. The former, however, is becoming more general in autumn by means of ridge-ploughs, but for a different purpose as compared with the old plan; and sometimes the ridges or stretches may be split at this season, prior to smashing for spring corn or green crops. The old plan was to rafter-plough in autumn, with the view of preserving a bone in light friable soils, and to keep damp-bottomed land high and dry for early spring following. The modern plan is to ridge up heavy soils and all land requiring exposure to the winter frost. Where it is intended to plant Beans towards the close of January or early next month, on land manured in the autumn, it is seldom advisable to split the stretches just now; but in places where manure could not be, or was not applied in the autumn, and where a spring fallow is necessary to prepare the land for manure, the best plan may be to split the stretches as early this month as the land will permit, following up the after operation according to the weather, using artificial manure in preference to farmyard as the crops and land require.

Turnip Land.—Plough or rib as the crop is cleared off, either by folding or cutting to the surface, and, if the weather permitting, Dry open soils are generally ploughed, but wet-bottomed land may be kept drier by ribbing or "rafter-ploughing," as it is termed in some places. The latter class of soils, whether the Turnips are carted off or consumed by sheep, is for the most part less or more poached, and the harm thus done is rectified more effectually by the weather, when it is high and dry in stretches, than when ploughed; and besides exposure of the poached land to frost and air, in wet weather the manure on the land is better protected, whether the land is thoroughly

drained or not. When water flows between the stretches, the land should be properly water-furrowed. In early seasons these stretches may be turned upside down by the end of the month or beginning of next, and in late seasons up to the early part of March, to expose the bottom to the weather, and afterwards smashed across to prepare it for seeding.

Water Furrows. In Wheat or ploughed lands, go over after every storm or thaw; even in grass land stagnant water should not be seen. Examine also the drainage, as directed last month.

Hedges.—Finish planting, pleaching, filling up gaps, and dressing. Gaps that cannot be closed by pleaching should be filled up, if possible, from old fences being stubbed up or which are intended to be so, taking care to select healthy plants. Where the gaps are wide and the hedge unhealthy on either side, examine the roots, and if rot has commenced, it is better to stub up the whole of the unsound. Trench deep, manure and lime the land when lime is required, and plant young Quicks. Short gaps may be filled up with young plants in the same way, but when the hedge is not pleached, the full-grown plants on either side require to be sloped off from the gap, to prevent "drip," which invariably kills the young plants, and the roots of the old plants should be cut away, so as not to rob the young plants next time. Where gaps and rottenness are occasioned by moorland or insufficient depth of soil, the moorland in the former case should be removed, and fresh soil applied in the latter to increase depth. Chalk and some other rocks can sometimes be dug out, so as to let down the roots; and when this can be done it is preferable to raising a hill above the common level. All hedge plants, from being grown close together, suffer from two causes—an excess of drip and root secretion, and for this a dressing of lime well dug in is generally the best corrective.

Store Cattle now begin to require careful attention in the dietary and grooming, to keep bone and muscle growing proportionally, and also to avoid surfeit and its many consequences under high feeding, and so on. *W. B.*

Markets.

ENGLISH WOOL.

There has been a very strong market both for English and foreign wools, and prices are in every case the turn higher, whilst stocks are diminishing, and holders consequently look for a yet further improvement. Most kinds of foreign wool which compete with English skin wool and the lower grades of fleeces are now to 10 per cent. dearer than they were three months ago.

HOPS.

BOROUGH MARKET, Jan. 18.

The market is very firm, fully sustaining the recent advance in the prices of English Hops, and at the same time the demand for Bavarian and Bohemian Hops has increased. American 1869 are commanding a rise of 2s. per cwt.

HAY.—Per Load of 36 Trusses.

SMITHFIELD, Thursday, Jan. 19.	
Prime Meadow Hay, 130s. 1040s.	Clover, old 135s. 145s
Infior do. 110 120	Infior do. 115 125
New Hay	Infior do. 120 135
Infior do.	Infior do. 105 115
Straw 30 40	

CUMBERLAND MARKET, Thursday, Jan. 19.	
Sup. Meadow Hay 135s. 1047s.	Infior Clover 126s. 10132s.
Infior do. 125 135	Prime do cut
New do.	New do.
Infior do.	Straw 42 46
Superior Clover .. 138 147	

METROPOLITAN MEAT MARKET, Jan. 19.

Best Fresh Butter	20s. per dozen lb.
Second do. do.	18s.
Small Pork, 4s. 2d. to 5s. 2d.; Large Pork, 3s. 8d. to 4s. 6d. per 8 lb.	

METROPOLITAN CATTLE MARKET.

MONDAY, Jan. 16.

The number of Beasts is small, but the demand is also very limited; our highest quotations are only reached for choicest qualities, and a clearance cannot be effected. There is also a short supply of Sheep, and a very small demand; trade for everything is very dull, and prices generally have a downward tendency. Good Calves are scarce and dear. Our foreign supply consists of 190 Beasts and 250 Sheep; from Scotland there are 204 Beasts; from Ireland, 700; from Norfolk and Suffolk, 1130; and 876 from the Midland and Home Counties.

s. d.		s. d.	
Best Stoks, Herefords, &c. .. 5 8 6d		Best Long-wools .. 4 10s 8	
Best Shorthorns .. 5 6-8		Do. Shorn .. 3 6-4	
Best quality Beasts .. 8 5-0		Ewes & ad quality .. 3 6-4	
Best wethers		Lambs	
Half-breds .. 5 8-10		Calves .. 3 8-6	
Do. Shorn		Pigs .. 3 8-8	
Beasts, 300; Sheep and Lambs, 13,000; Calves, 21; Pigs, 140.			

THURSDAY, Jan. 19.

The supply of Beasts exceeds the demand, and prices are on the average lower; indeed, middling qualities can scarcely be disposed of. The Sheep market is very unimportant, but as regards supply and demand. There is nearly any business, and the quotations are not nominal. Calves are in demand, and command high

other plants."—GEO. FYLES, Superintendent, Royal Horticultural
Gardens, South Kensington. May 7, 1868.
Sole Manufacturer,



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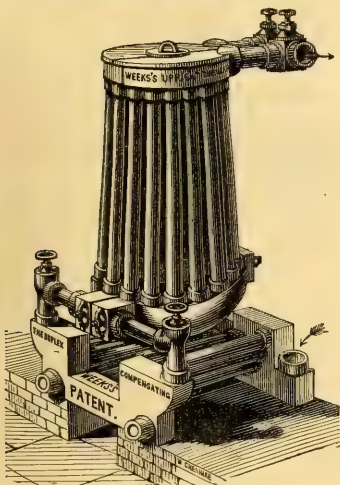
20 YEARS GOOD CHARACTER.
20 YEARS CONTINUOUS TRIAL.
20 YEARS SEVERE CRITICISM.
20 YEARS SPLENDID SUCCESS.
20 YEARS UNMATCHED FOR POWER.
20 YEARS WORKING LARGEST OPERATIONS.
20 YEARS HIGHEST RECOMMENDATIONS.

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2A, PORTOBELLO TERRACE, NOTTING HILL GATE, LONDON, W.,

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The Engraving 54 is an example of our mode of fixing. The wires are supported by Vertical Iron Bars projecting from the Wall, to which are added arms firmly cemented in the Wall, holes being bored for passing the Wire through at such distances as shall be decided on by the purchaser; one end of the Wires is attached to a Winding Ratchet, the remaining being securely fixed so that in case of strain the Wire can be tightly drawn at will.

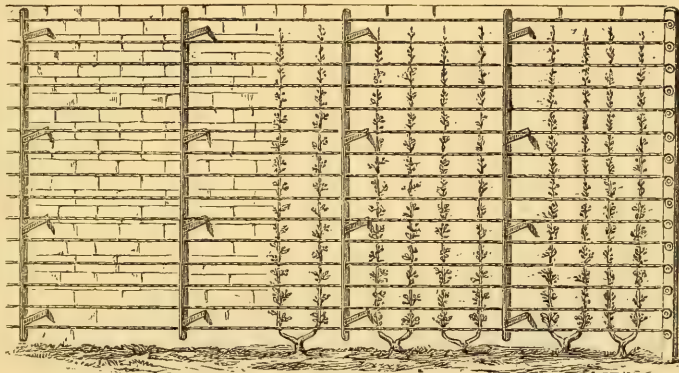


Figure 54.

This system is recommended for durability and economy by the saving of labour (*vide* W. Robinson on "Paris Gardening") and the cost in the purchase of Nails and Shreds, besides the future repairing of the Walls, occasioned by the disfigurement which the constant use of the latter creates.

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and	0 11	1 5	1 11
ELBOWS, No. 11	1 0	1 9	1 6
T-PIES, No. 33	2 0	2 10	3 0
SYPHONS	1 4	4 4	3 8
VALVES	1 0	1 10	1 10

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 RAMPIO, 1 pkt.
 TOMATO, 1 pkt.
 CAPSICUM, 1 pkt.
 CORN SALAD, 1 pkt.
 ORACH, 1 pkt.

From Mr. JNO. AKERMAN, Wilney.

"I obtained a Silver Cup for the best collection of vegetables last year from your seeds."

MESSRS. SUTTONS' COLLECTIONS are made up of the best selections at very moderate Prices, full particulars of Choice Vegetable and Flower Seeds will be found in SUTTONS' AMATEURS' GUIDE, price 1s., Gratis to Customers; or, SUTTONS' ABRIDGED SEED LIST, Gratis and Post Free on application.

SUTTONS'

£2 2s. COMPLETE COLLECTION

of CHOICE VEGETABLE SEEDS for a MEDIUM-SIZED GARDEN, forwarded Carriage Free, contains—

PEAS, the best, 12 quarts for succession, including Suttons' Kingmaker.
 BEANS, 4 quarts, including Suttons' Improved Windsor.
 FRENCH BEANS, 3½ pints, best kinds.
 BEET, 1 oz., Suttons' dark Red.
 BROCCOLI, 3 pts., best kinds.
 BRUSSELS SPROUTS, 1 large pkt.
 RADISH, 21 oz., for succession.
 SPINACH, 3 pts., summer and winter.
 SALSIFY, 1 large pkt.
 SCORZONERA, 1 ditto.
 TURNIP, 16 oz., for succession.
 VEGETABLE MARROW, 1 large pkt.
 HERBS, 6 pts., best sorts.
 RAMPIO, 1 pkt.
 TOMATO, 1 pkt.
 CAPSICUM, 1 pkt.
 CORN SALAD, 1 pkt.
 ORACH, 1 pkt.

From Edward CARRO, Esq., Albert Institution, Glamorgan.

"Permit me now to compliment you on the success attendant here on your seeds, far greater than with any others had from other parties."

SUTTONS'

£1 1s. COMPLETE COLLECTION

of CHOICE VEGETABLE SEEDS for a SMALL GARDEN, forwarded Carriage Free, contains—

PEAS, the best, 6 quarts for succession, including Suttons' Kingmaker.
 BEANS, 2 quarts, including Suttons' Improved Windsor.
 FRENCH BEANS, 1½ pint, best kinds.
 BEET, 1 pkt., Suttons' dark Red.
 BROCCOLI, 2 pts., best kinds.
 BRUSSELS SPROUTS, 1 pkt.
 CABBAGE, 5 pts., best for succession.
 SAVOY CABBAGE, 2 pts., ditto.
 CARROT, 3 oz., best sorts.
 CAULIFLOWER, 1 pkt., Early London.
 CELERY, 2 pts., best, Red and White.
 COUVE TRONCHUDA, 1 pkt.
 TOMATO, 1 pkt.
 VEGETABLE MARROW, 1 pkt.

From RICHARD STURGE, Esq., Shirley Warren, Southampton.
 "I cannot speak too highly of the collection of seeds you sent me, and my Gardener is equally pleased."

From Mr. DANIEL BOOTE, Oakfield.

"I had your Guinea Collection of Vegetable Seeds, and I have great pleasure in saying they proved most excellent. In fact my Gardener says he believes that not one seed has missed. Certainly I never had anything so good before."

THE HEAVIEST CROPPING AND BEST COOKING LATE POTATO IS

TESTIMONIALS.

From Mr. W. F. BENNETT, Steward to Lord Norbury, Valenciennes, Wetherham.

"Oct. 26.—The Flourball Potato is of first-class quality, a great cropper, and quite free from disease."

From Mr. JOHN HALLAM, Bolton.

"July 31.—I never had seeds that gave me half the satisfaction. I gained first prize with your Red-skinned Flourball Potato. Thirty computed."

From Major CLARKE, Wilton Park, Devon.

"Oct. 26.—The Red-skinned Flourball Potato is very prolific, quite free from disease, very handsome, and beautifully white."

From Colonel J. LE COUVEUR, Belle Vue, Jersey.

"Oct. 26.—Half-a-peck of Red-skinned Flourball Potatoes produced 18½ lb. weight; they are a fine size, excellent and mealy; floury; no sign of disease."

From JOHN E. STANIER, Esq., Uppington, Wellingham, Salop.

"Nov. 2.—I consider your Flourball Potato the best I have ever grown, both as to quality and quantity; they are quite free from disease, and remarkably uniform in size, with a shallow eye and fine clear skin."



SUTTONS' RED-SKINNED FLOURBALL.

Introduced by them last season.

This extraordinary Potato has given the most complete satisfaction. It produces very large tubers, and while most other red varieties blot yellow, this is white, of particularly fine flavour, and is most correctly described as "Flourball." For supplying the London dining-rooms especially, we feel confident it will supersede every other kind when sufficiently known. In a field where many other sorts were all more or less diseased, our "Red-skinned Flourball" was entirely free, which we can only attribute to its remarkably vigorous growth.

Lowest Price per Bushel, Sack, and Ton may be had on application.

SUTTONS' GRASS SEEDS FOR ALL SOILS.

FOR PASTURES.

FOR PARK GROUNDS.

FOR GARDEN LAWNS.

Improvement of Grass Lands by Sowing

SUTTONS' RENOVATING MIXTURE IN THE EARLY SPRING MONTHS.

A great improvement in the quantity and quality of this year's Hay Crops may be effected by sowing the above, costing from 4s. 6d. to 9s. per acre.

For complete information as to the Formation and Improvement of Pastures, apply to

SUTTON AND SONS, SEEDSMEN TO THE QUEEN, READING.

THE HORTICULTURAL GAZETTE.

No. 4.—1871.]

SATURDAY, JANUARY 28.

Registered at the General Post Office as a Newspaper. Price 5d. POST FREE, 5d.

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Notice.

THE GARDENERS' CHRONICLE AND AGRICULTURAL GAZETTE, for FEBRUARY 4 will contain a PORTRAIT of W. WILSON SAUNDERS, Esq., F.R.S., Vice-President of the Royal Horticultural Society. Free by post, 5d.

Notice.

GARDENERS' CHRONICLE AND AGRICULTURAL GAZETTE. The VOLUME for 1871 is now ready, in cloth, 6s. 6d. W. RICHARDS, 41, Wellington Street, Strand, W.C.

NOTICE TO SUBSCRIBERS.—On and after this date the SUBSCRIPTION to the GARDENERS' CHRONICLE and AGRICULTURAL GAZETTE will be 6s. 6d. per annum, including postage, instead of 5s. 6d., as heretofore. Subscriptions may be had of all Booksellers.

Published by W. RICHARDS, 41, Wellington Street, Strand, W.C. October 1, 1870.

ZOOLOGICAL GARDENS, CLIFTON.

HORTICULTURAL MEETINGS, 1871.
SPRING SHOW, THURSDAY, JUNE 25.
ROSE SHOW, THURSDAY, JUNE 26.
Schedules of the above shows may be obtained on personal application at the Gardens; Mr. D. BASKERVILLE, Nurseryman, top of Park Street; Messrs. HUNTER and CO., Seedsmen, Clare Street; or by letter addressed to the Secretary, Zoological Gardens, Clifton.

SPALDING FLOWER, FRUIT, &c., SHOW will be held on THURSDAY, June 25, 1871. Schedules in February on application to GEO. F. BARKELL, Hon. Sec. Schedules of FOWLTRY show at same time and place of Feb. 25, 1871. J. W. BARKELL, Hon. Sec.

Verbenas, Verbenas.
WILLIAM BADMAN offers strong Plants of PURPLE, WHITE, and SCARLET VERBENAS, with plenty of cuttings, at 1s. 6d. per packet, post free. Terms Cash. Cemetery Nursery, Gravesend, S.E.

Verbenas, Verbenas, Verbenas.
PHILIP LADDS is now sending out PURPLE, WHITE, and SCARLET VERBENAS, with plenty of cuttings, at 3s. per dozen. Nursery, Bexley Heath, Kent.

Pyrethrum Aureum, or Golden Feather.—The Advertiser begs to offer new Seed, at 6d., per lb. per packet, post free. Price per ounce on application. JOSEPH MAY, Seedsmen, 35, Bridge Street, Covent Garden, W.C.

British Fern Catalogue.
ROBERT SIM will send, post free for six postage stamps, Part I. (British Ferns and their varieties, 26 pages, including a list of the PRICED DESK CATALOGUE OF BRITISH and EXOTIC FERNS, No. 7.

Quick, for Hedges: Large Elm and Alder.
PAUL and SON, the Old Nurserymen, Cheshunt, N. have to offer QUICK, strong, 3yr. in drill, 10s. per 1000; ditto, ELM, 4 to 7 feet, per 1000. ALDER and WYCH, 4 to 7 feet, per 1000.

ARCH, 2-yr. transplanted, stout, 9 to 15 inches, 12 to 18 inches, 14 to 15 to 21 inches, 10s. per 1000.
BARKER'S ACQUILA, 1 1/2 to 2 feet, 25s. per 1000.
BARKER'S ACQUILA, 1 1/2 to 2 feet, 25s. per 1000.

Special Offer.
LARGE COMMON LAURELS, 6 to 8 feet, very bushy, good colour, more well, 1/6 per 1000.
LAURELS, 4 to 5 feet, good balls, full of bloom buds, much harder than the Trade, 4s. per 1000.
W. KNIGHT, Floral Nursery, Hailsham, Sussex.

Surplus Bulbs, Cheap.

HYACINTHS, TULIPS, CROCUS, NARCISSUS.
BARK and SUGDEN, 12, King Street, Covent Garden, W.C.

COLLECTIONS OF RULBS and SPRING CLOWERING PLANTS.—Full particulars are given in large Advertisement, p. 159 of *Gardener's Chronicle*, Dec. 10, 1870.

SPRING FLOWER GARDENS.—Those who are planting large quantities of Bulbs and of Spring flowering plants, can have special advantageous offers of such. See p. 169, *Gardener's Chronicle*, Dec. 10, 1870.

WEBB'S NEW GIANT POLYANTHUS.
Flourish Flower, and GIANT COWSLIP SEEDS; also Plants of all the varieties, with Double PRIMROSES of different colours; ARICULAS, both Single and Double; with every sort of Early Spring Flowers. LIST on application. W. WEBB, Calcut, Reading.

FRUIT TREES.
JOHN FRASER, Lea Bridge Road Nurseries, Leyton, E., has still on hand a large number of fine standard PEARS, which he can offer at the Trade at a moderate price. The sorts are such as Marie Louise, Williams' Bon Chrétien, Louise Bonnet, Beurré Hardy, Beurré Diel, Duchesse d'Angoulême, Napoleon, &c.

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CARTER'S GENUINE SEEDS, carriage free. See p. 68 of last week's *Gardener's Chronicle*.

JAMES CARTER AND CO. 239 and 240, High Holborn, London, W.C.

CARTER'S GARDENER'S and FARMER'S VADE MECUM is now ready, and should be consulted by all who possess a garden. Post free, 12s. 1s. 6d. to purchasers.

JAMES CARTER AND CO. 239 and 240, High Holborn, London, W.C.

New Seeds.
BOLTON and CO. beg to announce that their stock of New SEEDS is now complete, comprising all the novelties for the Kitchen Garden, Flower Garden, and Field.

New and Unadulterated Seeds.
WITTY and SON'S PRICED CATALOGUE of the above is now ready, and he had post free on application.

New and Unadulterated Seeds.
PURCHASERS of large quantities of SEEDS and POTATOS will be supplied on liberal terms on application by post or otherwise (tinting quantities required) to SUTTON and SON'S, Seed Growers, Reading.

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For packets of the above in mixed colours, see Catalogue, p. 39.

Stocks.

Dwarf German Ten-Week, in 12 distinct colours, separate 2s. 6d.
Large-flowering German Ten-Week, in 12 distinct colours, separate 2s. 6d.
Large-flowering German Ten-Week, in 12 distinct colours, separate 2s. 6d.
Earliest flowering Autumn, in 6 distinct colours, separate 2s. 6d.
Imperial, in 8 distinct colours, separate 2s. 6d.
Brompton, in 12 distinct colours, separate 2s. 6d.
Cucurbit, or Giant Cape, in 6 distinct colours, separate 2s. 6d.
For packets of the above in mixed colours, see Catalogue, p. 39.

Antirrhinums.

From Mr. Cox's splendid collection, see *Gardener's Chronicle*, 1868, p. 820.

Assortment of 18 finest varieties, separate 2s. 6d.

Balsams.

Smith's Camellia-flowered, in 12 distinct colours, separate 2s. 6d.

Camellia-flowered or Bloated, in 8 distinct colours, separate 2s. 6d.

Rose-flowered, in 8 distinct colours, separate 2s. 6d.

Carnas.

Assortment of 12 finest varieties, separate 2s. 6d.

Assortment of 18 finest varieties, separate 2s. 6d.

Carnations and Picotees.

Perpetual Flare, in 12 varieties, separate 2s. 6d.

Perpetual Flare, in 12 varieties, separate 2s. 6d.

Picotees, white ground, in 12 varieties, separate 2s. 6d.

Picotees, yellow ground, in 12 varieties, separate 2s. 6d.

Perpetual or Tree, Self, in 12 varieties, separate 2s. 6d.

Perpetual or Tree, Self, in 12 varieties, separate 2s. 6d.

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Dwarf varieties, in 12 distinct colours, separate 2s. 6d.

Cyclamen persicum.

Assortment of 6 varieties, separate 2s. 6d.

Double Helichrysiums.

Assortment of 10 splendid varieties, separate 2s. 6d.

Parsons' New White Mignonette.

RESEDA ODORATA EXIMIA.

Mr. Parsons avows the public that this new Mignonette is a great acquisition, and cannot fail to take pre-eminence of all others. It has been awarded First-class Certificates by the Royal Botanic Society, the Royal Horticultural Society, the Crystal Palace Show, and the Brighton Horticultural Society. Per packet, 2s.

Reseda odorata meliorata.

This new Mignonette is quite distinct from, and far superior to, the old large flowered variety, on account of its giant pyramidal growth, and its remarkably large flowers, which are of an orange-gold colour. Per packet, 6d.

Solanum Warscewiczii.

A magnificent plant, with immense lobed leaves, of a deep green colour. It attains an average height of 6 to 8 feet, and when planted in masses produces a grand effect. It is probably the best of the large-leaved Solanums yet introduced. Per packet, 1s.

Statice spicata.

This charming Caucasian species is of annual duration, flowering early in the season, and continuing to flower a very long time. The leaves are pretty semi-pinnatifid, situated, of a lively emerald-green, forming a spreading tuft out of which rise a multitude of cylindrical ear-like spikes, partly undivided, or more or less branched in a pyramidally-arranged fashion, closely set with flowers of a lovely rosy pink colour. The whole plant represents a graceful sub-pyramidal bouquet about one foot in height, of exceedingly handsome shape. It is very free in the beds or edgings, succeeding in common garden soil. Per packet, 1s. 6d.

Stock East Lothian.

This magnificent variety is of dwarf and compact habit, furnishing itself with immense Hyacinth-like spikes of bloom. Mr. Thomson, formerly of Richfield Gardens, who has grown it very extensively, describes it as unrivalled amongst effective bedding plants, and if grown in a rich soil it will keep up a succession of bloom from July till the end of November, after which the plants may be potted and kept to make a further display the following summer. Per collection of three colours (scarlet, white, and purple), separate, 2s. 6d.

Belvoir Castle Dwarf Yellow Wallflower.

Of a dwarf compact habit, having a dense bright green appearance during the winter, followed by an abundant display of bright clear yellow blossoms during the spring months; the flowers are large and well-shaped, and the seedlings are very robust, making the beds or borders where spring gardening is carried out. Per packet, 1s.

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Assortment of 25 best varieties, separate 2s. 6d.

Assortment of 12 best varieties, separate 2s. 6d.

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Saved from a choice collection, in 12 named varieties 2s. 6d.

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Assortment of 12 finest varieties, separate 2s. 6d.

Larkspurs.

Double Dwarf Rocket Hyacinth-flowered, in 10 distinct varieties 2s. 6d.

Double Dwarf Ranunculus-flowered, in 6 distinct varieties 2s. 6d.

Double Tall Stock-flowered, in 12 distinct varieties 2s. 6d.

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Assortment of 12 finest varieties, separate 2s. 6d.

Ornamental Grasses.

Collection of 50 finest varieties 2s. 6d.

Collection of 25 finest varieties 2s. 6d.

Collection of 12 finest varieties 2s. 6d.

Ornamental Gourds.

Collection of 24 finest varieties 2s. 6d.

Collection of 12 finest varieties 2s. 6d.

Giant Gourds.

Collection of 12 finest varieties, separate 2s. 6d.

Petunias.

Assortment of 12 varieties, separate 2s. 6d.

Phlox Drummondii.

Assortment of 12 finest varieties, separate 2s. 6d.

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Peony-flowered, in 10 distinct colours, separate 2s. 6d.

Carnation, in 12 distinct colours, separate 2s. 6d.

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Double-flowered, in 6 finest varieties, separate 2s. 6d.

Single-flowered, in 8 finest varieties, separate 2s. 6d.

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Assortment of 10 finest varieties, separate 2s. 6d.

Scabious.

Large-flowered, in 8 distinct colours, separate 2s. 6d.

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Assortment of 12 best varieties 2s. 6d.

Assortment of 24 best varieties 2s. 6d.

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German, double, in 10 splendid varieties 2s. 6d.

Zinnia elegans.

Double-flowered, in 8 distinct colours, separate 2s. 6d.

Single-flowered, in 6 distinct colours, separate 2s. 6d.

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SWEET WILLIAM - Perpetual flowering, 6d. and 1s. 6d.
THALICTRUM MINUS - Elegant Fern-like leaves 1s. 6d.
VIOLA LUTEA GRANDIFLORA PERFECTA 1s. 6d.
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SUTTONS' IMPROVED WHITE SPROUTING BROCCOLI.
Vide *Gardeners' Chronicle*, p. 76. 1s. 6d. per packet.



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READING ONION,
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1s. per ounce.

For descriptions of the above, and complete LIST of KITCHEN GARDEN SEEDS, FLOWER SEEDS, and CHOICE POTATOS for Planting, see

SUTTON AND SONS,
SEEDSMEN TO THE QUEEN. READING.

In determining the rate of transmission of fluids through plants, a solution of lithium citrate was employed. The branch under examination was placed in this solution, and allowed to remain in it, exposed to the sun, for periods varying from 10 to 70 minutes; it was then cut into pieces, each piece consisting of a leaf and an internode, which were numbered, measured, dried, and weighed, then reduced to ash, the ash treated with hydrochloric acid, and finally examined by the spectroscopic, which revealed the presence of the lithium. In this manner it was found that in the course of 70 minutes the lithium solution must have traversed $8\frac{1}{2}$ inches, the branch in question being exposed to the sun, and a corresponding branch placed by its side was found to have transpired at the rate of 7.58 per cent. per hour. In other cases between 9 and 10 inches must have been traversed in 30 minutes. In another instance $4\frac{1}{2}$ inches of stem were traversed in 10 minutes.

The last series of experiments was undertaken with a view of ascertaining the relative influence of various gases on transpiration. The branches were placed in vessels containing different gases, and the amount of transpiration measured. From these experiments it results that leaves transpire most in an atmosphere of oxygen, less in atmospheric air, and least of all in nitrogen.

We are led to infer, from certain statements in Dr. McNAE's paper, that he is likely to carry on further experiments in this most interesting and important field,—an intimation that will be received with lively satisfaction by those who know how much remains to be done, and how very few workers we have had in this department in England. The paper from which we have condensed the preceding remarks, is a mere record of the mode of performing the several experiments, and the results obtained from them. Some of these experiments are repetitions of those performed by others, and the results obtained are similar to those already known, while no pains have been taken by Dr. McNAE to indicate (except in the case of the spectroscopic experiments) those for which he is specially and primarily responsible. It is to be hoped in future that Dr. McNAE will append to his paper such references to the literature of the subject he has in hand, as may enable the student to ascertain what has been done before, how far Dr. McNAE's researches are confirmatory or the reverse of the labours of his predecessors, and what are the special gains to our knowledge which we owe to the author himself.

WE wonder how many readers of the *Gardeners' Chronicle* are without Hyacinths, or other SPRING BULBS, now growing in glasses at their windows, or on their chimney-pieces. Judging from our own observation, we should say that the number must be very small. We feel sure that nine-tenths of those interested in horticulture, or loving flowers, have expended a few pence or a few shillings on bulbs. But there is another piece of statistics which we should also like to get at. How many of these nine-tenths, or whatever be their numbers, of bulb growers in houses grow anything but Hyacinths, Narcissus, early Tulips, or Crocuses, in glasses? Shall we say one in ten, one in a hundred, or one in a thousand?—or shall we be driven to say, none at all? We are afraid it would turn out to be so. It is not everything that will grow in glasses, or at least grow well, and we have got into the stereotyped routine of Hyacinths and Narcissus, and Narcissus and Hyacinths—like the Spaniard, who, when boasting of the great wealth of literature in his country, being asked to particularise, cited "Don Quixote" and "Gil Blas," and when further pressed, instanced "Gil Blas" and "Don Quixote." But it is not necessary that our choice should be so limited, and more than the Spaniard's. If we looked about a bit we could find new roots for ourselves that would suit, and if our powers of adaptation are greater than our originality, we can copy from other countries who have saved us the trouble of finding them out. In Chili, for example, the *Convolvulus Batatas* is very generally grown in common Hyacinth glasses or other glasses, exactly as we do Hyacinths. One tuber will be put on each side of the window, and the plants creep up and unite overhead, forming a beautiful green frame illustrated by handsome flowers. We are told that other showy flowering plants are grown in the same way in Chili and Peru, although our informant, not being a

botanist, was unable to do more in the way of precision than to specify the sweet Potato. But we read in Mr. MIERS' admirable account of Chili and La Plata, which although now old applies almost as well to the present date as to 1820, when it was written, that in La Plata the parasitic plants are used for similar purposes (of course without water). Let us turn the passage up for the reader. "At San Luis" (in the Pampas) "we found great varieties of Tillandsias and other parasitic plants, better known in the houses of Buenos Ayres under the name of 'air plants,' which, without any earth about their roots, but merely tied to the iron grating of windows and balconies, will continue alive, and flower for many successive years."

These may not do for our living rooms, but they might surely help to decorate our conservatories; and as to the Batatas there is nothing to hinder it being grown successfully in every house in London.

We sympathise very heartily with those who like their bulbs in glasses rather than in flower-pots. We do not say that we do not sympathise with those who prefer the latter—we sympathise with both, and like to see both; but we know that many, who if there were no other glasses would have no Hyacinths, and for their sake, as well as for the beauty and cleanliness of that mode of culture, we would gladly do anything in our power to encourage it, and for that reason we invite them, and what is more to the purpose, their purveyors, to exercise their ingenuity in extending the field of their operations and multiplying and varying the objects of their care.

— THERE are many, very many, in whose memories the following letter relating to CHISWICK will find a responsive echo:—

"I was perfectly astounded when I heard it announced last year, at the anniversary meeting of the Horticultural Society, that the Council had for some time past seen the necessity of changing the experimental garden from Chiswick to some locality more suited for their operations:—the result of the cultivation there was yearly becoming less satisfactory, while the expenditure entailed by the establishment was constantly being increased. So unexpected was this announcement, that it took the meeting by surprise, and led to an animated discussion, in which it was evident the general feeling was against the proposition, until the Fellows had had time to consider the question. It was eventually agreed to leave it in the hands of the Council, with the hope that they would endeavour to see if some arrangement could not be made so as to render it necessary for removal."

Having been connected with the Society almost from the day they obtained the lease of the ground, and commenced the formation of the garden at Chiswick, I could not help regretting, after all the vicissitudes I had known it to pass through successfully, that circumstances should at last have rendered it necessary for the Council to resort to the determination of abandoning their garden, on which vast sums had been expended, and where so much had been done to stimulate and encourage a taste for horticulture in all its branches. From a financial point of view, perhaps, there was no alternative, but to me it appeared to be a mistake, and I felt confident that time were allowed for reconsideration, some plan would be devised to get over the difficulty. Happily this has been done—and that, too, in such a manner as I think will meet with general approval, from its relieving the Society of a portion of the heavy weight which has since it entered upon so large a garden without having sufficient means to support it. In so far as I may offer an opinion from personal inspection of the works in progress, and a practical knowledge of the extent and requirements of such an experimental garden as the Royal Horticultural Society ought to possess, I have no hesitation in saying that, when the well-considered alterations and additions are completed under the able direction of Mr. BARRON, they will render the Chiswick Garden not only more complete and less expensive to keep, but far more convenient and useful for carrying out the purposes of the Society.

"There are many, perhaps, who will fall to see in the new arrangements any advantage to the Society, on finding they involve the loss of the orchard and arboretum, but these are unavailable. The sacrifice, however, is not so great as it at first appears. With regard to the orchard, every one conversant with hardy fruits will admit it has done good service, and been the means of bringing into notice, and enriching our gardens with most of the fruits which are the arboreal varieties of fruit in the collection that are now in general cultivation. Although this department is to be given up, it must not be supposed that the collection it contained will be lost, as due precautions have been taken to secure young trees, all of which will be reserved as soon as the ground allotted for them is fit for their reception."

"For more than 40 years the orchard was under the charge of the late Mr. ROBERT THOMPSON (well known as one of the first pomologists of his day), who was enabled after careful examination and comparison to select and rear all the varieties of fruit in the collection, under the respective names by which they are most generally known. This is shown in the Fruit Catalogue of 1842 that he prepared, and which is really one of the most useful publications ever issued by the Society."

"In the arboretum, I have no doubt, we have lost, regretted, especially by those who can remember the grand fêtes and splendid fruit and floral exhibitions that

were formerly held in this part of the garden. To me it has invariably recalled some pleasing reminiscences of bygone days. When it was designed in 1824, it was considered a novelty, little interest at that time being taken in any other than those with which all are so familiar who know anything of living in the country. The Royal garden and pleasure grounds at Kew, to which the public are now permitted to have free admission, were then shut up, and no opportunity was afforded any one to see and examine the many beautiful specimens growing there. The Society, therefore, determined on forming an arboretum that should contain an example of all the evergreen and deciduous trees and shrubs that would live in the climate of England, and by this means encourage a taste for arborescence. The late Dr. LINDLEY, the young arboriculturist, took much interest in the management of this department. He not only assigned the places that the different sorts of trees and shrubs should occupy, but he superintended the planting of all the beautiful specimens which have long rendered this part of the Chiswick garden extremely interesting and attractive. Of those who assisted in this work, I grieve to say the writer and two other persons are all that remain. W. B."

— We learn from the daily papers that the magnificent collection of ORCHIDS at the MUSEUM of NATURAL HISTORY, in PARIS, having been in great part destroyed by the German shells, M. CHEVREUL, the Director of the Museum, had addressed to the Academy of Sciences the following protest:—"The garden of medicinal plants, founded in Paris by an edict of King LOUIS XIII., dated January 3, 1626, became a Museum of Natural History on May 23, 1794. It was bounded by the reign of WILLIAM I., King of Prussia, Count BISMARCK, being Chancellor, by the Prussian army, on the night of the 8–9th January, 1871." The Academy has determined that the protest of M. CHEVREUL shall be printed at the head of its reports, and the Committee of Professors of the Museum has decided that a marble monument, with an inscription of the protest, shall be placed in one of the galleries of the building, surrounded with projectiles thrown from the enemy's batteries.

— At a meeting of the COUNCIL of the ROYAL HORTICULTURAL SOCIETY, held on January 8, it was decided to recommend MESSRS. J. BATEMAN, F.R.S., JOHN KELK, and E. J. LOWE, F.R.S., to the Fellows for election at the next annual meeting, in the place of MESSRS. ANNE WICKHAM, F.R.S., and JOHN THOMAS THOMSON, F.R.S., who retire. Mr. JOHN CLUTTON is recommended as Treasurer, and Lieut.-Col. SCOTT, R.E., as Secretary. MESSRS. WILSON SAUNDERS, JOHN CLUTTON, and SIGISMUND RUCKER are nominated for the Expense Committee.

— The following is the list of PRIZES offered by MESSRS. CARTER & CO. for VEGETABLES, to be awarded at the meetings of the Royal Horticultural Society during the present year:—

- May 17.—For the best Dish of Carter's First Crop Pea (1 peck), £1 10s; for the best Dish of Early Peas, not First Crop (1 peck), £1 10s.
- June 1.—For the best 3 Dishes of Peas to include Alpha and Invicta), i.e., Early White, Early Round Blue, and Early Wrinkled Peas, 1st, £2ss; 2d, £1 10s; 3d, £1 10s.
- June 22.—For the best 3 Dishes of Vegetables, including Laxton's Supreme, Carter's Hundredfold, Laxton's Quality, Dwarf Waterloo, and two other varieties of Peas, 1st, a Guinea; 2d, £2 10s; 3d, £2 10s.
- July 5.—For the best 6 Dishes of Peas, to include Laxton's Supreme, Carter's Hundredfold, and Laxton's Quality, 1st, £3 10s; 2d, £2 10s; 3d, £2 10s.
- July 19.—For the best Collection of Vegetables, to include 3 dishes of Peas (including Carter's Imperial Wonder and Laxton's Supreme), Carter's Improved Garningham Parsley, and Carter's Giant White Cos Lettuce, 1st, £2 10s; 2d, £1 10s; 3d, £1 10s.
- Aug. 26.—For the best Collection of Vegetables, to include Carter's Champion Runner Beans and 3 dishes of Peas (including Carter's Supreme and Carter's Wonder of the World), 1st, £2 10s; 2d, £1 10s; 3d, £1 10s.
- Sept. 6.—For the best Collection of Onions, to include the New Giant Roots of Naples, Giant White Tripoli, and Neapolitan Marzoglio, 1st, £2 10s; 2d, £1 10s; 3d, £1 10s.
- Sept. 20.—For the best Collection of Vegetables, to include Carter's Dwarf Crimson Celery, Carter's Dwarf Mammoth Cauliflower, New Giant White Cos Lettuce, Kohl Rabi, 3 dishes of Peas (to include Carter's Imperial Wonder), and Carter's Perfection of Beets, 1st, £2 10s; 2d, £1 10s; 3d, £1 10s.
- Oct. 4.—For the best Collection of American Potatoes, 6 varieties, 1st, £2 10s; 2d, £1 10s; 3d, £1 10s.
- Nov. 1.—For the best Collection of Potatoes, to include Carter's Potato Flinders, Carter's Kidney, Carter's Kidney-slimed Flour-ball, and Carter's Main Crop, 1st, £3 10s; 2d, £2 10s; 3d, £1 10s.
- Dec. 1.—For the best Collection of Vegetables, to include Carter's Little Pike Savoy, Scotch Kale, Brussels Sprouts, Carter's Garningham Kale, Parsnips, Scorzoneria, Salisaty, and (each), 1st, £2 10s; 2d, £1 10s; 3d, £1 10s.

All vegetables to be grown by *bona fide* gentlemen's gardeners or gentlemen amateurs, without forcing, in the open ground.

— We have received from Mr. J. VICK, of Rochester, New York, a tolerably well-executed chromolith plate representing several of his NEW PETUNIAS, including some of the fringed varieties, as they are called, that is to say, varieties in which the margin of the corolla is bluntly toothed. The colours are varied, and Mr. VICK's is, no doubt, a good strain of Petunia. Further chromoliths are given in Mr. VICK's Illustrated Catalogue, in which some remarkable blotched flowers and others of very large size are indicated. Thus one, called VICK's Diamond, is represented as being thick and half an inch in diameter, and of course of Ellensmere. One named Kermesina, with a rayed white throat, and represented as being nearly 3 inches in diameter, is a finely shaped and bright coloured flower. This Catalogue and Floral Guide of

96 pages is illustrated by a series of woodcuts along the head of every page. While referring to Fringed Fetunias, we may mention that a fine series of Double Fringed varieties was raised at Chiswick last year, and will be distributed at the first ensuing ballot of the Royal Horticultural Society. This series includes Souvenir de Chiswick, a very double carmine-rose variety, the flowers of which are streaked and blotched with white. Some of these novelties are very handsome.

—The MAXIMUM TEMPERATURES in England during the week ending January 21, ranged from 48°·2 at Portsmouth to 42° at Hull, with a mean for all stations of 44°·5; and in Scotland from 45°·6 at Leith to 41°·7 at Edinburgh, with a mean for the several stations of 44°·1. The MINIMUM TEMPERATURES in England and Scotland differed but little from each other, although the mean for the northern country was slightly above the mean for the southern country. In England the extremes were represented by 31°·4 at Portsmouth and 18° at Hull (the same stations at which the extremes of the maximum temperatures were recorded), with a mean for all places of 26°·1, 0°·6 less than the mean for the several stations in Scotland. The MEAN TEMPERATURES in England ranged from 38°·5 at Portsmouth, to 32°·7 at Hull, with a mean for all stations of 35°·6; and in Scotland they ranged from 36°·9 at Greenock, to 34°·2 at Dundee, with a mean for the several stations of 35°·3. RAINFALL.—The distribution of the rainfall throughout the two countries was very irregular. In England, 1·55 inch at Portsmouth, and 1·32 inch at Blackheath, were the greatest falls, and 0·00 at Newcastle the least; whilst the mean for the different stations was 0·53 inch—0·06 inch less than the mean for the several stations in Scotland, where the extremes were represented by 1·40 inch (at Greenock) and 0·20 inch (at Dundee). (See MR. GLAISHER'S Tables in our present issue.)

—It appears that there are botanical grounds for asserting that the advertisements have long told us, viz., that there are several kinds of COCOA. At any rate, Dr. BERNOULLI, in a recently published review of the species of THEOBROMA, describes, in addition to the ordinary well-known T. Cacao, other species as cultivated in various parts of tropical America, such as T. leiocarpa, T. pentagona, T. angustifolia, to say nothing of other species which occur wild.

—Advertising to the use of COLLODION IN STRIKING CUTTINGS, Major CLARKE writes:—"I am inclined to think that the capabilities of collodion in striking cuttings have not been sufficiently tested. Collodion varies greatly in its qualities according to the method of preparation. Procure it from a good photographic chemist, as for instance THOMAS (Pall Mall), and state in your order that it must be 'capable of giving a strong, horny film, with only sufficient alcohol to ensure solution, and to be twice as strong in cotton as that used for photographic purposes.' Allow the cuttings time to dry of while moistened by the cut; then dip the ends; in a minute or so dip again, and in five minutes plant them. I struck several things last autumn thus which had thus defied me by their habit of damping off at the base." This is a subject worth extended trials.

—It appears from the researches of Dr. ENGELMANN that the so-called PINUS SINCLAIRII has no real existence, the name being given by HOOKER and ARNOTT, in the "Botany of Beechey's Voyage," represents the foliage of P. insignis in association with the cone of P. Montezumæ.

—We learn that the appointment of SUPERINTENDENT OF VICTORIA AND GREENWICH PARKS, &c., is now vacant, and that the Commissioners will be ready to consider applications from educated gardeners, experienced in laying out grounds, in the management of men, and in keeping accounts. The limits of age are from 30 to 45, and the salary is £150 per annum, rising by annual increments of £5 to £200, together with a house in Victoria Park. Persons desirous of being candidates for this appointment should make immediate application in writing, accompanied by testimonials, to the Secretary, H. M. Office of Works, 12, Whitehall Place, as the appointment is to be filled up forthwith.

—We find in a recent number of the Transactions of the Scottish Arboricultural Society the following particulars relating to the ARBOR-VITÆ

(THUJA OCCIDENTALIS), introduced into Great Britain in 1596:—

"In America it is commonly called the White Cedar. To those who have not seen this tree in its native grandeur, the name implies a mere bush, fit only for growing in our gardens and shrubberies. I believe, therefore, that many will not credit me when I say that I have seen them above 100 feet in height, with a stem of between 4 and 5 feet in diameter at the bottom, with beautifully spreading branches. It is a very graceful tree, and deserves particular notice. Perhaps it may be asked, why has it not grown to such a height and general dimensions in this country? The reason that the tree has not attained more than the dimensions of a bush here, is simply that its wants in regard to soil and situation were not understood when planted. Let us see how it is in this respect as found in its native state. I found it invariably luxuriating in the wettest parts of the country; in swamps, creeks, and on the flat and wet banks of rivers, sometimes wholly occupying these. Now, how do we find it planted in this country? Almost invariably on dry and exposed places, where of course it never can succeed. Indeed it is a wonder that they grow at all as they are treated in this country. It would not do, however, to plant them actually in the midst of water here, as it would then be too cold for them, and they would most probably die altogether. Our climate is not warm enough to grow them on land saturated with water. The site which I think most suitable for them in this country is on low-lying flat parts, well sheltered, and within the influence of water, but not absolutely in it, although in its vicinity. The timber of this tree is exclusively used for

great amount of printing is also required. An incredible number of boxes and baskets are needed for packing purposes; the latter are made by the poor people in the neighbouring villages; the former are made in the Thuringian forest. Many poor families do nothing else during winter but make wooden tickles, and sticks for the flowers.

A number of little Thuringian villages are almost upheld by the manufacture of flower-pots for Erfurt alone. About 600,000 are planted yearly with about 3,600,000 Stock Gillyflowers. These, placed in a single row, would reach nearly 50 miles! In the year 1863, 150,000 pots were planted with 1,500,000 Gillyflowers for seed, and these brought in an income of nearly 50,000 thalers. The production of the Gillyflower, in 16 varieties and over 200 colours, established the horticultural fame of Erfurt ever since 1810.

"Of the seeds, 58 per cent. is sent to Austria, 24 per cent. to Germany, and 18 per cent. to other parts of Europe, to England and America. A large trade in dried flowers is also carried on. In some of the gardens it is very difficult to get even a single bouquet."

New Garden Plants.

ÆNOTHERA (GODETIA) WHITNEYI.

Minute puberula, caule simplici v. e basi ramulo valido apice infatato, foliis oblongo-lanceolatis, serratis; floribus amplis confertis; calycibus tubo obconico segmentis multo brevioribus; antheris linearibus; stigmatibus linearibus elongatis; capsulis carnosissimis oblongo-fusiformibus canaliculatis, loculis polyspermis; seminibus adscendens. *Ænothera (Godezia) Whitneyi*, A. Gray, Proc. Amer. Acad., vol. vii, p. 340, June 11, 1867; Hook. f. Bot. Mag. t. 3897.—*Godezia grandiflora*, Lindley, Bot. Reg., 1842, t. 61.

This splendid *Ænothera* was shown by Mr. W. Thompson, of Ipswich, at one of the meetings of the Floral Committee of the Royal Horticultural Society, during the past year. Mr. Thompson, it appears, raised the plant from seeds sent by Mr. Bolander, who gathered the plant in Humboldt County, California, in 1867; but the same plant was figured by Lindley, in 1842, in the "Botanical Register," under the name of *Godezia grandiflora*. Unfortunately no seeds were saved at that time, and our gardens have since been deprived of this fine annual till its re-introduction by Messrs. Bolander and Thompson. The plant is a foot or 18 inches high, with oblong-lanceolate leaves, and very numerous flowers covering the whole of the upper part of the plant.

The flowers measure between 3 and 4 inches across. The petals are oblong, obovate, rose-red, with a dark crimson blotch about the centre. Our figure (fig. 25) shows a flower of the natural size, and an outline showing the habit of the plant. We have received from Prof. Asa Gray the following note referring to this species. All who saw it will echo the Professor's wish that it may be retained in cultivation, as few, if any, annual plants exceed this in beauty:—

"The truly magnificent *Ænothera (Godezia) Whitneyi*, as illustrated in the November number of the "Botanical Magazine," in Mr. Thompson's hands, we trust may now be kept in cultivation. That it has been grown in England before will appear upon comparison with tab. 61 in the "Botanical Register" for 1842, and attention was called to this on a later page (400), [and in our columns, 1842, p. 759], in which *Ænothera Whitneyi* is characterised, indeed indeed the blossoms of Bolander's plant are larger, and much richer in colour and marking than those of the best *Godezia grandiflora* of Lindley. As I already suggested, the plant will now most probably be allowed to retain the name of Whitneyi, as *Godezia* is ranked under *Ænothera*, and as there is an *Ænothera grandiflora* of long standing. Asa Gray, Botanic Garden, Cambridge, Massachusetts, Nov. 16, 1870."

MANAGEMENT OF CAMELLIAS.

The Camellia is undoubtedly one of the most noble and useful ornamental plants that we possess. Nothing can exceed the gorgeous display afforded by well-grown specimens during the winter months, and as a Christmas table flower it has no equal, for, independently of the great variety of form and colour in the flowers of the Camellia, its noble growth and rich glossy foliage gives it a character which is excelled by no other plant.

Moreover, there are but few other cultivated plants which require less artificial assistance to grow to perfection. How far this assertion is borne out may be questioned, for, unfortunately, it is the exception, and not the rule, to meet with collections in good order, and yet it is a plant which does not readily succumb to bad treatment. Nevertheless, I venture to say that the veracity of the statement can be fully proved by the



FIG. 25.—ÆNOTHERA (GODEZIA) WHITNEYI.

fencing purposes in America. It is light and durable, and, I think, might be judiciously used in this way in this country. I have seen very fair specimens of it in England, where they had been planted in suitable situations."

—A correspondent of an American journal thus speaks of the immense HORTICULTURAL ESTABLISHMENTS at ERFURT:—

"Erfurt has been given the name of the 'Garden City of Germany,' and, according to recently published statistics in Upper Consistorial Councillor von Tettau's 'Erfurt—Past and Present,' she well deserves the title. The area devoted to horticultural purposes in and around the city is over 2000 Prussian morgens (·65 of an acre). About 600 morgens of this are devoted to market horticulture; 220 morgens of the latter again are devoted to the production of flower seeds, and 220 morgens to vegetable seeds. The houses for the culture of exotic plants, and the hot and cold beds, possess glass covering to the extent of 250,000 square feet.

"There are 36 independent horticulturists, of whom 27 do only a wholesale trade, besides 100 market gardeners, altogether employing over 500 assistants. The vegetable and seed trade depends almost entirely upon the larger cities of Germany. Over 300,000 catalogues and priced lists are annually printed for the wholesale producers, at a cost of 10,000 to 20,000 of these are wholesale catalogues, and half of the latter are prepared for England and America. The amount of postage paid on these catalogues, some of which are pamphlets, and on the letters containing seeds, is very great.

"For the transmission of these seeds a vast number of linen and paper bags and paper are required, involving an annual outlay of over 7000 dols. Both these articles are manufactured in the surrounding villages, giving employment to a great many poor people. As all these bags must be provided with the name of the dealer, a

cultivators of the many highly creditable collections to be met with in British gardens.

In order to verify the above remarks, I will here describe the manner in which I have treated a collection I found at this place three years ago. They were growing in boxes and pots, and in general appearance seemed for the most part to be in tolerable health, the plants measuring from 10 to 12 feet in height, and as much through.

They were first carefully cleaned and well watered, liquid manure being freely used, but notwithstanding every precaution the buds dropped off to an alarming extent. I was given to understand that this was a yearly occurrence, which led me to examine the soil, the result being that they were turned out, and divested of the peat into which they had been planted. This peat was of a poor hungry nature, and wholly inadequate to afford the supply of nutriment required for the maturation of the buds. One half of the plants were then planted out to a border, and the other half into boxes, in a compost of fresh turfy loam of a good medium texture, cut 1½ inch thick, and to which was added a dash of sand and charcoal. They were watered freely overhead twice a day, were kept in a growing temperature, and slightly shaded from the sun. They made a splendid growth, and perfected a good display of flowers without the loss of a single bud. In the spring of last year the plants were freely cut in, so as to regulate the growth, and at the present time they are covered with buds and bloom from base to summit, and are well furnished with wood and foliage of the deepest green colour.

It may be asked to what is this rejuvenescence attributable? Mainly, to the substitution of the loam peat for the peat, which was not of a natural depth, the roots of the plants; to a perfect drainage being secured; and to their having been carefully yet freely supplied with water, and slightly shaded from bright sun, a free circulation of air being maintained to insure rigidity of growth. These are, in my opinion, the most essential conditions to ensure success in their culture, and, if carefully attended to, would in a great measure lessen the chances of failure. The greatest amount of success seems to be obtained with specimens that are placed out to a system of root restriction. Fine specimens may be grown in comparatively small pots. For instance, take the superb specimens to be met with in Belgian gardens, and which, in point of general excellence, we cannot equal. These plants are grown in a rich soil, and are not particularly suited to the requirements of the Camellia. Such peat I have failed to discover in this country, or, indeed, any at all to be compared with loam for promoting the development of this much ill-treated plant. *George Wetland, Willey Court.*

A NEW SYNOPSIS OF ALL THE KNOWN LILIES.—I.

As I have read from week to week the interesting papers on Lilies, new and old, that have lately appeared in your paper, I have been reminded of the great want which there is of a systematic revision of the genus, and of some document in which all the species and leading varieties now known should be arranged in systematic order, and so defined that, by its means, miscellaneous garden and dried specimens coming to hand from time to time might be readily named, and their place in relation to other forms understood. I have often wondered that the systematic literature of a set of plants that have been so long and so generally favoured with flower lovers from time immemorial, should be so very scanty. Amidst the enormous mass of our own horticultural literature, there is nothing of the kind which I mean; and now, Spae's monograph, in your judgment on which, both as regards its merits and shortcomings, I entirely agree, is more than 20 years old, and difficult or impossible to procure. As I have a few ideas of my own about the best arrangement of the Lilies, and hope to be able to publish a monograph on the genus in due scientific form, I will, if you will allow me, make a first trial now in your pages at classifying and defining them, and attempt, in short, to work out a Synopsis fit for every-day working purposes, upon the same plan that I followed for Narcissus. At present, for want of such a Synopsis, any one trying to name a Lily has usually to lose a great deal of time in hunting about in different books and journals, and from the botanical point of view we particularly need a careful comparison of the numerous Lilies which have been described and figured since Spae's time in the various horticultural periodicals with the older-known types, and of many of these older-known types with one another, in order to understand which of them are really worth taking into account as well marked species; and, far more than is the case in Narcissus, a great deal still remains to be done in working out and explaining which are the characters that are most safely to be relied upon to distinguish the well marked species from one another. I want to try in this paper to place the acknowledged species of *Lilium* upon the same footing as regards comprehensiveness as those which are adopted in our

approved handbooks in ordinary use for wild plants, such as Hooker's "Students' Flora," or Syme's "English Botany." I am convinced that it is only by doing this that a Synopsis fit for working purposes can be constructed, and that, by following the plan, the natural relationship of the forms can be most fully and clearly shown; and if in attempting to do this I overlook or misunderstand any characters which are valuable for distinctive purposes, I hope that your horticultural readers will not fail to correct what I have mistaken, or to add what I have omitted. This is a genus in which there is an especial need, in order to put it upon a sound botanical footing, for botanists and horticulturists to work together.

First, I will give a list of notes on the characters in which the species differ from one another.

Bulbs.—The bulbs in the great body of the Lilies furnish no important modification in structure. So far as I am aware, except in two species, they all present the type of fleshy imbricated lanceolate scales which we see so often drawn in botanical handbooks. The two exceptional species, *L. roseum* and a close ally still undescribed from the Himalayas, have a thick bulb growing up, and large membranous tunics, like a *Hedysarum* or a *Tulip*.

Stems.—There is nothing about this that needs to be mentioned now.

Petioles.—True petioles, sometimes as long as the leaves, are present in cordifolium and giganteum, and short but distinct ones in speciosum and auratum; but in the majority of species the leaves are sessile.

Leaves vary greatly in number, shape, texture, veining, direction, and arrangement. The presence of bold veins in the axis is a character probably of specific value. The large rotundate-cordate leaves of cordifolium and giganteum are very different to the lanceolate or linear leaves of all the others. One of the best characters for distinguishing species is furnished by the arrangement of the leaves of several of them in regular whorls; but this character, useful though it be, is not entirely trustworthy. I believe that all the verticillate species are liable to have the whorls broken down, sometimes partially, occasionally entirely, in exceptional cases, and a variation that is very puzzling, when a specimen of this kind comes to hand by itself, without any warning of its exceptional character.

Inflorance.—I believe that although several of the species are always single-flowered in the wild state, they all may be made to produce more than one flower under cultivation; and still more readily may the species that commonly yield three or four flowers when wild be made to show from 12 to 20 in gardens. There is always a tendency, too, in what are typically single-flowered species, to become congested into umbels under cultivation, and of what are properly scattered bracts to fall into whorls.

Perianth.—Good characters may be had from the position of the individual flowers, whether erect, drooping, or intermediate in direction; very good characters, also, from the shape of the flower, whether permanently funnel-shaped, with the divisions spreading falcately towards the lip only when fully expanded; or bell-shaped, with the divisions more or less spreading, or often decidedly reflexed. The shape of the segments of the perianth furnishes also excellent characters. Here we may trace at least four distinct types, with intermediate gradations:—1, oblanccolate, broadest above the middle, narrowed gradually to the base, as in longiflorum, candidum, and japonicum; 2, obovate-spathulate, broadest about the middle, narrowed suddenly into a distinct claw, as in bulbiferum, Catesbeii, and philadelphicum; 3, ovate-lanceolate, decidedly broadest below the middle, without a claw, and narrowed gradually in the upper half, as in speciosum and auratum; 4, lanceolate, narrowed gradually from about the middle to both ends, as in Martagon, chalcidonicum, and pomponium. In the colour of the flower we have two principal series:—1, unspotted white, liable to be tinged with yellow, green, or purple; 2, bright shades of red and yellow, very liable to interchange or mix with one another, spotted usually with dark purple. Only about four of the species will not be admitted in our classification.

The character of the keel and surface of the inner face of the segments in their lower third should be noted carefully in the living plant. Here we have three principal types:—1, the face not at all papillose and keel not distinctly hollowed out, as in candidum and its allies; 2, the face more or less distinctly papillose, but the groove indistinct and glabrous, as in speciosum, pomponium, and Martagon; and 3, the face papillose, and the groove a distinct hollow, bordered by raised hairy lines, as in bulbiferum and tigrinum.

Stamens.—The filaments generally place the anther on a level with the stigma, and fall not far short of the mouth of the flower. Both style and filaments are decidedly shorter than the perianth in the erect-flowered *L. coloratum*, and in several of the drooping-flowered species of the Martagon group; and the stamens are decidedly shorter than the style in candidum. In the direction of the filaments, and shape of the fully expanded anther, there is a still more considerable variation. The funnel-flowered Lilies all the filaments run parallel with one another and the style towards the mouth of the flower, resting against its lowest divisions, and curving a little upwards towards their points. In the bell-

flowered Lilies the style is distinctly curved, and the filaments diverge on all sides from the centre.

Pistil.—In all the species there is a more or less distinctly clavate ovary. In all, except two, there is a moderately short style, clubbed at the end by a stout, bluntly 3-lobed stigma. In these two exceptional species, the Himalayan Lilies, which form the genus *Notholirion* of Wallich, we have a style quite as long in proportion, but more slender, and deeply cleft at the point into three slender stigmatose hooks, like the top of a shepherd's crook.

Capsule.—The capsules, so far as I have seen them, of all the Lilies are quite uniform in general structure. To the question of how far there are differences in shape that may be used for specific characters, I have paid too little attention on living plants to speak in this connection with confidence.

The following is an outline of what I believe to be the most natural primary division of the genus. I believe that no one who will take the trouble to master the characters of these five groups, and once understand them by the aid of living specimens, will find any difficulty in referring any flowering specimen to its proper position.

Subgenus 1. NOTHOLIRION (Himalayan Lilies).—Bulbs tunicated; stigma deeply cleft into three subulate hooked divisions; *e. g.*, *roseum*, Hooker (*n. sp.*)

Subgenus 2. LILUM PROPER.—Bulbs squamose; stigma a thick head to the style, with three blunt lobes.

Group 1. EULIRION (funnel-flowered Lilies).—Perianth funnel-shaped, horizontal or slightly drooping, its divisions broadest above the middle, narrowed gradually to the base, spreading only in the outer quarter when fully expanded; filaments and style all parallel with one another; *e. g.*, longiflorum, candidum, and cordifolium.

Group 2. ARCHELIRION (open-flowered Lilies).—Perianth broadly bell-shaped, horizontal or slightly drooping, its divisions ovate, broadest below the middle, not unguiculate, spreading from below the middle when fully expanded; stamens diverging on all sides; *e. g.*, auratum, speciosum, and tigrinum.

Group 3. POLYLRION (erect-flowered Lilies).—Perianth broadly bell-shaped, quite erect, its divisions oblong-lanceolate, broadest about the middle, in most of the species narrowed suddenly downwards to a distinct claw, spreading in the upper third or half when fully expanded; stamens diverging on all sides; *e. g.*, bulbiferum, philadelphicum, and Catesbeii.

Group 4. MARTAGON (Turk's-cap Lilies).—Perianth broadly bell-shaped, always drooping, its divisions lanceolate, broadest about the middle, not distinctly unguiculate, reflexed (usually from half or two-thirds the way down) when fully expanded; stamens diverging on all sides; *e. g.*, Martagon, pomponium, and chalcidonicum.

J. G. Baker.

EMBRYONIC INARCHING.

We have met with conclusive proof that embryonic points can unite and form one perfectly homogenous branch. It is well known to botanists that the usually one-seeded genus *Malva*, of the Malvaceae, or plants of the Mulberry family, have occasionally two seeds, and it is further known to those who grow one of these plants, the Osage Orange, on a large scale, that it is not unusual for the two germs to get together in the same seed-coat. These result in twin plants.

The points of union seem first at the collar or precise point where stem and root first diverge—the junction of the cotyledons, or seed-lobes with the stem. The descending axis is usually united at a distance of from two to four inches below the top of the original stem, and the two forms become distinct parts. The ascending axis, however, seldom unites, but separates at once from the cotyledonous point, and makes two stems. We have thus two plants perfectly united at the middle like the Siamese twins, but distinct above and below.

We have, however, found one plant where the points of these two independent origins have united, and they have formed one thoroughly perfect stem in which there is not the slightest trace of a distance of union, where the two stems have remained perfectly distinct. This specimen we have presented to Dr. Geo. Engelmann, of St. Louis, to whose indefatigable labours in botany the world owes so much.

Now, there can be no more reason why two germ points in buds cannot unite together without division there, than the two points in a seed-coat, and we are compelled to believe that the ground assumed by Mr. Blodgett, and long before him, Erasmus Darwin, and others, is good ground, and that the physiological law we have seen in the field for the most wonderful class of hybrid fruits we have ever known.

How very strange it is that with this idea before the world for over a hundred years, so few should ever have tried to realise its truth. The fact is, the world is cursed with a set of lay closet philosophers, who build entirely on the observations of a few dozen hard working collectors of facts. With these they mix the fancies of their own dreamy and idle thoughts, and produce what are called "principles," and "natural laws," which are not laws at all. If we could only induce more personal observing and less pen theorising, our progress in the path of perfection would be much more rapid than it is.

Of course, such habits will lay those who possess them open to the charge of "wishing to be possi-

ties" in disputed matters,—but the satisfaction of feeling sure of one's position will make such a reputation cheap, and one which any one can well afford to have. *American Gardeners' Monthly*.

A CURRANT TWIG AND SOMETHING ON IT.

ADVENTURES in search of the picturesque are as nothing in comparison to adventures in search of the novel and curious in animal and vegetable life. There may be some difficulty in finding the picturesque amid the frost and snow, the drenching rains and dense fogs of this uncomfortable season, but curious things, of which not one person in a thousand can give a satisfactory explanation, embarrass by their profusion rather than by their absence.

Here, for instance, is a small twig, picked from a rubbish heap, little thicker than the stem of a tobacco pipe, and only a few inches long, which has been lying on the ground in a damp situation perhaps for months (fig. A). It is dead, in so far as its own progress as a Currant twig is concerned, but it is full of new life, belonging to new individuals which have vegetated upon the dead twig. The whole surface of the twig is covered from end to end with little bright pink prominences, little rounded knobs bursting through the bark, at very regular distances, scarcely a quarter of an inch apart. Towards one end of the twig these prominences are of a deeper, richer colour, like purplish cinnabar or vermilion. The naked eye is sufficient to detect some difference in the character of the two sorts of pustules, and where the two merge into each other specks of cinnabar are visible on the bright pink projections. Naturally enough we inquire what these things mean—what are the pink, and what the vermilion pustules, and what relation subsists between them? To answer this we seek the aid of a hand lens and a microscope, and resort to dissection.

By removing the bark from around the pink projections we discover the latter to have a kind of stem, of a much paler colour, which spreads out above into a nearly globose head, rather flattened, and covered with a kind of delicate mealy bloom. Reverting, again, to the stem and pursuing it downwards, in search of its root, or what serves the purpose of a root, we find that it has penetrated to the inner bark, and into that delicate colourless threads seem to radiate in all directions, and these constitute the mycelium, or root-like portion of the parasite. If the bark is stripped off, it will be seen at once that the fibrils have not entered the wood, that the whole of the new organisms are removed with the bark, and are confined to the bark; in fact, that they are parasites of the bark, belong to the bark only, and we shall look for them in vain on naked wood.

Already we have made out that there is a kind of root which we called mycelium, a short pale stem, a flattened head, and a delicate bloom covering the head. If we make a section of the stem downwards through the head, we shall find just such a form as indicated in our figure (fig. B.) A very thin slice cut from this with a sharp penknife will be essential to the further prosecution of our inquiry. Such a section, immersed in a drop of water upon a slip of glass, and covered with a disc of thin glass, must be submitted to the microscope, first using a one-inch, and then a quarter-inch objective, until the whole of the structure is comprehended. We need not go through all the details of the examination, but content ourselves with the results. It may be that an hour has been employed to arrive at conclusions which may be summed up in a few words. Delicate parallel threads are compacted together, seemingly glued together, but separating when pressed, and these constitute the stem and the compressed head. Sometimes they are simple, and sometimes they are branched, bearing here and there upon them little bodies which are readily detached, and float away in the water in which the fragment has been placed for examination (fig. C). It has also been discovered that the mealy bloom we had noticed on the surface of the tubercles consisted of the same little bodies. Some would call them the spores, because it is easy to jump to the conclusion that they are fruit of some kind; and this conclusion may be verified by causing them to germinate, when they will be seen to partake of the character of Fungus spores, although for the present we will call them *conidia*, and proceed with their examination. These *conidia* are little cylindrical bodies, very slender, and rounded at the ends. They are produced singly, here and there, upon the threads, without stalks or pedicels, and many of them together have a pinkish tint; when lying upon the surface of the tubercles, they constitute the mealy "bloom" above alluded to. But therefore call them "*conidia*?" This is a word compounded of two Greek words—

"gonos," a seed, and "eidos," a likeness, or resemblance. It is sometimes written *gonidia*, but more usually *conidia*, and means, therefore, "seed-like," or "resembling seed." We shall see hereafter that, although germinating bodies, they are not the only germinating bodies intimately associated with this parasite, and not the ultimate development, hence we are content to call them *conidia*.

Passing to the other end of the twig, we encounter the darker vermilion tubercles, which are similar in size and in disposition, but, even under a lens, of a more complex structure, which now demands closer examination. Instead of a single, simple, flattened head, each tubercle is found to be compounded of scores of smaller, nearly globose bodies, closely packed together, often compressed, but forming in a mass just such a tubercle as the other, except that it seems to be granular to the naked eye, instead of smooth. If we remove the outer bark carefully, as in the former instance, we find just such a short stem and just such a rooting base (D, E, F). It would seem as if a granular compound head had grown upon the stem of one of the pink tubercles. If, for a moment, we look at the tubercles near the spot where pink tubercles merge into vermilion, we shall notice parti-coloured tubercles. These are pink tubercles, sprinkled with a few of the small vermilion bodies, which together form the complex head of the vermilion tubercles. At once we are led to suspect that the vermilion heads are really produced upon the stems (stroma) of the pink tubercles—that this is an instance of a doubled Fungus, a Fungus of two forms, or, as it is termed, a dimorphous species.

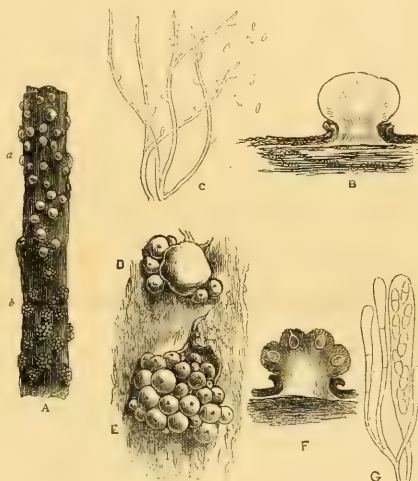


FIG. 26.—TUBERCULARIA ON CURRANT TWIG.

REFERENCES.—A, Currant twig with parasitic pustules (a) of the Tubercularia; (b) of the Nectria; c, section of Tubercularia, with (c) component threads and conidia; D, Tubercularia and Nectria; E, Nectria; F, Section of tuft of perithecia of Nectria; G, Asci and spordia of Nectria cinnabarina.

Returning to the vermilion pustules, with the conviction that the heads of one kind are growing upon the body of the other, we proceed, as in the previous instance, to divide one of the tubercles through the head down to the base, and the result is just that we have depicted. Numerous nearly globose little bodies (fig. E) spring from the top of the fibrous stem. These somewhat resemble capsules, in that they are globose, hollow shells, externally of a vermilion colour, and granulated, internally filled with a drop of jelly, like a minute drop of isinglass jelly, which may be called the nucleus. The capsules or spherules are normally globose, but by mutual compression, owing to the clustered manner of their growth, many of them become angular. The top of each has a minute projection, and when fully mature in the middle of this projection, a minute hole is perforated. This is the mouth of the capsule, through which its contents finally escape. The name by which these capsules are known is perithecia. If we were to state the conclusions at which we have now arrived in a technical manner, we should say that a cluster of vermilion, papillate, rough perithecia, are developed upon the stroma of the Tubercularia, or pink Tubercles.

Another stage in the examination relates to the gelatinous contents of these perithecia. We will assume that, with a sharp penknife and a steady hand, we have sliced off the top of one of the perithecia, and exposed the little gelatinous nucleus. Having a slip of glass ready, we take out the nucleus on the point of

a penknife, and transfer it to the glass slide, immersed in a drop of clean distilled water, cover with a disc of thin glass, which we press down so as to disperse the nucleus sufficiently for the light to pass through on examination with high powers. Seen with a good quarter-inch objective this nucleus will be found to consist of long cylindrical bays called *asci*, each enclosing eight elliptical bodies, of the nature of spores, or seeds, called *spordia* (fig. G). Although the term "seed" is not by any means a proper name to give to the reproductive bodies of several lower orders of plants, we have used it several times in a popular sense, with this saving clause in explanation. Another kind of structure found in the nucleus consists of innumerable delicate threads of about the same length as the *asci*, and which are regarded as abortive *asci*, called paraphyses (G). The nucleus consists, therefore, of *asci*, containing *spordia* and paraphyses, or barren *asci*. It should be noted that here, and in the majority of similar instances amongst *Fungi*, the number of *spordia* contained in each *ascus* is eight, as shown in our figure; rarely it is four or sixteen. When the *spordia* are quite ripe, either the *asci* are dissolved or the *spordia* escape from the ruptured apex into the cavity of the perithecium, and are ultimately expelled from the mouth, by compression of the perithecia, which usually collapse, unless the walls or shells of the perithecia are of a hard carbonaceous character.

During examination of the nucleus under the microscope we shall have noticed that some of the delicate *asci* are broken by removal and pressure, allowing the *spordia* to escape into the water. These, being free, can be examined more to advantage than when still enclosed in their *asci*. Each *spordium* is divided across the middle into two cells, each cell being rather longer than broad is nearly ovate, or egg-shaped, attached together at the broad ends. When carefully cultivated in a suitable medium these *spordia* develop from either or both cells germinating filaments. Any one accustomed to the constant examination of these organisms will occasionally meet with instances in which the *spordia* have commenced germination whilst still enclosed within their perithecia.

The advanced student will by this time have discovered that the pink tubercles on our Currant twig are those called by fungologists *Tubercularia vulgaris*, and the vermilion clusters are *Nectria cinnabarina*. To him it will not be new to observe, that the latter is developed on the stroma of the former, and that both the tubercles are conditions of the same Fungus. He will know that in the pink state *conidia* are produced, and in the vermilion state *spordia*, but he will not know what others are sure to ask of us at the conclusion of this examination—that is, what are the relations which subsist between the *conidia* and the *spordia*; how do the former influence the latter? and what functions do the *conidia* possess in their productive processes of the Nectria? We must confess that the why and the wherefore are mysteries not yet to be answered; at present we are very ignorant of the processes concerned in the reproduction of *Fungi*. We know that it is not so simple as formerly supposed. Some *Fungi* have at least four or five forms or conditions, all related to each other, all producing bodies more or less partaking of the character of spores, sometimes called *conidia*, sometimes *spores* link joins them into a complete chain is still unknown.

How many a time have we kicked aside a little twig, like the one which led to the present gossip, thinking perhaps that we could learn nothing from it more than we already knew; and yet it is very probable that in such a twig lies hidden a problem which man, with his exquisite microscopes and his nineteenth-century wisdom, cannot solve. M. C. C.

Home Correspondence.

Lastrea Filix-Mas as a Tree Fern.—About this time last year I wrote you, stating that I had found the above common Fern with stems, and that I was going to try to grow them into Tree Ferns. I beg now to say that they have gone through the year without showing any symptoms of decay at the stem—the place where I expected the failure, and have produced fronds of the usual length. The crowns which they have formed, together with the roots they have emitted—down the stems and into the soil—give promise of success for another year, if not for many. Have any of your readers tried them? Many persons have seen these with surprise and pleasure, and some resolved to "go into" the idea on viewing them. These Ferns grown in this way, however, will not do well. I rather think they would die where the rays

of the summer's sun strike against them; anywhere in the shade they would do. In hardy ferneries they are quite at home, and give to the place an interest the year round, which, perhaps, nothing else could. "Ars et celestem in se place" is a plant which should be carried out in such a place in its fullest sense; and these Ferns would be a great help, if planted in proper places to that end. A situation near trees, waterfalls, grottos, &c., should be selected for them. To those who would like to seek such Ferns I would say, now is the time; I would recommend a preparation in the shape of gloves, leggings, a spade and hook, &c., and a yard or two of small rope should be carried in the pocket to bundle the Ferns together when found. Go down through the wood, steer for a rivulet; have an eye on the way to the base of old trees, and against the banks at the side of the stream; examine lumps of Ivy, sometimes they are supported by that plant. Don't throw any away because there are but few roots at the lower end of the stem, those higher up will grow downwards. Spread what roots there are evenly over the stems, and tie them in this position with soft twine, or make some mud which is composed principally of rotten leaves, rub this into and over all the stem, beginning at the top and striking it downwards; then a few flakes of Moss should be tied over all. Now for a pot with just a crock or two over the hole, one a little bigger than the stem will do best; fill one-half of it with peat soil, ram it as hard as possible in a dry state. Place the stem in the pot, and fill in again with soil, which should be well pressed. Put the plants in the shade, and the sky clear, and all through the coming summer, and by the next they will be established. *Henry Mills.*

Stauntonia latifolia.—In the spacious conservatory of a neighbour, at Torquay, a plant of *Stauntonia latifolia* is bearing fruit very freely—is it usual? The fruit is as large as the olive, and the colour of the Passion-flower, and of a beautiful purplish lilac colour of a fleshy nature, and containing a vast number of black seeds. The plant is quite hardy in South Devon, but was placed in the house alluded to for the sake of its fragrance, which I understand is almost too powerful at times. To what natural order does it belong, and is it synonymous with *Holboellia*? *A Devonian.* [The two genera have been separated. It was once called *H. latifolia*; they both belong to the Lardizabalaceæ. Eds.]

Aucubas and the Cold.—I am pleased to be able to bear testimony to the hardiness of many of the new varieties of Aucuba. Last season I planted about 500 plants of japonica, putting in here and there a few of the following varieties—*A. maculata*, *A. angustifolia*, *A. maculata bicolor*, *A. latimaculata*, *A. maculata vera*, *A. femina vera*, *A. limbatata*, &c. Some of these produce large bunches of red or green berries, and others have large bunches of bloom just in sight; none were permanently injured, but the foliage of both old and new varieties is considerably discoloured, owing to the severity of the weather, showing clearly that the new varieties are as hardy as the old. May I say that the situation is very exposed, so that they have had to stand all the severity of the late weather. *Charles Youngs, The Nursery, Upper Tooting Park.*

Permit me to record my testimony of the hardiness of the above fruit to withstand the severest weather incidental to our insular climate, inasmuch as there is a bush here, with a few of its branches laden with a nice crop of green berries which have passed through the recent trying ordeal without injury, although on the morning of December 31 we had 27° of frost, as indicated by one of Negretti's thermometers. It may be further interesting to remark that the fruit in question is not the result of artificial impregnation, but merely from the influence of a male plant in a pot, elevated near the top on one side of the female bush, which is about 5½ feet high and proportionately broad, in order to ascertain how far the influence of the pollen would extend. The only thing kept in mind was that a male plant in position, as I had been informed that such a simple procedure was all that was necessary to effect a complete dissemination all over the bush. The result, however, proved contrary to expectation, inasmuch as only that portion of the bush adjoining the female plant proved fruitful, thus demonstrating that more than one male plant placed around the bush was necessary to complete dissemination all over the bush, unless the solitary plant had been frequently shifted about on all sides of the bush during its active state of florescence. It would be interesting were others of your readers to afford similar records of their experience. *Wm. Gardiner, Lower Ealington Park.*

Our Winter Visitors.—It may interest some of your readers to know that this winter we have had several unusual, or, to say the least, uncommon winter visitors. No doubt the earliness and intensity of the cold has driven many birds further south than is usually the case. Besides numerous fieldfares, redwings, and birds of that tribe, a greater variety of the smaller birds than usual has this year been observed. Amongst them I may mention the brambbling (Pringilla montana), a bird of the alpine region, seen so far south in England as this. Its handsome plumage has caught the eye of the bird-catchers, and several may be seen in the bird-fanciers' shops. The aberdavine or siskin (*Fringilla spinus*), though not so

rare as the brambling, still is sufficiently so to call for observation. I am told that, last year, no bramblings, and few if any siskins, were seen in the south of England. Of the hawfinch or grosbeak (*Coccothraustes vulgaris*) I have seen several specimens this year, though they are not so easily caught as either of the last-mentioned birds. Both the redpolls, the mealy (*Linota caennensis*), and the lesser (*Linota linaria*), have been obtained in the neighbourhood, but I have as yet been unable to procure a specimen of the mealy for my collection. No doubt some of your correspondents have met with various other species this winter, but these are all that have come under my notice. *W. B., Bath, Jan. 23.*

Eye Seed.—Some years ago, when on a tour with some friends in North Wales, I saw a plant which some of us knew as Clary, others as Wild Sage, growing plentifully in the ruins of Denbigh Castle. The man who was in charge of the ruins gathered some of the seeds, and showed them to us as a wonderful cure for eye disease. His mixed Welsh and English was difficult to understand, but the point appeared to be, that the seed was good for checking inflammation in the eye, and might be placed whole under the eyelids without doing harm. He was anxious that we should make trial of the virtues of the plant at once on him, but we altogether declined so perilous an experiment. As far as I can remember the plants, very agreed with the description of the eye-drops, were those of the Wild Clary, the *Salvia Verbenacea*; they were labiate, about a foot or two high, and the flowers of a bluish purple; the time of year was about the beginning of July. *E. O.*

Lilium tigrinum flore-pleno.—Your correspondent, Mr. Knight, of Flixton, writing on this plant, anticipates that it will prove a fine border plant, and anticipates that, being double, it will stand wind and rain better than most other Lilies. I am happy to be able to confirm both his expectation and anticipation. We flowered some here last year in the open border, and from the beauty and lasting qualities of the flowers I think this will prove one of the most valued of the new Lilies. It is interesting to watch the very delicate petals in which the flowers develop, then the flowers, after the fall of petals open one after another at intervals; at first you do not at all see the shape the flower is going to take. I should much like to know if the *L. Thunbergianum punctatum* Mr. Knight speaks of has a synonymy; I do not know the name, and it is not in Mr. Leitch's list, published in the *Gardeners' Chronicle*, Sept. 3, 1870, which is perhaps the most complete of any issued. *George F. Wilson, Heatherbank, Weybridge Heath.*

Garden Walks.—I have very often had to regret seeing many otherwise nice gardens made unenjoyable and uncomfortable by bad walks, and hope the subject may receive that amount of attention which it deserves.

"Asphalting" is no new untried patent crocheting, but a well-known and a well-used one upon the horticultural public. Mr. Taylor says they have had made 13 years ago which are now as good as ever. I can testify from my own experience to walks which required but one dressing, and that only a superficial one, in 17 years. During that time we made several extensive alterations, and although the garden walks were made for pleasure walks, we created some tons of piping, boiler, &c., without even breaking or disfiguring the surface. In the least objectionable way to show that "asphalting" is a durable and serviceable it is clean and comfortable. We had also during the above time (in 1856) the thermometer down 7° below zero, with the ground perfectly saturated with heavy rain, and the walks remained perfectly firm. I believe public paths and streets might be coated with asphalt, which would be found a cleaner, healthier, and better material than the present paving and flagging system. I have seen at the Sheffield Botanical Gardens—where large galas are held—when the paths were laid (to the great pleasure seekers and visitors) in a few minutes after the rain had abated the walks were perfectly enjoyable, and the visitors promenading in full enjoyment. Some years ago, when British correspondent for the "American Monthly," I wrote a long account of the method of forming substantial waterproof walks. I should feel pleased to know if they have been adopted in that country? In making them I would advise, first, thorough drainage; second, a firm and substantial bed of cinders, rough gravel, or stones, well beaten down; and then, the finer finish, gravel prepared with tar, and well rolled: small Derbyshire spar sprinkled on this, and rolled in well, gives a clean, bright, and sparkling finish to walks which I hope to see in every garden—public and private—and to see tried in every town. *William Payne, Chester.*

Irish Apples.—In your notice of new fruits at p. 40, you mention an Apple—the Eclinville Seedling—as one which is new in England, though it is an old Apple in Ireland. There are many other Apples, which are found in old Irish gardens, that may be either unknown or rare in England, but the names of them in several cases doubtful. Of the Apples peculiar to Ireland, of first-rate quality and generally named, there are some it may be worth while to notice, as the Irish Peach, Scarlet Crofton, White Crofton, Ross Nonpareil, Irish Russet, and Irish Reineette. The

Eclinville Seedling is a first-rate show fruit, and the Kerry Pippin, not unlike the Paradise Pippin, is an excellent Apple, and extremely pretty. I may mention that Mr. Niven, of the Garden Farm, Drumcondra, has a large collection of the best fruit, grown in Ireland; and that at Charleville Forest, near Tullamore, is a large fruit garden, with an old orchard, where amongst most of the new kinds of fruit may be found several old and curious varieties. Charleville Forest is famous for its Grapes, Mr. Roberts, the gardener, having for some time taken the principal prizes at Dublin. This year, for the first time during a long period, the Quince ripened there, and a beautiful sight it was, the rich, golden fruit, with a russet tinge, hanging in profusion round the tree. Amongst the old sorts of Pears found in Ireland, are the old Portugal, North Royal, and Green Chisel; but the absence of sun does not make the climate of Ireland very favourable to the growth of Pears. One of your correspondents has made inquiries concerning the Silver Fir. I have planted it a good deal on the borders of Lake Bleda (Lough Ennell), and found it suited to the perfection. It stands wind and storm like the Austrian. For the first few years it requires shade and partial protection. It is admirable associated with the true Highland Pine. There is a good deal of limestone in my soil, and some Firs do, as a consequence, thrive. I have also planted the Nordmanniana, which promises to be the finest and hardiest of all the silvers for general purposes. When old it must be splendid, and I have found it less unattractive than the nobilis. Of the magnifica and amabilis it is difficult to say much, as they are too expensive to plant in quantity, and the latter is not to be got from seed. Of their beauty there can be little doubt. Another tree, the excellence of which cannot be overrated in Ireland, is the *Cupressus macrocarpa*. It is not only hardy, but shows no dislike to limestone. Its spreading habit, the darkness of its foliage, and the rapidity of its growth, ought to make it a very valuable when associated with architecture. *Brinsley Marlay, Jan. 25.*

Transpiration of Leaves.—Pray afford me the opportunity to record the following suggestion to the young from many, I believe, your readers. The process of transpiration is carried on most freely during sunshine, and by plants most largely surrounded by humidity. Has it ever been noticed that under such conditions certain plants form and retain upon portions of their leaf surface minute drops of actual moisture, whilst a majority existing under precisely similar circumstances show no sign of such? Not only may this be seen in glass structures, but also on some forms of vegetation out-of-doors. As an instance in support of the former, that may be seen within doors—the singularity of which struck me when I was an apprentice boy—I may mention the several varieties of stove Impatiens. As well as I can remember, the case stood thus:—After thoroughly syringing the stove, containing, amongst other plants, several species of this genus, on a midsummer afternoon, when all the moisture expended had been in a manner absorbed by the dried up leaves, the minute drops of water, or, as I used to suppose, exude from the leaves. This, if my observation be right, bears out your assertion; and why should it not be right? For if transpiration does take place, why should not some plants having larger stomates than others admit the egress of moisture more freely at such times when all surroundings are favourable? In other words, if healthy roots under the most favourable conditions pump up an excess of food, of water, a resinous exude from the leaves, and through the surface of the leaves, why may it not be given off in certain instances with such freedom that from its very abundance it forms the globules of actual moisture which I refer to? As regards outdoor plants, I need but refer to the example afforded by thrifty, fast-growing, young *Cauliflower* plants. These are most noticeable after one of those early June showers which areso refreshing to vegetation. After the foliage of all other forms of vegetable life has become dry, the *Cauliflower* seems, if not to increase, at least to maintain observable moisture. It may be suggested by some, that these conditions are simply the result of the condensation of excessive moisture floating in the air; but this cannot be unless plants, like animals, possess a certain amount of warmth, the colder blooded ones being those which attract the vapour constituents of the air. Depend upon it, the facts of the case are as you have stated; transpiration takes place in the leaves, and the food exuding condition is at its maximum. I make these observations as a sort of suggestion, and not from any pretence of understanding the merits of this highly interesting subject in all its bearings. *William Earley, Valentines.*

Brown Scale and Hot Water.—I find with the usual common dressings for Peach trees, the brown scale is with some difficulty completely eradicated; the insects appear to find shelter in some nook, so as to prolong their existence. With the same care in dressing, the trees will in some years scarcely show a single scale, while in other seasons individual trees seem to be more or less infested. In November, when the trees were in a dormant state, I gave three, which were affected with brown scale, good syringings with hot water at a temperature from 175° to 180°, and I now think that I have mastered the scale. It being my first practice

with hot water in killing scale, I was rather anxious about the result. In a day or two I fancied that I could perceive the insects becoming larger, and raising themselves, as it were, off the shoots, when shortly they became detached altogether, and dropped as shrivelled matter off the trees. The blossom in my first Peach-house, looking well, the second is showing colour; and, up to the present, I can observe no harm done to the shoots or buds by the hot water. I think it is a capital dressing for brown scale, and quickly done, for I gave it them right and left on three successive days to make sure work, and now, when the scale is clean gone, the shoots of the affected trees appear of a spotted colour—green and brown. I remember a dressing for Peach and Nectarine trees some years ago, which I never saw again, but in one place. There is one thing I am certain of; during the several years that I was employed at the place, there was always abundance of Peaches and Nectarines to thin off the trees. The dressing was no more than soft water, train oil, and sulphur, applied to the trees with the garden engine when they were in a dormant state. The proportions of the mixture, from my memorandum-book, run as follows:—Half a pint of train oil to about 10 gallons of soft water, mixed with 1 lb. of sulphur; the whole when well stirred had a milky appearance, and I never observed that this dressing had any deleterious effect on the trees, as they were always healthy and vigorous. *J. Miller, Workshop Manor.*

Education of Gardeners.—May I venture to say a word or two on behalf of the young gardeners?—not that I do not blame the conduct of some of them in making bad acquaintances. Many young men, or rather boys, entering the bothy at the age of 15 or 16 years, imagine that the standard of manhood is to smoke, sniff, drink, and tell a good story. I am the son of a labouring man, with a large family, who was glad to get me off hand at a very small sum; no doubt my education was sadly insufficient, and therefore I feel the more strongly that head gardeners are often to blame for not looking more closely at the habits of their apprentices. The responsibility of the head gardener taking boys from the parental roof is a heavy one, and it is a duty incumbent on them to see what use the young men make of their leisure time, and to try and direct and guide the young men so that they become useful members of society. During my apprenticeship one of my fellow apprentices and myself were always to be at home, ready to be called on at any time when wanted. To pass the time, we set up each evening for a certain subject: in that way we made up a little for our deficient education. When I went out as a journeyman gardener I was bound to be in every evening, when not on duty with fires, at 10 P.M. My companion in the Latin Delectus was similarly situated. Young gardeners would do well to spend a few years in the Royal Gardens of Kew, the present of an education to its inmates, and to be trained for their wise and discriminating treatment of young men. Young men entering that establishment will find well-stocked houses, with plants from every clime, and a pleasure-ground remarkable for its beauty and for its collections of trees and shrubs, among which are some magnificent specimens; and last, though not least, there are the filled shelves of its useful library, and the lectures given by the various officials of that establishment. There is an idea among nurserymen and head gardeners that a young man from Kew is apt to be lazy, but I assure them this, as a general rule, is a mistake. I do not say there are not many opportunities in a large establishment for a young man, so inclined, to indulge himself; but, as a rule, their character is soon known to the efficient heads, and woe to that young man—no promotion for him. Now, if nurserymen and gardeners in general would encourage a sojourn at Kew, I think they might find a better class of young gardeners, but as it now stands the heads of this establishment find enough to do to get efficient men to fill their foreign places. In conclusion, I would say to nurserymen, head gardeners, and all connected with young lads from under the parental roof, try and act a father's part by them, and I think in a few years we should not hear so much complaining about the generally ignorant of young gardeners. My companion, to whom I have already alluded, and myself, are now both in good positions under a southern sun; and for my own part I am now thankful to the head gardener under whom I was placed in my boyhood, although I thought it very hard at the time. *A Forfarian, Madras, India.*

I have been reading up for this subject, for it is not complimentary to the gardener's son, being, more over, a gardener himself, should be classed among the thieves—not thieves of the nobler class such as formerly risked their lives on Hounslow Heath or Finchley Common, in order to rob the rich on their way to the metropolis, but thieves of that shabby sort who could rob a dust-bin, and steal the cinders. Coke is sold retail in Manchester by honest men at 5s. per cwt., and I am very ignorant of any prices where a bushel of cinders would fetch 8s. As for finding a wagon that they would contain 66 13s. worth of cinders, the bulk being just equal to 50 4-bushel sacks—that is to say, 15 sacks on end in the wagon, 15 on end over these, and 15 on end again by way of a third tier, and then 5 odd sacks on the top, which, reckoning 3 feet from the ground to the floor of the wagon,

would be 15 feet 9 inches in height—it is quite preposterous, supposing all the while that the plunder was in sacks; but, gentle reader, ask a man to load cinders till the quantity above stated is got into a farmer's wagon, without sacks, and that man will require no other employment for life, since they will only lie in a heap, just as water does, at an angle of 45°. Last, however, "Subscriber" says it is the test of bulk, let us look into the specific gravity of 100 bushels of coal, for he says, "the 200 bushels in the wagon were half coal." Now, 100 bushels of coal is, say, 33 3-bushel sacks, such as we see about London. Let us put 33 London coal bags, fully laden, into the bottom of a country wagon, and then stick 100 bushels of cinders over that, and let the jolly carrier try what his two horses could do with such a tonnage on the ups and downs of a country parish road. Counting the wagon 1 ton, and 4 tons and odd of coal, and the odd 100 bushels of cinders (not kept dry) at the mere make-weight of 28 lb. to the bushel = 25 cwt. more, we have a clear case that no such weight or measure was ever got into a wagon of the usual kind. "Subscriber" speaks of the load being sheep-gated, that is, having hurdles at the sides, but what is a 3-foot hurdle to the height of 15 feet, which, even if the cinders were in sacks, would be wanted for the wagon to contain the 200 bushels? For my own part I am certain there never was such a wagon of coals and cinders, and from the writer's own showing, I think most of your readers will now be at my way of thinking. The head gardener mentioned at p. 1637 (1870) must have been a shrewd fellow, able to play his part cleverly, when that garden was finally closed, as "Subscriber" says it was, nothing better could have happened, as it would be a scandal to the whole neighbourhood—that is to say if ever such a garden had existence, which I do not believe, or that there ever was such a gardener. It is not my business to write an apology for the shortcomings of gardeners, but who would lie under such an imputation as this coal-dust and cinder robbery?—

"We dare depart, in utter scorn

Of men who such a name had borne."

I find that the Editors, in the first paper written on this subject, have quoted Dr. Lyon Playfair, who cries up a high standard, as he says, to elevate the man, but does not hold with teaching, as he tells us, "about the Jewish wanderings," or in other words, about the Jewish wanderings, in which the Jewish leader Moses got direct from God, and the Ten Commandments, without which the educated man might be a consummate craftsman, but not necessarily instructed in honesty. Without this no gardener would be employed, for this is, indeed, a necessary item in every gardener's education; and the gist of "Subscriber's" argument amounts to this, that he had not been a day's work with. Peter Bell. Frisch thinks that young gardeners are overpaid. This is something quite new, and looks hopeful. He speaks of lads at 14 or 16 years of age getting seven to nine shillings a week, and having no apprentice fee to pay, in the counties of Aberdeen, Forfar, and Kincardine. The wages in Aberdeenshire and the neighbouring counties for gardeners, young and old, for the last 40 years, has been simply what it has been, and has good reason to know. I was born there, duly apprenticed, and paid a fee, and instructed in gardening, and served a time to the business there, and this little matter just alters the case. Any number of lads, young men, middle-aged, or otherwise, employed in a garden, are decidedly labourers whom no one has been paid to teach; indeed, no gardener could teach the elements of botany, or, indeed, any plant lore, to an ordinary labourer, whether he be man or lad, that could hardly read. The names of plants present violent uphill work to any lad that has not been well grounded in the rudiments of Latin. It is easy enough to set up a scarecrow of a gardener. Sir Walter Scott did this ably in his "David Dalziel" and the famous garden of "Druidical"; but all arguments founded upon such caricatures from the bothy are quite beside the mark. First of all, the man has been born a gardener, he has to be by nature fond of rural affairs; his parents or grandfathers were moderately rich, so as to be able to maintain him at school for six or seven years; and he ought to be early impressed with religious teaching, so as to be honest and truthful from very habit; and all this schooling and moral training has to be got through before the youth begins to learn gardening. He will now have to be instructed in all the practical details of the business, and who does not tell us of our gross ignorance of certain subjects in which they have been instructed, they forget that no sane man could trust a learned doctor to thin a bunch of Grapes intended to be exhibited for a prize. The Greek root for the grammarian: the Grape, root and branch, fruit and flower, for the gardener,—neither should be lightly spoken of, for the last is valuable education as well as the first. The gardener's place as a gentleman in the garden establishment, is next above the bailiff, and next below the cook, and in the days of Abercrombie and Mawe the gardeners were livery and hair powder. Most gardeners, now, have a house of their own, and very little to do with the indoor servants; and, as for any respectable gardener allowing his young men to be hangers-on about

the servants' hall, or frequenting it himself, it may be the exception, but it is certainly not the general practice. Young gardeners are usually better employed, and have neither time nor inclination for that kind of thing. Few writers have any idea of the great bulk of work to be done in learning gardening, and there are very few indeed that have been fortunate enough to have a fine good garden, so as to get them out of the toil and anxiety they have gone through. The trades unions have clearly pointed out the way that gardeners have to be examined. The bricklayer, tailor, carpenter, &c., who represents himself to be one of these, must produce evidence of his working abilities, by having been duly apprenticed to the business; and that, and that only, makes the bricklayer, tailor, &c., and no further questions are asked. In these cases, for all that need be known. Now, as a child can easily ask a question that no man could answer, I am afraid that the examination test is set too high, for that which is quite practicable and necessary for a medical man, a lawyer, or a clergyman to go through, could never be applied to gardening, because no living man has learned above one tithe of what the body collectively know, and yet the employer must be contented with this small amount in his gardener selected from the situation most resembling that which he is to fill. It is here that the great value of an apprenticeship is seen, as the man claims respect for practical experience, and has his claims allowed. The man who has been taught how to shoe a horse, weld a coulter, or ring a wagon-wheel is reckoned a blacksmith, and the world at large gives him credit for his learning in that line; and, although good scholars might smile at his wages, and, though good scholars might smile at his wage-keeping, they would respect the successor of Tubal Cain as a hammerman, and as a man. However much scientific men may despise what Dr. Lyon Playfair calls the wanderings of the Jewish people, it was just during those very travels that men first got that rule of life in the Decalogue, which has ever since elevated every man who has honestly tried to keep it. Surely Mr. Bonnett is joking when he refers to his wage question, or he must believe the Editors have been napping when we see in a journal professionally published in the interests of gardening, a statement that young gardeners are grown independent and purse-proud from high wages. No one, however, can know better than they how sadly low wages cripples the march of intellect among young men. *Alex. Forsyth, Salford.* Enough has now been said on this question. [Eds.]

Pelargonium Nomenclature.—The extract from the *Florist* of a suggested classification, together with an allusion to my complaining of the indefinite nomenclature of the sections and varieties of the Pelargonium, fails to explain itself without reference to the collateral remarks contained in my paper. I there complain of the indiscriminate application of the names "Geranium" and "Pelargonium," of the misapplication of the name "Zonal," and the necessity for the means of more readily distinguishing the different sections, and also of defining the class to which the varieties belong. I rather inclined to the opinion that if the name of "Geranium" was definitely understood to represent what is called the "scarlet" section, and the name of "Pelargonium" the large-flowered section; it would render the two sections which are so distinctly different in the qualities more easily distinguishable, and facilitate the classification of their varieties. The Editor of the *Florist*, in a foot note, states the fact that the name of "Geranium" could not correctly be applied, as they are all alike "Pelargoniums," that the Geraniums are border plants of another character altogether. I grant that the Editor's remark is perfectly correct—that they belong to the sub-family or genus Pelargonium, but there is some foundation for the popular error, as they are nevertheless, all of the Geranium family, and by common consent the name has from time immemorial been associated with the scarlet section, until it would be most difficult effectually to eradicate the error. The appellation "Scarlet Pelargonium," applied to a class of plants which produce white, lilac, pink, and flowers of all varieties of colours, appears to me to be equally incorrect. To distinguish the large-flowered section from the scarlet section, in the present nomenclature, it is necessary to resort to the unbotanical and unpoetical designation of "show" Pelargoniums. Again, the term "Zonal," as at present applied, is surely also incorrect; it in no way indicates the type of flower, but refers to the marking of the leaf, a marking which many of the so-called Zonals do not possess at all. The name Zonal would be in its proper place, and would be the best way to distinguish the plants cultivated for their foliage only. The want of definition of the flower entitled to compete in a particular class has, since the so-called Zonals and Nosegays have become blended by breeding, caused difficulties, to avoid which in my suggested classification I propose a "decorative" class to include all, with the exception of those claiming florists' qualifications. Supposing it were deemed expedient for convenience to transfer the name of the popular error by assigning to the scarlet section the name of Geraniums. Head the first division of my suggested classification "Pelargoniums," in my second division substitute "Geraniums" for Scarlet Pelargoniums, and in the fifth class of the second division, viz., the "Zonal" section, again sub-

stitute the word "Geraniums" for Pelargoniums, and I think it will be seen that the increased use of this slight botanical error would be worth the trouble that would accrue to the nomenclature. *John Dray, Stoke Newington.* [But, then, how distinguish between these "Geraniums," and the real Geraniums? Eds.]

Crickets.—Can any of your correspondents give me a recipe to get rid of crickets? They are a perfect nuisance here, eating the Cucumber and Vine leaves by wholesale. I am aware that oatmeal and arsenic will poison them; but the question is, how am I to procure the latter? I have tried two different chemists, and they date not, or will not, sell it. Any information will be thankfully received, as they are about the most troublesome pests I have ever had to deal with. *J. Edwards, Hanworth Park Gardens, Hounslow, W.*

Odontoglossum bictionense.—In p. 45, "T. P." Forthgidden, asks if it is not unusual for this plant to show a flower-stem 24 inches in length, and then throw out a bunch of leaves, and a miniature plant at the point? It is not at all unusual. A very fine plant in the Royal Gardens, Kew, was shown in the October 1869 catalogue. In my mind, instead of producing flowers, it enlarged its bracts (especially in the upper part of the shoot) into leaves about 2 or 2½ inches long; to altogether neglected the formation of flowers in the axils, but formed such miniature plants as "T. P." mentions. In October, 1870, another spike made its appearance, and for some time it was rather undecided whether it should bloom, or again run to seed, and plants; but on its being lifted to a situation where light and air were admitted more freely, it forgot all its rambling habits, and is now displaying its beautiful flowers. *M. W.*

About Potatoes.—I cannot accept as correct the theory advanced by Mr. Earley (p. 45) as to the connection that may be presumed to exist between ill-ripened tubers and the Potato disease. The exceptionally dry summers of 1868 and 1870 produced the phenomenon of super-tuberization in the Potato in a larger degree than it has ever previously been developed. What may be the result this year from the seed crop saved from the late growths of 1870 it would be premature to speculate; but it cannot be denied that the crop of 1869 exhibited no special features either of disease, weakness, or decay arising from the imperfectly ripened nature of much of the seed that was then planted; and if that example is to furnish us with any data worthy of reliance, I should say that from the unripened tubers of last year we shall reap no great evil in the year 1871. I am the more anxious to guard readers against forming opinions too quickly upon the matter, as it is just possible that a summer in which a much greater amount of moisture may prevail than has been the case for the last few years. Should this be so we may reasonably look for a considerable development of our old enemy, as I believe it is not "dead, but sleeping," and only awaiting the season of cloud and damp to start it once more into vitality. Should such be the case this year, we may be told that the disease was the result of last year's ill-ripened crop, while the maturation of the seed is due to the atmospheric changes that gave it life. I am not so sure as Mr. Earley that complete ripening is essential to the production of good Potato seed. The rules that govern the maturation of all ordinary seeds do not apply to Potatoes, as the former must be ripe, according to the laws of Nature, to germinate into growth. [Some seeds will grow before they are ripe. Eds.] But Potatoes may be lifted at almost any stage of growth and put by until planting time, when it will be found that they are as full of vitality as are those taken from the most ripened crop. My experience of imperfectly ripened tubers leads me to believe that the most effectual mode of assisting an imperfect maturation is to allow them to remain beneath the ground as long as convenient with safety, and then when lifted to spread them out thinly in a dry airy house or shed, where exposure to the light and wind will help materially to ripen them, and finally fit for future planting. A far more serious evil to our Potato crops than planting unripe seed, and one that is far more productive of weakened constitution, is the practice by large growers of "pitting" their seed tubers, or of placing them in large heaps in barns or outhouses covered up thickly with litter, and where they lie untouched until the heaps or pits have "sweated" so much, that considerable premature growth has been induced, and the vitality of the seed is off to the manifest waste of "force" (I think "D. T." for this word) in the tubers; and oftentimes, in a mild winter, this exhaustive process has to be repeated before planting time. Where such is the trying ordeal that Potato seed has to undergo, it is reasonable to expect a good crop, or that such produce can withstand the attacks of an insidious disease? There are two points in connection with the cultivation of the Potato of great importance than the housing of seed during the dormant months of the year; and any grower who has a thoroughly sound, healthy, and unexhausted stock of seed to plant in the spring, starts in his Potato culture with far better chances of success in the end than any other does who has not made the winter housing of his seed a matter of the first moment. When I brought all my stocks of seed Potatoes to this place,

my first consideration was as to where I should house them, that they might obtain the essentials of a dry bed, light, and air. Having more room in one of my greenhouses than was for a few months needed for plants, I utilised one of the side beds, first spreading over the soil some dry ashes; upon this the Potatoes, in their respective sorts, were laid thinly, and, although some of my friends prophesied premature growth, and other evils, I had no fear as to the result; and, although almost the whole of my crop of last year were lifted in what might be called an unripe state (much of the haulm being literally burnt up with the heat), yet I have never had seed that looked sounder, was firmer, or more healthy, and in which there had been less growth than I have for my planting next March. It is worthy of note that these Potatoes withstood 3° to 4° of frost three nights in succession at Christmas with impunity, even the minute shoots, first starting, not being injured, thanks to the hardening weather they had undergone. As bearing upon Mr. Earley's proposed experiment, I may mention that one wet day before Christmas I looked over the stocks, and cut into halves some of the largest, all of them soon formed a callus over the wound, but with this difference, that, whilst some are still quite dry, others, such as Flourball, Gleason's Late, and Victoria, have generated all over the wound a wet nauseous mould, thus showing there was a large proportion of moisture in their formation. *Alex. Dean, Bedford.*

Flower Pots.—We have in this locality a potter who is making flower-pots, the larger sizes down to 12, with movable bottoms, so that by standing them upon a block of wood or another pot, and turning, you can get them to grow out bottom and all, to examine its roots, or to repeat it without having to turn it upside down, which I think a great acquisition, especially in the case of large plants. Not having ever seen or heard of this kind of pot before, I do not think they are very common, but they may be made so by giving orders to any potter. Thinking that some of your numerous readers might be glad of the information, I am induced to give it. *H. P., Tunbridge, Kent.* [Not new: it is the old West Kent pot. Eds.]

Boilers and the Frost.—There seems to be no direct plan to prevent the explosion of hot-water boilers in frosty weather. Many plans have been proposed, but of no practical use. It is not for us to say that such a year as the present has never been foretold of, and think I have done all that can be done, and still suffer our female domestics to be blown to pieces. My plan to prevent these sad occurrences is to have a small cylinder on the flow-pipe close to the boiler, as incrustation is less likely to occur there than on the boiler. On the boiler a safety valve of good size, working in a discharge pipe. Attached to the piston-rod is a long lever, with a small weight at the end, and a small valve in the discharge pipe in a stuff box, similar to a force pump. When undue pressure occurs, the piston-rod will lift up the lever, also the valve, and the steam and water will pass down the discharge pipe into a drain. A wire could be affixed to the lever passing into any of the rooms of a house, and the master or mistress could, by pulling the wire, open the valve as often as they liked in frosty weather, thus taking some of the responsibility off the servants. *Isaac Delnam, Much Hadham, Herts.*

Insect Destroyers.—To meet the enemy and destroy him without killing or damaging the plant, and to do it more effectively, economically, and expeditiously than by hand-labour, is the one thing now desired. I certainly think that every practical man will regard as one of the greatest and best helps ever placed at his disposal, when a specific shall be placed in his hands which he can use with confidence and success. In my own experience I have tried many—some of my own invention, and some sent out by others, but I regret to say that I never found the one thing needful; for the last few years I have not had an opportunity of trying experiments, but in travelling through the country I have seen many results, which have helped me to form my own conclusions. Several of the Orchids, and some very tender young fronds of Adiantum, &c., had the scale and green-fly dead upon them, while not a pinule was either discoloured or in any way injured by the mixture. These results I saw, and I was pleased to read in the article before alluded to how well the mixture served the purpose for which it was tried. During last autumn I was in the neighbourhood of Liverpool, and there heard much of the mixture, and saw all sorts of insect life, invented by a gardener, Mr. Cowen; and while visiting Mr. Smith, of Calderstone, he showed me an Acacia which had the bark completely and thickly coated with the white scale, but on a certain portion of the stem some of Cowen's mixture had been applied, and every scale was as completely killed and removed as if the bark had been peeled and polished. I heard that this mixture would kill anything and never injure the plant.

I can say that the Peach trees in a very long range of glass had not a single scale upon them, and I was informed that the mixture not only acted as a preventive, but also as a perfect cure in all cases. Feeling anxious that some test might be adopted to prove which mixture is the best for killing all forms of insect life on plants, without injury, I have thought, and respectfully submit to parties who vend mixtures of this character, that they should enter a contest at some of the great exhibitions, say at London, Manchester, York, or Liverpool, and there, before a committee chosen for the purpose, try their different mixtures upon plants infested with different forms of insect life. By the aid of a small magnifying glass the result could be ascertained, and we should be put in possession of information which, while it would expose quackery, would give credit and profit to the best article. *William Payne, Chester.*

The Proposed "Challenge Cup."—Mr. Marshall's proposition for a sort of horticultural produce stakes, noticed in last week's *Gardeners' Chronicle*, looks better on paper than it ever had a chance of doing. It is proposed that those who enter the arena are each to procure an equal number of plants of similar sorts and size, from which a certain number are to be exhibited at some subsequent time to be agreed upon. To ensure identity they are to be marked in some way [Sealed, we believe. Eds.], in addition to which they are from time to time to be subjected to a sort of inquisitorial inspection (a proceeding which no man possessed of a spark of honour would submit to do), which at once implies that the scheme is open to practices the reverse of honest, and, indeed, this is the case to an extent that it would be difficult to equal by any other arrangement, and which all the markings and inspections possible will be utterly inadequate to prevent on the part of those who will not scruple to embrace such a tempting opportunity. This, in itself, is sufficient to prevent any one who acts honestly in these matters from having anything to do with it. Granted that a given number of plants to each exhibitor, and all marked. What is to prevent any one so disposed from procuring a duplicate number, and marking them similarly? or, in replacing any that may die or not do well? And what is the prize held out? "A challenge cup!" Verily, it must be supposed that the plant growers of the present day are so fond of exhibiting that they will rush into anything. It is a great mistake in this, as in all other things, to originate anything without first considering the premium upon trickery, as the proposed scheme, in my opinion, would do. It is even worse in this respect than the classes for plants in limited sized pots, where the direct imposition is so frequently resorted to of growing a portion of the plants in larger pots and reducing them for the occasion of exhibition (even in the case of the best hard-wooded plants). These classes are also a mistake in being diametrically opposed to the object of the exhibition, as the exhibitors are to show fairly and induce to keep these plants in those limited sized pots until they are stunted and worthless. Regarding these classes, notwithstanding the objections I have stated, it is only reasonable that they should exist to a limited extent, so as to accommodate those who have not larger plants; but they ought not to preponderate, as they did last year at the greater number of metropolitan shows, to the almost entire exclusion of the larger plants; and although it has become with some people the fashion to decry these, are still much better evidences of good culture; and in the absence of them those exhibitions were, except in quantity, nothing superior to anything that might be seen at any third-rate provincial town. *T. Baines, The Gardens, Southgate House, Southgate, N.*

Budding Vines.—As your correspondent, Mr. Lawrence, has again brought forward the subject of Vine budding (see p. 1704, 1870), perhaps the principal details of this letter, which I have received from Mr. Thomas, Drayton Manor, may not be uninteresting to your readers. In a letter I received from him lately, he says:—"For curiosity's sake more than for any other reason, I have inserted a bud of a Black Alicante on a Child of Hale I have in the late vinery here, and it has taken well." Being interested in the matter myself, I wrote to Mr. Thomas for more particulars, and he has replied as follows:—"On referring to my note-book, I find that I budded the Vine mentioned on September 15. I selected a bud, not too large or knotty, of the kind mentioned. It was taken off with a sharp knife, having a portion of the wood also with it. That portion of the wood that was attached I cut off at each end, leaving only the centre or eye. I consider it of importance to have a sharp knife for preparing the bud in a proper manner. The part of the process remaining is very similar to ordinary Rose or fruit tree budding. It was the 'cane' and not the spur that I budded, and in performing the operation I made a clean thorough cut, and did not cut the wood deep enough to lay in the bud well. It will not hurt the Vine, and when tied round firmly with matting it soon heals up. If the weather after the operation should continue dry, I consider it of advantage to moisten the bud at times with a wet sponge, and in the course of a few weeks the matting should be examined, to see that it does not bind too tight." Mr. Thomas further remarks that he is now sorry he did not bud the Alicante, as he could then have had a crop of Alicante

publication of a complete list of local and provincial names. But it is not too much to say that in learning and ingenious hypothesis Mr. Prior's work is far in advance of any that has been published, either at home or abroad, and must be the basis, at any rate, of any more detailed work, such as that last referred to.

When the first edition was published a lengthy notice of it appeared in our pages, from which, and from the extracts we have given from time to time, our readers will have been enabled to form a fair idea of the contents of the work. A detailed review would, therefore, now be unnecessary; but we may briefly notice a few of the more important improvements which occur in the edition. The most striking of these is the systematic list with which the book concludes, in which the Latin names of the plants are alphabetically arranged, each being followed by its English equivalents; and the various names of each plant are thus brought together. Strictly local names are eschewed by our author, and the list is consequently somewhat limited, *e.g.*, "Hunger weed" is given as the only equivalent for *Ranunculus arvensis*, which owns many another uncomplimentary title, such as "Hellweed" and "Starwee-acre," in various parts of the country.

Certain trifling, probably casual, errors in name, which appeared in the first edition, are here corrected; and the list of works referred to is much extended; and there is considerable condensation in some of the explanations. Thus, while the bulk of the book is but little increased, much new matter is introduced, and the whole has become more intelligible and interesting. Among the names introduced we notice Crazy, or Craisye, the Wiltshire and Gloucestershire name for the various species of *Ranunculus* known commonly as "Buttercups." This Dr. Prior considers as a corruption of Christ's-eye, *oculus Christi*, the mediæval name of the Marigold, which, he says, was transferred to other yellow flowers. This may be so; but to us the name appears to have more connection with Cress—a supposition supported by the fact that *Buttercups* are sometimes called "Yellow Cresses," and "Butter Cresses." Speaking of *Buttercups*, we are tempted to suggest, with due deference, that the obvious derivation of the word may, after all, be the correct one; the "butter" referring to its colour, to the well-known amusement of children in connection with its flowers, or to the supposition that it gave its colour to butter; and the "cup," characterising the shape of its blossoms. The name "broom clover," from which Dr. Prior would derive the first half of the word, seems to have been confined to the garden double-flowered variety; and plants so well known as the three common species of *Ranunculus* would scarcely owe their common name to a cultivated form of one of them.

We are reluctant to leave with so brief a notice a work which is simply indispensable to any one who would possess even a slight knowledge of the meaning of English plant names, and who would console ourselves by doing by the thought that Dr. Prior's volume, like "good wine, needs no bush," and that it will be welcomed by many readers who, in spite of Shakespeare, believe that there is something "in a name."

— Under the title *Method and Medicine* (Churchill), Dr. Balhazar Foster has published an essay which, although specially written with reference to medicine, applies equally well to *literature*, as it appears, with a view to silence the senseless quibbling of those, and there are many, who decry medicine, on the ground that it is not a science, but a mere collection of empirical rules applied hap-hazard, fortunately or unfortunately for the patient, according to the degree of endurance he possesses, and according to the greater or smaller amount of experience and skill possessed by the practitioner. Now the reproach is just if applied to those so-called "empirical men" who avail themselves of their father's experience and their forefathers' theories without any attempt on their own part to test the value of the information so obtained, still less to increase the stock of general knowledge. That medicine is not an exact science in the sense that the much simpler sciences of astronomy or mathematics are, forms no real ground for reproach, except in the mind of those too ignorant or too thoughtless to consider the meaning of what they say. In the medical sciences, as precisely on the same footing as physiology generally, and the same methods and means required for the successful prosecution of the one study are required with the necessary modifications in the other. We allude to the subject here because, to a very great extent, practical gardening bears the same relationship to physiology and botany that medicine—that is to say the maintenance of health and the investigation and cure of disease—to anatomy and physiology. In deciphering the phenomena of life, whether animal or vegetable, with a view to practical ends, we must avail ourselves, as Dr. Foster well puts it, of observation, experiment, and comparison. We have in this country plenty of observers, but few of them trained to observe properly. We have comparative anatomists (we are now referring exclusively to botanists), but we have very few experimenters. Every gardener is thus, in a sense, an experimenter; but as every medical practitioner is an experimenter; but few, indeed, are there in this country who devote themselves to the study of the physiology of plants by actual experiment, with all the means and with all the precision and skill which such

experiments demand; and yet improved methods of cultivation, and what is more successful, medical practice, depend now-a-days mainly on the experiments made in the laboratory of the physicist or chemist; experiments, too, made in the first instance for purposes of pure science only, and without special reference to utilitarian applications.

— *Alpine Plants* (Bell & Daldy) is the title of an illustrated work issued in numbers—monthly we presume—devoted to figures and descriptions of the most striking and beautiful of alpine flowers, and edited by Mr. D. Wooster, whose name will be familiar to horticulturists as the assistant of the late Mr. Loudon in the preparation of many of his later publications. Of the execution of this work, in each shining number—we may speak in commendation. They are printed in colours, very neatly executed, and generally give sufficiently faithful portraits of the plants; indeed the drawing of the subjects is excellent, and in the delicate tinted flowers especially the colouring, too, is very satisfactory. The text is confined to a brief description of the plants figured and of the general features of the order to which they generally belong. The object of the popular style. Besides the true alpine the work is evidently to include any ornamental hardy plants that come to hand, since we meet in the numbers before us with the North American *Cypripedium* spectabile, the Madeira *Orchis foliosa*, and the Japanese *Fuchsia undulata*; the book will not, however, be less acceptable on that account. The arrangement of the subjects is a little awkward, but it has been adopted to economise space. Thus the number of subjects on the plate varies from one to three; the selections being wholly miscellaneous; and where the subjects are mixed on the plate, the figures stand apart, whole plants and fragments thus occurring in close proximity. This gives an appearance of irregularity and want of order, which might be avoided by associating on the same plate subjects more uniform in size and habit, which might easily be done as the choice is unlimited. This, however, is a minor defect, and more than counterbalanced by the cheapness of the publication, and the general excellence of its contents.

Florists' Flowers.

In continuance of our remarks on the florists' flowers of the last year, we may state that careful selection and patient cross-breeding of the Cyclamen persicum have given us some beautiful and richly coloured varieties, and during the past year three of these were adjudged worthy of First-class Certificates, viz., *C. persicum kermesinum* (Welsh), the flowers a bright deep rosy crimson, the mouth rich carmine-crimson, a very distinct and striking variety; *C. persicum giganteum* (Welsh), the flowers unusually sized, of a rich rosy purple hue, a true large-flowered form of this exquisite winter blooming tuberous-rooted plant; and *C. persicum purpureum* (Goddard), the flowers bright crimson, much suffused with blue. How these fine flowers are to be perpetuated other than by the somewhat uncertain mode of seeding from them, it is difficult to state; at any rate, they must give us a progeny of fine, high-coloured flowers, which, as we have seen in collections, the general complaint being that there is a too great a preponderance of light varieties.

Dahlias are less numerous than usual, both in numbers and first-class varieties; but the season, from its commencement to its close, was one singularly hostile to the fine development of the Dahlia, the atmosphere being hot, dry, and withering. Annie Hobbs (Hobbs), a white self; Marchioness of Bath (Wheeler), tipped with rose on a light ground; Monarch (G. Rawlings), shaded crimson, tipped with red, a splendid flower; and Yellow Standard (Parker), a yellow self, received First-class Certificates; while Certificates of the second class were given to Flower of Kent (Harris), a soft yellow self; George Peabody (Rawlings), dark maroon, tipped with crimson; Incomparable (Keynes), buff ground, tipped with heavy carlet; James Cocker (Keynes), a large bright crimson self; Mrs. Vane (Parker), shaded with dark red; Prince Imperial (Perry), orange, with shaded centre; Robert Lambert (Hobbs), shaded dark maroon; and Victory (Keynes), rich shaded crimson. Of fancy varieties, but few have put in appearance; of these First-class Certificates were awarded to Flora Wyatt (Keynes), dull orange flaked with orange-red; Gem of the Season (Harris), an improved Standard's Gem; and Richard Dean (Keynes), a yellow self, with a white eye. Of the second class Certificates to Flossy Williams (Keynes), the ground blush, the edges pale lilac, and striped with purple. That out of only six fancy flowers three of them should receive First-class, and a fourth a Second-class Certificate, seems to indicate an unusual average of excellence in the new varieties.

In the pretty carmine-coloured form of *Epacris hyacinthiflora*, shown by Messrs. Rollisson & Sons, and awarded a First-class Certificate by the Floral Committee, we got a good addition to these useful winter blooming plants, as to a great profusion of bloom there is joined a very attractive hue of colour, the flowers being much tinted with a deep bright rosy pink.

Fuchsias appear to multiply as rapidly as any other class of florists' flowers. A list of Fuchsias has as

much obesity of proportions as one of Dahlias or Zonal Pelargoniums, and, while some good things are yearly added, a new Fuchsia is rarely produced at one of our horticultural meetings. At one of the meetings of the Royal Botanic Society, Mr. H. Cannell, of Woolwich, who appears to be the special representative of the Fuchsia in the councils of florists, exhibited Champion of the World, a huge ungainly variety, of immense proportions, the tube and sepals scarlet, and the corolla dark plum-purple. Philosophers tell us there are compensations in Nature, and the principle was well illustrated in this monstrosity, as, while there was a gain (?) in size, the flowers were very sparingly produced. Somehow or the other it got a First-class Certificate; but then this was not the only surprise that came to the horticultural world during 1870. Mr. George Smith, of Islington, whose long connection with the Fuchsia warrants the belief that he would not offer a new variety unless fully convinced of its needful utility, offers no less than a double variety, with a pure white corolla and brilliant carmine-scarlet tube and sepals, said to be the best formed of all the Fuchsias with double white corollas yet distributed; and Purple Prince, tube and sepals glossy carmine-scarlet, and rich violet double corolla, reported to be of high-class quality, and very fine. It requires a very fine dark Fuchsia to beat some of the varieties already in cultivation. The splendid flowers have come to the fore during the last few years. Our raisers have already given us striped corollas; when we are to see a really distinctive variety with striped tube and sepals? At the present time novelty is the prime feature in request among Fuchsias. In the spring Mr. B. S. Williams sent out *Striata perfecta*, said to be a charming and effective variety, the tube and sepals waxy white; corolla bright carmine, striped with broad lines of pure white. If this is really what it is represented to be, it should be shown next season.

New Gladioli come mainly from abroad, and the year 1870 will be long remembered as a most disastrous one, in so far as it affects the Continental growers. A war almost as unprecedented in some of its attendant circumstances as it is important in its issues, has laid waste many a peaceful spot hitherto sacred to the highest efforts of the florist's art, and the floral treasures have perished with the crops of the fields. Perhaps a few new Gladioli may reach us from France, the source from which so many have been drawn; many cannot be expected. As far as home is concerned, Mr. Douglas, Loxford Hall Gardens, produced a splendid flower, appropriately named John Standish, of a delicate flesh colour, stained with pale crimson, and marked on the throat with pale purple. This variety forms a noble and massive spike, and the flowers are of fine form and quality. We merit the First-class Certificate awarded to it by the Floral Committee. Messrs. Kelway & Son, Langport, have produced a few seedlings, the most distinct being Colonel Pinney, white, flamed with rosy lilac, and having purple pencillings on the throat; Marchal Bazine, scarlet, flamed with carmine, the lower petals having a blotch of ivory; and Marguerite, pale creamy white, shaded and flamed with rosy purple.

Long-stemmed heavy-looking flowers, like *Gloxinia* will hold its own for many years to come, while for exhibition purposes commend me to a well grown well-flowered group of *Gloxinias*. I once saw at an exhibition some *Gloxinias* flanking groups of the dingy coarse-grown stove *Begonias* one too often seen, and which look as if they never could be made attractive when so shown; the juxtaposition of glowing cheerful *Gloxinias* quite lent a radiance to the *Begonias*, and made them for once bearable. First-class Certificates have been awarded to Alice, a very attractive drooping flowered variety, the throat creamy white, the lobes rich plum-purple, shown by Messrs. Rollisson & Son; and Scarlet Gem, a very striking erect flowering variety, the flowers bright scarlet and very attractive, shown by Mr. B. S. Williams.

With the exception of two or three wretched flowers that might have attracted the attention of the florist 15 years ago, and which still find their way to the meetings of the Floral Committee, the only new flower of the season was Rose Queen (Porter), of a bright deep rose colour, and somewhat promising. This was awarded a Second-class Certificate. Though Mr. William Chater did not send new flowers to any one of the meetings of the Floral Committee, he yet gave a taste of the quality of some of his new flowers at two or three of the larger shows, having them in superb condition. Such fine varieties as Alfred Chater, mottled blue and flushed with red, and the old-fashioned yellow; Champion, deep shaded crimson; Conquest, bright scarlet-crimson, very fine and striking; Eclipse, bright rosy red, very fine; Joy, delicate flesh, tinted with deep rosy carmine; Majestic, scarlet, suffused with buff; and Marvellous, deep orange-buff; will be found to fully sustain Mr. Chater's reputation as a raiser of the Hollyhock.

That six First-class Certificates should be given to Lilies in one year is quite unusual, but the past season was unusually productive in this respect. Foremost among them must be placed the hybrid Lily raised at Stanstead Park by Mr. George Thomson, and said to be the result of a true cross between *L. auratum* and *L. speciosum*. This new form has the flatter form and rich perfume of the first-named parent, and the form of petal of the latter. It has received the provisional

name of *L. Purity*; but whether it is to be regarded as a new species, or merely a variety of one of the species from which it originated, has not transpired. *L. auratum* Charles Turner is one of the finely marked varieties of *L. auratum*, so often found among imported bulbs; it is a large and bold flower, the golden band being replaced by a suffused tint of reddish brown. Rubro-vittatum and virginalis are two distinct and good forms of *L. auratum*, in the possession of Mr. W. Bull, the former being very finely marked. *L. Leitchii* is a handsome and distinct species, the flowers yellow, much spotted with dark purple, and recurved like those of one of the Martagons. *L. longiflorum* alba-margina-tum is a very acceptable type of variation, and in *L. tigrinum splendens* and *L. tigrinum flore-pleno* we get two magnificent forms of this well-known Lily that will be welcomed by cultivators. A revision of our nomenclature of Lilies is much needed, as a good deal of confusion exists, and now that Mr. G. F. Wilson and others are turning their attention to the provision of collections of this flower, a good step is being taken towards a revision. (See p. 104.)

In *Lobelia erina* speciosa *Purity*, there is much reason to believe a decided advance has been made towards a useful white bedding Lobelia. Hitherto, such white Lobelias as Snowflake, Miss Murphy, and Queen of Whites, have fallen very short of what was desired; while the so-called white forms of *L. speciosa* have always had more or less of a blue tint in the flowers. In Mr. Chambers' variety, *Purity*, there was observed all through the summer an entire absence of the blue tint, and when it was shown in London it was in bad condition. I have no hesitation in recommending it. *R. D.*

(To be Continued.)

THE WEATHER.

STATE OF THE WEATHER AT BLACKHEATH, LONDON, FOR THE WEEK ENDING WEDNESDAY, JANUARY 25, 1871.

1871. MONTH AND DAY.	Reading of		Hygrometrical Deduction from Glaisher's Tables, 5th edition.					
	Barometer reduced to 32° Fahr.	Ther- mo- meter.	Ther- mo- meter.	Wet Ther- mo- meter.	Deg. F.	Deg. C.	Deg. F.	Weight of Vapour in a Cubic Foot of Air.
January.								
10. Thurs.	30.20	35.0	35.0	35.0	35.0	2.0	100	0.8
11. Friday	30.20	35.0	35.0	35.0	35.0	2.0	100	0.8
12. Satur.	30.20	35.0	35.0	35.0	35.0	2.0	100	0.8
13. Sunday	30.20	35.0	35.0	35.0	35.0	2.0	100	0.8
14. Mon.	30.20	35.0	35.0	35.0	35.0	2.0	100	0.8
15. Tues.	30.20	35.0	35.0	35.0	35.0	2.0	100	0.8
16. Wednes.	30.20	35.0	35.0	35.0	35.0	2.0	100	0.8

1871. MONTH AND DAY.	TEMPERATURE OF THE AIR.					WIND.		RAIN In inches.
	Highest.	Lowest.	Range.	Mean.	Direction.	Force.	Direction.	
January.								
10. Thurs.	38.7	30.7	8.0	34.6	2.3	variable	100	0.08
11. Friday	37.8	30.4	7.4	34.0	1.4	E. by N.	100	0.09
12. Satur.	37.7	31.8	5.9	34.8	1.2	E. by N.	100	0.00
13. Sunday	40.0	31.7	8.3	35.9	1.1	E. by N.	100	0.00
14. Mon.	38.2	35.5	2.7	36.9	1.3	E. by N.	100	0.00
15. Tues.	36.0	31.8	4.2	33.9	1.3	E. by N.	100	0.00
16. Wednes.	31.9	27.0	4.9	29.3	1.3	E. by N.	100	0.05

Jan. 19.—Overcast till night; then cloudless. Very gloomy about mid day.	
20.—Overcast. Rain fell in the early morning, and occasionally during the day.	
21.—Overcast. Foggy till rain fell at times.	
22.—Generally fine in the night, then shower. Rain fell during the evening.	
23.—Overcast throughout. Nearly continuous rain.	
24.—Overcast. Thin rain fell occasionally till 5 p.m., then snow commenced to fall.	
25.—Generally cloudy. Thin snow fell occasionally.	

TEMPERATURE OF THE AIR AND FALL OF RAIN AT DIFFERENT STATIONS, DURING THE WEEK ENDING SATURDAY, JANUARY 21, 1871.

NAMES OF STATIONS.	TEMPERATURE OF THE AIR.					FALL OF RAIN.	
	Highest.	Lowest.	Range.	Mean.	Direction.	Force.	Direction.
Portsmouth	48.2	31.4	16.8	44.3	33.5	10.6	38.2
Blackheath	40.7	30.7	10.0	41.3	34.1	7.2	37.1
Leicester	44.0	27.7	16.3	40.4	32.9	7.5	36.3
Derby	41.7	26.0	15.7	38.9	32.9	7.5	36.3
Nottingham	41.7	26.0	15.7	38.9	32.9	7.5	36.3
Sheffield	41.7	26.0	15.7	38.9	32.9	7.5	36.3
Manchester	41.7	26.0	15.7	38.9	32.9	7.5	36.3
Salford	41.7	26.0	15.7	38.9	32.9	7.5	36.3
Bradford	41.7	26.0	15.7	38.9	32.9	7.5	36.3
Leeds	41.7	26.0	15.7	38.9	32.9	7.5	36.3
Hull	41.7	26.0	15.7	38.9	32.9	7.5	36.3
Newcastle	41.7	26.0	15.7	38.9	32.9	7.5	36.3
Edinburgh	41.7	26.0	15.7	38.9	32.9	7.5	36.3
Glasgow	41.7	26.0	15.7	38.9	32.9	7.5	36.3
Aberdeen	41.7	26.0	15.7	38.9	32.9	7.5	36.3
London	41.7	26.0	15.7	38.9	32.9	7.5	36.3
Cardiff	41.7	26.0	15.7	38.9	32.9	7.5	36.3
Belfast	41.7	26.0	15.7	38.9	32.9	7.5	36.3
Dublin	41.7	26.0	15.7	38.9	32.9	7.5	36.3

JAMES GLAISHER.

Miscellaneous.

CHERRIES.—There are perhaps no cherries more delicious and more universally liked than those of the May Duke tribe, when the can be kept from birds, so as to be thoroughly ripe—a rare feat. The only methods to obtain this seems to be, “cherry-houses,” made like “orchard-houses,” or upright cordons and bushes covered with Haythorn's netting before the fruit is ripe. (These tubes, of coarse muslin, or Haythorn's netting, should be slipped over the cordon cherry trees before they come into bloom, to protect the fruit from frost. They should be tied at the top and bottom.) The Duke Cherries to be recommended for this mode of culture are Empress Eugénie, May Duke, Archduke, Duchesse de Fallau, Royal Duke, and Nonvelle Royale; these give a succession from the last week in June till the last week in August. The trees form most charming upright cordons, and are easily kept in order by summer pinching and biennial removal, if they grow too freely. All in the above list, the Mahaleb (*Prunus Mahaleb*) stock, in soils very unfavourable to the common Cherry stock. The culture of the Morello Cherry, which has hitherto been confined to the northern aspects of walls, is likely to be much extended by employing pyramids on the Mahaleb stock. They may be planted from three to four feet apart, and cultivated in the smallest suburban garden by summer pinching, as described in the “Miniature Fruit Garden,” 15th edition. Under this treatment, their shoots do not become bare of buds and leaves, as is very common, but every branch is thickly studded with blossom buds, and every tree becomes a pyramid of flowers and fruit. The Kentish Cherry is now comparatively rare in Kent, the old trees on the common Cherry stock having in many cases died. On the Mahaleb stock it may be cultivated in gardens with great success; it is a most useful variety for the kitchen. There are numerous varieties of the Duke and Kentish race in France, but few of which are worthy of cultivation. *Cerise de Vaux*, *Alexandrine Bion*, and several other new Grotte Cherries have fruited here the past season; they have proved neither bad nor good, yet not worthy of propagation.

A SCAMP.—The village scamp of one kind is the cleverest man in it—a man who can turn his hand to anything, and who consequently turns it to nothing at anything else, or to any stable business. A scamp lives by anything rather than by steady work, though sometimes, when a virtuous fit is on him, and he is not “out on the rampage,” the “loose,” or the “spree,” as the vernacular of the place may have it, he will undertake a delicate job for the parson or the squire, and “do it as well,” says his employer, enthusiastically, “as any man in London could.” This kind of scamp is a most useful genus, but if only poorly bred, a man who has educated his hands up to the highest point of deftness of which he is capable, and who has grafted half-a-dozen finer branches of his business on to the original rough poor root. Perhaps he is a toolmaker who has taught himself all about clocks and watches; perhaps he is a watchmaker who has got to learn the principles of the microscope, and who has improvements of his own on each—not carried out; perhaps he is a carpenter, or a vulgar joiner, set on to learn a clever cabinet-maker, a delicate machinist, a clear and vigorous wood-carver; whatever he is by trade he is sure to be more by capability, and he is also sure to have, beside his manual skill, a natural aptitude for geometry. He can also do anything whatsoever that wants nice manipulation, clever adaptation, and a dash of original genius; and, with his almost intuitive perception of figures, not only understands his employer's most intricate plans, but adds improvised ideas of his own. “The best workman I ever had,” says his first master, shaking his head. “Lord bless ye, he could do anything he was put; but the drink took him, and now where is he?” Where, indeed! In the ale-house, or the kettle-drum, idling about with his hand in his pockets, dirty, ragged, unkempt, and penniless; with faculties that would have made him a competent workman and an honourable position, if not an absolute fortune, if he would have used them, through the “drink” and idleness together going straight to the dogs and the workhouse. His parson alternately rates and encourages him, according as the bad fit or the good is on him; the master employer of his special trade tries him again and again, and is always glad to give him a job to do, and to take it; but the ale-house and the kettle-drum, idleness, and idleness, are stronger temptations than work and honesty, respectability, and comfort.—*Dickens's “All the Year Round.”*

Garden Operations.

(FOR THE ENSUING WEEK.)

PLANT HOUSES.

CONSERVATORIES, and show-houses in general, should now be made gay and attractive with early forced spring-flowering plants. Where there is an abundant successional supply, more care will be required in their arrangement, to see that the various colours are well and effectively blended together. The

first thing to be secured in arranging a house is the equal distribution of the colour at command, and the next point is to see that due prominence is given to all the more striking specimens, by bringing them well forward in the line of sight, so that they will catch the eye first; after which the secondary or less prominent subjects may be worked in uniformly together at a lower height, inserting some wavy-fronded Ferns here and there, as colour or other circumstances may suggest. Still keep the temperature in such houses at these comparatively cool, say from 47° to 52°, but do not admit air too freely through the front lights, as cold draughts are very injurious to such plants as have only recently been brought out of the forcing-pit. Continue to shift into larger pots the successional batches of *Cape Pelargoniums*, according to the advance which they make in the formation of roots and foliage. Good strong plants of the well-known forcing varieties, such as *Rubens*, *Gauntlett*, &c., will be much benefited by a small shift, if they are not required to bloom quickly. Such a shift, if given now, will greatly extend the supply of blooms at a future date. Those who require early flowering specimens of climbing plants, such as *Stephanotis*, *Clerodendron*, &c., in stoves, and *Harlequin*, *Kentia*, *Gompholobium*, &c., in conservatories, should get pot-prune, and train them at once, and plunge them into bottom-heat moderate or otherwise, according to the temperature in which they severally thrive the best. It would be advisable to give every plant-house a good fumigating with tobacco at an early date, with a view to prevent the growth of such insects as are likely to exist. I learn that Mr. Fowler, who introduced the useful “Gardener's Insecticide,” has just taken out a patent for a new kind of tobacco-pipe, which is said to be more powerful than any of the ordinary preparations of this kind, and which has the merit of retaining, in the prepared paper sheets, its original strength for an indefinite time. This, I think, will prove a boon to horticulturists in general, and amateurs in particular, who must often be at a loss to know how much tobacco may safely be used, &c.

FORCING HOUSES.

Syringing should now be discontinued in the case of *Vines* which were started late in November or early in the following month, and which have advanced moderately in growth and are showing the first symptoms of flowering. *Plum* and *Apple* blossoms are fully expanded and the latter is ripe for fertilising, so that may be afforded by carefully ringing the whole bunch with the hand, so that the pollen may be disseminated more freely. Do not be afraid to use atmospheric moisture in moderation, as this, with a proper supply of fresh air, will prove rather an incentive to the process than otherwise, as some growers believe. In the matter of pinching back, each shoot bearing an embryo must be stopped back at one joint from the bottom wood is at all plentiful, but if it is rather thinly distributed, then at two joints. Also remove all superfluous shoots which may push by the side of those actually bearing fruit. In regard to *Pines*, do not excite the younger rooted suckers, or even the forward ones, but keep them for a time as much as possible at rest, so far as growth is concerned. Be careful not to moisten the hearts of any which are engaged in the preliminary stage of fruit formation. Take the bottom heat, and see that it is maintained at, or as near as possible at a mean of 83°. Continue to dead the young shoots upon early *Peach* and *Nectarine* trees regularly and uniformly, and when the fruit is once set resort must again be had to more frequent syringing. *Forcing pits*, or such structures as are applied in the main to the production of early forced flowers, should now be in the full tide of usefulness. Every kind of plant now introduced into these houses, having first undergone a preliminary preparation by starting them in an intermediate temperature, will answer most freely to a genial imitation of spring. *Bulbs*, *Roses*, various American plants, *Lily of the Valley* and *Solomon's Seal*, as well as most shrubs, all force readily. Keep up a brisk heat, both top and bottom, in *Conservatories*. In neither case should the temperature now fall below 75° by day if the plants are in proper health. Do not by any means allow any plant to carry an unnecessarily heavy crop at this date.

FLOWER GARDEN.

Go carefully through the whole stock of plants wintered for future bedding-out. If not done recently many decayed leaves will be found which require careful removal. A sharp knife should be used for the removal of such leaves as will not part from the stem without running the risk of uprooting the entire cutting. All other symptoms of decay should also be cut neatly away. Those who have room to command to put in cuttings or old plants which were stored away thickly last autumn. In so doing always use the smallest sized pots compatible with the size and extent of the roots which are to be planted in them. I have previously suggested that all *Hyacinths* and *Tulips* planted out-of-doors, which are pushing through the ground, should have a covering of some kind of light compost placed over them.

KITCHEN GARDEN.

Do not delay to make sowings of early kinds of *Peas* and *Broad Beans*. Of the former such varieties as *Sutton's* Kingmaker, *First Crop*, or a good selection of

is patent to none, the cause or explanation of them is known to none. Not that no explanation has been offered: if we go to the vegetable physiologists, they will say that there is no difficulty at all about them—they understand them perfectly. They think they do; for when was a physiologist caught without his answer? For every why they have a wherefore." But is their wherefore in this instance the true one? They tell us that these tuberiform bodies are a provision of Nature meant "to contain a reservoir of nutriment, of which the plants can avail themselves when needful." But how do they know that they are reservoirs?—how do they know that plants have or can use reservoirs?—how do they know that, instead of being a reservoir, it is not a drain upon the plant?—how do they know that the supposed reservoir contains nutriment fitted for it, or that it is convertible to its uses? It is all assumption, and if we study these excrescences a little we shall see that the facts are quite inconsistent with such an explanation. Of course if they are reservoirs the plant must require reservoirs, and they will be constantly supplied—they will be a normal accessory regularly present. But it is not so. The fact is that they are very generally present, but not always, nor always in the same quantity.

In order to ascertain if they were a constant part of the plant, we instituted some experiments for the purpose, such as growing them in different mediums and under different conditions; and we were happy in securing the assistance of an able and accurate observer, our correspondent



FIG. 27.—EXCRESCENCES ON PEA ROOT.

"E. A. O.," whose attention had been already drawn to the subject from another direction, and who took the labouring oar in the prosecution of these experiments. In all our observations we have thus had the advantage of a double check upon their accuracy.

The result of our observations was, first, to settle beyond dispute that the tuberiform bodies were not always present. We grew Peas in flannel and water, and then no excrescence ever showed itself. Once something like a callus or swelling showed itself at a place where a rootlet had been broken, but the cause of this was apparent. We next grew them, first in water, and afterwards potted them in rich garden soil; and to prevent the change of condition coming too suddenly upon them, we slung the flower-pot containing them into a jar of water, and afterwards simply exposed them to air and light in front of a window. They were potted on August 23, and taken up and examined on September 3, and there was not a single excrescence nor trace of a tuber on any part of them. The greatest length of roots was 6 inches; the mass of roots about 2 inches. This, we think, shows that the excrescences are not necessary parts of the Pea root.

Then again the time at which they appear, and the period for which they endure, is inconsistent with the idea of their being a reservoir. They commonly appear on the roots of Peas within a few days after germination, that is, in early summer, when there is no need of extra supply of nutriment; and after a month or so they are found empty and rotten, so that the reservoir comes when it is not needed, and goes away before it might be required. We found also that

they are vastly more numerous in the early part of the summer than at a later part of the year; and in one or two trials which we made in the open ground in August only one or two of the excrescences appeared on a plant here and there, and then only single and isolated, not in clusters, as is usually the case. A trial which we made a little later in the year on the Kidney Bean, however, produced a considerable number of clusters, which, however, were differently disposed.

The result of our experiments thus far was to show that it was not anything in the nature of the plant itself which produced the tuberlike bodies, that there was much less of them later in the year than at the beginning, and we think that they seemed more numerous the coarser the soil, and that the roots were absolutely free from them when insects had no access to them (as in water), and where they met with no obstacle or obstruction in their growth, as in finely pulverised garden soil. This, however, is one of the points on which we do not think our experiments were conclusive, single tubers having appeared in one or two instances, even when the soil was fine; and this year we propose to direct them more carefully to growing them in the most finely comminuted impalpable mud that we can get.

The reader will see that the two points to which our mind has been directed in search of an explanation of the phenomenon were, that they are galls, either produced by insects, or by injury occasioned in some way to the tender rootlet by pressure on stones or other obstructing hard bodies. Another week we shall give an account of what we have observed in relation to these points.

— AT Mark Lane on Monday good samples of Wheat brought the extreme prices of the previous week—others were difficult of disposal. On Wednesday the market was calm, and the average ranged 6d. to 1s.—In the Metropolitan Cattle Market a short supply on Monday caused a rise in the price of all kinds of stock, which a large supply on Wednesday did little to alter.

— It will be seen from an advertisement in another column that a meeting of the General Committee of the FRENCH PEASANT FARMERS' SEED FUND will be held at the Salisbury Hotel on Monday next, to consider various matters; and we may be excused for again directing the attention of intending contributors to the fact, that the object of this fund differs from that of others, in that it seeks to enable the small peasant farmer to sow his land, and thus in some measure to provide for the future.

— We had hoped to have given in this number of the *Agricultural Gazette* a portrait and short memoir of Mr. HEWITT DAVIS, whose name has long been known among our most influential and energetic land improvers. Our intention must be postponed for a week, as the engraver had not perfectly succeeded in catching the expression of the photograph which had been given to him.

— Mr. ALLNUTT, of the Agricultural Library, 200, Fleet Street, has issued his useful annual Table of the WEEKLY FLUCTUATIONS in the IMPERIAL AVERAGE PRICE OF WHEAT during 1870. Given in a diagram, where every step from left to right is another week, and every step up or down is 3d. 18s. or fall of price per quarter, the variations strike the eye, and are understood at once. The range of prices for 1870 extended from 40s. 6d. to 55s. per qt., the lowest price having been reached on February 26 and the highest on August 6. Since then prices fell 10s. a qr. in seven weeks, being as low as 45s. 6d. on September 24. They rose again during the last three months of the year, remaining for the most part stationary, however, during December. The picture of variations given in Mr. ALLNUTT's sheets, which can be had by post for a fourpenny bit, should hang up in every farmer's sitting-room or office.

— A request to Mr. DEANE, of Huttons, of whose farm a report was given last week, has brought us the following memorandum on his plan of FEEDING CATTLE for the butcher almost wholly on hay and meal.

"I look upon it there are always some portions of farm management that cannot be made directly profitable, but may be often made to answer in an indirect manner. To bear good crops my land must have a good deal of good manure, and I have no doubt I am compelled to give this at a positive loss in the actual feeding. I have known for many years that the expenses of my bullock feeding will not bear the test of *£* s. d. I had 11 oxen in the year you saw, from November 30, 1869, to December 20, 1870, and they never saw a grass field. These 11 bullocks had hay-chaff mixed with some of the natural chaff from the threshing mill, with about 14 gallon meal per day among the lot, and 1 lb. of cake apiece from November 30, 1869, to middle of May, 1870. I then began to cut up mixed grass for two weeks, after that Saintfoin for more weeks, then Cow-grass for four weeks after, and about one week meadow grass, meal, and cake as before. They then returned to the hay and

mixed hay-chaff with about 2 lb. of cake per head, and continued this up to the time they were killed. Of these animals seven were of my own rearing, and of these kept always in good condition, the other four were bought, and they were very poor at the time, viz., November 30, 1869, I had a good deal of straw, and they made a deal of good manure, which was never moved till it became 4 feet thick or more, and was in one rich compact supply mass. This plan I have adopted for the last four years, and it has succeeded. From the great scarcity of water last year, I had a man and two horses with water-barrel for nearly three months, fetching water up the long hill from the village spring."

— Mr. E. F. DE MAN, the author of the pamphlet on "The Beetroot-sugar Question," reviewed at p. 57, has written to protest against our incredulity. As to his assertion that LINED OIL is a most powerful stimulant to the GROWTH OF PLANTS, he says:—"You believe, very probably, in the efficacy of oilcake as manure; and if the refuse of seed which is pressed into oilcake is admitted to be a powerful manure, what must be the essence of the seed? Let British agriculturists try experiments with this powerful moral stimulant upon plants, and they will perhaps be sufficiently interested in the matter to give publicity to the results of their experiments." Lined consists of oil and the refuse material which constitutes lined cake. Because one of these ingredients is serviceable as manure, Mr. DE MAN infers that therefore the other must also be a fertilising substance. Such an inference is evidently without any foundation. The oil and the husk are altogether different things; the former yields no ash on burning, the latter is full of mineral matter; the former contains no nitrogen, the latter contains a considerable quantity. The value of oil as a manure can be learnt only by experiment; and such experiments as we are acquainted with do not lead us to expect much from the trials which Mr. DE MAN desires that "British agriculturists" should make.

— Mr. LAWES has this year taken the CONDITION of the PERUVIAN GUANO TRADE for the text of his annual circular, pointing out that facts no longer justify guano buyers in accepting the brand of the Peruvian Government as proof that the goods are worth the money asked for them. The samples of guano of a quality much that it is plain supplies do not now exist in the enormous masses from which they were originally quarried; and the guarantee of a special analysis is now as much required in the case of genuine Peruvian guano, as in that of any home manufactured artificial manure. Mr. LAWES points out the scale by which valuations should be made: 15s. per ton for every one per cent. of ammonia in the sample, and 2s. 3d. per ton for every one per cent. of superphosphate, and the date of a trustworthy calculation. The whole communication, given in another page, deserves perusal.

— The Justices of Burnley, on October 31 last, excused Mr. JAMES HARTLEY, of that place, from the payment of an ASSESSED TAX of 10s. 6d. UPON A HORSE by him retailed, on the ground that the produce of his farm. This decision was appealed from by the Board of Inland Revenue, with the following result:—

Mr. ADDISON said the milk was not hawked from door to door, but was simply delivered to the respondent's regular customers, and to dispose of the produce of the land, the milk, in this manner, was just as much a part of husbandry as the actual tilling of the land. The respondent was carrying on the business of a dairyman, but was simply getting rid of his produce as a farmer, just as another might send his Carrots or Turnips to market. The milk was just as much the produce of the land as those products would be, and the horse was not used to produce milk in husbandry. Mr. GORST said he knew that the farmers near Harrow sent their milk to London, where horses were employed in retailing it, and those horses were taxed. If the respondent had sent his milk to Burnley in the gross, the horse carrying it would not have been taxed. But he sent it himself, he was liable to tax. The Chairman (Mr. T. B. ADDISON) said it appeared to the Bench that the selling of the milk was part of the respondent's business as a husbandman. Therefore, they agreed with the Justices below, that the horse must be exempt from the tax.

OUR LIVE STOCK. CATTLE.

THE small herd belonging to Mr. Eastwood is to be sold during the spring. The fame of the Buttery blood, since the days when the Townley boxes sent forth prize-winning blood, has been mainly sustained by this small herd. *Old Roadie* victories will be fresh in the memory of many, and it seems but as yesterday that Mr. Eastwood was winning the 1st and 2d prizes for yearling heifers at the great Yorkshire show at Beverley, and for 2-year-olds at Wakefield. The HERO (20,958)—himself a prize bull—has also left some fine animals, but we shall give further particulars of this stock when the sale is more definitely fixed. This herd has been preserved by the most eminent breeders and judges, whose increasing years and declining health have compelled its disposition.

Mr. Bolton, of Co. Wexford, has announced a sale of 12 yearling bulls on February 6. These are full of Booth blood. Mr. Bolton has been a frequent exhibitor and prizetaker at the Dublin spring shows, and has taken many of the cups given by the Royal Agricultural Improvement Society of Ireland. The

young bulls are described by one who saw them a few months ago as remarkably promising, with abundance of hair and fine quality of flesh.

HEREFORD CATTLE.—I purchased to-day two clever Hereford calves, by SIR HENRY (by BATTENHALL), of Mr. Foot, of Bewley Wood, in the parish of Buckland Newton. He has two very good Hereford bulls, brought respectively of Mr. Edwards and Mr. Duckham. I believe Mr. Duckham's bull was by AYON. SIR HENRY is a dark chestnut-red, and of admirable formation; and I was lucky to get two early heifer calves by him. Mr. Foot put into my hands Mr. Duckham's able lecture on Herefords, delivered before the Royal College at Cirencester. There are two extracts well worthy of attention. He says, as regards the requisites of a first-class Hereford —

"The face, throat, chest, lower part of the body, and legs, together with the crest and mane and tip of the tail, are beautifully white; a small red spot on the eye, an round red spot on the throat, in the middle of the white, are distinctive marks which have many admirers. The horns are of a yellow or white waxy appearance, frequently flat at the ends; those of the bull should spring out straightly from a flat forehead, whilst those of the cows have a wave, and a slight upward tendency. The countenance is at once pleasant, cheerful, and open, presenting a placid appearance, denoting good temper, and that quietness of disposition which is highly essential to the successful grazing of all rumbling animals; yet the eye is full and lively, the head small in comparison to the substance of the body; the muzzle white, and moderately fine; the skin, though not deep and full, the bosom sufficiently prominent, the shoulder bone thin, flat, and sloping to the chine, well covered on the outside with mellow flesh; kernel full up from shoulder point to throat, and so beautifully do the shoulder blades bend in to the body that it is difficult to tell where a well-fend animal where they are set on; the chine and loin broad, hips long and moderately broad, legs straight and small, the rump forming a straight line with the back, and at a right angle with the thigh, which should be full of flesh down to the hocks, without exuberance, twist good, well filled up with flesh, even with the thigh; the ribs should spring well and at an level with the shoulder point; the flank full, and the carcass well and evenly covered with a rich mellow flesh, distinguishable by its yielding with pleasing elasticity to the touch; the hide thick, yet mellow, and well covered with glowing hair, having a tendency to curl. Such are the requisite characteristics of a first-rate Hereford."

The other extract is also very noteworthy —

"I feel that the overfeeding requisite to obtain that object (prizes) is an evil, and one which cannot be easily remedied, inasmuch as the breeder, who has temerity enough to exhibit an animal in fair store condition, is sure to stand but little chance of carrying away the prize for which it competes; and although not only the judges, the breeders, the public, and last, not least, that mighty engine the press, condemn the practice, yet the fat animal catches the eye, and the others are designated an unfortunate middling lot. The result of this is, that their owners, believing in their superiority, resort to more forcing feeding, and upon subsequent competition they frequently become more successful. The judges place them first, the public admire them, and the press remark upon the wonderful improvement they have made since last year. The result is, that the breeder, who has sustained a serious loss to the owners, from the destruction of the breeding properties of their animals with which they have ultimately become successful in obtaining the temporary advantage attached to a first prize."

I can bear out Mr. Duckham's word. Two friends of mine, who feed extra high, had between them 47 heifers go barren, or slip calf, last spring. *W. F. Kitchin, Oxford Piquette.*

THE PERUVIAN GUANO TRADE.

FOR some past time there has been a slight but still a very decided decline in the average quality of the Peruvian guano imported into this country. At one time the farmer could calculate on receiving guano containing, on the average, nitrogen equal to 16 per cent. by weight. But now, if he is not very lucky, he can only count on himself fortunate if that which was supplied to him yielded 14 per cent. of ammonia. Nor would there be much cause for complaint if the lower standard were maintained, with the present importer's price of £13 10s. per ton; or if, adopting that composition and price as the basis, the price were to be regulated according to the deviation of the composition from that standard.

It is, however, to be feared that, with the exhaustion of the produce of the Chincha Islands, the supply of guano of as high quality as that which has hitherto been received is at an end. The present imports are not only much inferior in average quality, but there is a very great variation in the quality of different cargoes, and it may be of different portions of the same cargo.

Under these circumstances, the term "genuine as imported" is no longer an assurance of value; and the farmer will be unwise to continue to purchase guano without some further guarantee.

It is hardly necessary to state that, practically, the value of Peruvian guano depends almost entirely upon the amount it contains of two constituents, namely, nitrogen reckoned as ammonia, and phosphoric acid reckoned as phosphate of lime. Of phosphate of lime we have in the manufactured, soluble phosphate, or "superphosphate of lime," the most valuable source, in a better and more economical form than it exists in

Peruvian guano; but as an abundant and cheap source of ammonia guano has hitherto been without a rival.

Taking guano as recently imported to contain phosphoric acid equal to 27 per cent. of phosphate of lime, and nitrogen equal to 14 per cent. of ammonia, and to be worth £13 10s. per ton, we shall not be far wrong in estimating the value of the ammonia at £10 10s., and that of the phosphate of lime (with a small quantity of alkaline salts) at £3. Adopting these data as a basis, let us see what is the value of each of the 13 different samples of Guanafe guano, an official account of the composition of which was presented to the Council of the Royal Agricultural Society in February last. The following Table shows the percentages of nitrogen reckoned as ammonia, and of phosphoric acid reckoned as phosphate of lime, in each of the 13 samples, and also the value per ton according to composition.

Guano from the Guanafe Islands.

Nitrogen reckoned as ammonia.	Phosphoric acid reckoned as phosphate of lime.	Estimated money value per ton.
Per cent.	Per cent.	<i>s. d.</i>
18.82	5.73	24 10
16.22	26.95	15 3
14.12	29.88	13 11
11.65	34.38	12 11
11.42	23.58	11 3
10.92	33.99	11 6
10.82	28.11	11 8
10.74	30.43	12 9
10.50	26.80	10 10
10.42	29.12	11 10
7.56	44.46	10 10
6.73	42.84	9 10
3.88	56.08	6 18

Thus, in 13 samples of guano from the locality whence the chief supplies will probably be obtained for some time to come, there is a variation in the amount of ammonia from nearly 19 per cent. to under 4 per cent., and in that of the phosphate of lime from more than 44 per cent. to little over 5 per cent. The result is a difference in the estimated value per ton from over £15 to under £7.

It is obvious that a material which varies so very widely in composition and in value should not continue to be sold at a uniform price. It would suggest that the farmers of this country should represent to the agents of the Peruvian Government the necessity of fixing the price of the guano they sell according to its composition; and I would recommend that, until this is arranged, some other manure, such as nitrate of soda, the composition of which is very uniform, be employed as the source of nitrogen. As imported into this country, nitrate of soda contains nitrogen equivalent to 19 per cent. of ammonia, and for purposes of top-dressing it is superior to guano.

Taking the importer's price of nitrate of soda at £16 per ton, as much nitrogen could be purchased in it for that sum as would require the expenditure of between £30 and £40 to obtain, if purchased in one of the lower qualities of Guanafe guano at £13 10s. per ton.

So long as purchasers are content to pay £13 10s. for guano, "genuine as imported," which may contain nitrogen equivalent to more than 16 or less than 10 per cent. of ammonia, it is not likely that any action will be taken in the matter by the Peruvian Government. But considering the splendid revenue which that Government derives from Great Britain by the sale of guano, it is little likely that they will risk the loss of it by refusing to regulate the price according to the quality of the article they sell.

There would be very little difficulty in arranging a standard price to be regulated according to the composition according to its composition. For example: adopting as the basis 14 per cent. of ammonia, 27 per cent. of phosphate of lime, and £13 10s. as the price per ton for guano of that composition, the price should only be 15s. per ton for every 1 per cent. of ammonia, and 2s. 3d. per ton for every 1 per cent. of phosphate of lime which the guano contains. Thus, a guano containing only 10 per cent. of ammonia but 36 per cent. of phosphate of lime, would cost —

10 per cent. of ammonia, at 15s.	£ 1 10
36 per cent. of phosphate of lime, at 2s. 3d.	1 1
Total price per ton	.. £ 1 11

But even if any such arrangement were adopted, it would still be to the advantage of the purchaser to buy the better qualities when required for corn crops or grass; that is, chiefly as a source of ammonia. For in buying guano with a low percentage of ammonia, and a high percentage of phosphate of lime, he would have to pay for an excess of phosphate which would not compensate for the deficiency of ammonia; or, to obtain a given quantity of ammonia, he might have to purchase from 2 to 3 tons of guano instead of one; and with it, not only have to pay for an excess of phosphate, but also the carriage and other expenses on from 2 to 3 tons instead of one. If, however, guano containing only 10 per cent., or less, of ammonia, be employed for corn crops or grass, it should be mixed with an equal weight of nitrate of soda. But guano containing a low percentage of ammonia (say less than 10 per cent.), and a high percentage of phosphate of lime, is more advantageously employed for root crops, for which it may be sown broadcast, or better still, along the sides of the furrows in the dung—in either case superphosphate being sown with the seed.

In conclusion, I think I have shown good and sufficient reason why guano should no longer be sold at one uniform price irrespective of its quality. I now leave the matter in the hands of the consumer, whose business it is to settle upon what terms he chooses to purchase it. *J. B. Laws, Rothamsted, Herts, January.*

CONTINENTAL AGRICULTURAL ESTABLISHMENTS.

THE following letter has been addressed to Mr. F. N. Menzies, Secretary to the Highland Society (— Bonnington, Ratho, Dec. 26, 1870.

Dear Sir,—You kindly mentioned you would submit any remarks I had to make on Dr. Anderson's report to the directors (see p. 1716, 1870). Allow me to do so now.

1. From the enclosed letter from a mercantile firm in Germany who undertook to make inquiry for me, it appears that the Doctor's information is not quite correct when he says all scientific work has been put at a stop by the war. The various institutions are in working order in Saxony and Bavaria.

2. The statement made by the Doctor that there are twenty different establishments in Germany, supported chiefly by private funds, for the purpose of determining fundamental principles of agriculture, and applying these to practice, is fitted to surprise agriculturists in this country, where no such institution exists.

After Bousingault's private establishment at Bechebrunn, in Alsace, the Agricultural Chemistry Association of Scotland was the first, I believe, to be formed of the class. That institution was started by a practical farmer, the late Mr. Finnie, Swanston, aided by Mr. Oliver, Leochard—Mr. Finnie's home and Mr. Oliver's assistance. Its objects were "to improve agriculture by the application of chemistry, vegetable physiology, and geology; to enlarge present knowledge by experiments in the field and laboratory; to diffuse such knowledge," and to analyse manures and feeding-stuffs, soils, &c.,—apparently such work as is being done by these German institutions.

When the five years expired for which the association was formed, it was taken over by the Highland and Agricultural Society, "for the purpose of encouraging and directing the application of science to agriculture."

The effects which followed the formation of the association was a rapid increase in the demand for artificial manures, the making of which—the happy thought of Liebig, of dissolving bones with sulphuric acid—rendered possible a correct system. Much was done to check quackery and knavery in the manure and feeding-stuff trade. It is generally allowed that the operation of the chemical department of the Society has done much "to enlarge our knowledge of scientific agriculture." Dr. Anderson says little has come of all his attempts at the utilisation of refuse matters, and he holds up no great prospects of his being able to achieve much more. He, however, gives the farmer the assurance that "the manufacturer will be doing nothing and the farmer will be doing which can be useful to him." The Doctor thus appears to admit that the manufacturer is a much greater benefactor to the farmer than the chemist, and can succeed when the chemist fails. If such, then, has been the result of the working of the chemical department, some one may be apt to ask the question, What is the use of that department, as chemical analyses can be had as correctly and on the same terms elsewhere? Besides, the fact that the laboratory is in Glasgow, and the whole east of Scotland deprived of ready access to it, has caused other means of obtaining scientific information to be resorted to, as in the West Lothian Chemistry Association and others.

The expression of opinion in the report that matters are in a satisfactory position seems to me and others to strengthen the call for further information; and we daily see that the Doctor is not correct when he says all waste substances are utilised, and that the manufacturer will take care of them.

For instance, from where I write, I can overlook a district of country some eight miles by six, where much paraffine is made, the ammonia water from which was allowed to go to waste. Many experiments were tried by Mr. M'Lagan, of Pumpherston, M.P., and other agriculturists, to apply it to agriculture; and some progress has been made in converting it into sulphate of ammonia, if not directly into a manure; and from one large work about £20,000 sterling is sold annually. Nearly as much is made in other works. Yet it is calculated that ammonia and other matters which would return £30,000 if utilised are allowed to pollute the streams.

I am not aware that Dr. Anderson has ever turned his attention to the utilisation of this great waste. Within a few miles of the place there are several mills which manufacture oatmeal largely for the Glasgow market. The oatens shelled, until lately, were burnt as unfit for manure or food. These hard dried husks are now carefully collected and sent to the railway stations, a few shillings a ton being got for them; whereas at their destination it appears they are made to assume the form of organic matter in various composts, which, at high prices to the farmer, and chemists, from want of sufficient skill, are unable to trace them. The boon the manufacturer supplies in this

case is not quite apparent. I shall not give other instances from a distance. But the fact is undeniable that were greater scientific skill to exist or be available, not only would agriculturists benefit, but they would be able in their management and application of manures and feeding-stuffs to save money. A thorough reorganisation of the chemical department of the Society is urgently required; and my only plea for troubling your directors is a feeling that while, as practical farmers, we have few who excel us, we are not keeping up in science as applied to agriculture.—I am, &c.,
(Signed) JAMES MELVIN.

F. N. Menzies, Esq.

Lauf, by Nurnberg, Dec. 5, 1870.

Dear Sir,—We are now in the position to reply fully to your note of information, having gathered the necessary particulars from authentic sources.

Answer 1. The various Agricultural Chemistry Associations in Bavaria and Saxony are all in working order.

Answer 2. The schools and laboratories are—In Bavaria, the Agricultural Central School at Weiheustephan. Director—Carl Gustav Wenz. Laboratories in Saxony—(a) Landwirtschaftliche Versuche Station, at Pommern, near Buntzen; (b) Landwirtschaftliche Versuche Station, at Moekern, near Leipzig; (c) Agricultural Academy at Tharandt (of very high standing, and near Dresden, the first in importance in Germany). Directors—Mr. Schöber, professor; and Professor Stockhardt, Professor Stockhardt is considered a high authority in agricultural matters.

Answer 3. Guano manufacturers—In Bavaria: Fabrik, Henfeld, between Augsburg and Munich; in Saxony: Pommer & Co. at Plagwitz, near Leipzig; Albert & Hertel, at Dresden; Gall & Co., at Freiberg.

The manures are not manufactured according to the directions of Government chemists; but the manufactory at Henfeld gets its products from chemists of high standing, and Professor Liebig, of Munich, has a share in it.

Answer 4. Applications to inspect the above-named establishments should be made—In Saxony: Dr. Reining, General Secretary and Geheimrath, at Dresden; in Bavaria: Director Wenz at Tharandt.

Answer 5. The best time for a deputation would be in summer. We may mention for your guidance that Saxony will be the most important part of Germany for you to visit, for it is the best cultivated, and much produce has been sent to the Exhibition.

There is also an agricultural school and laboratory at Hohenheim, in Wurtemberg.

We shall be happy to get any further information you may desire, and trust that the foregoing will be what you want.—We are, &c.,

(Signed) J. F. BARTH & WEIGHMANN.
James Melvin, Esq., Jonnington, Ratho.

MODES OF POLING HOPS.

DURING the last few years many new plans for poling Hops have been devised, the primary notions of which came from America, where poles and labour are dear, and inventive genius is particularly fertile. According to one of these plans, for which a patent was taken out in this country by Mr. Collins, one pole is put to each hill, and stout string or cocoa-nut fibre yarn is stretched horizontally at a distance of from 8 to 10 feet from the ground from pole to pole. The appearance is very picturesque, as may be imagined from the slight sketch (fig. 28) given here; but the system is not by any means satisfactory, and has been discontinued by many planters who gave it a fair trial. I have tried it for three years upon 3 acres planted with the Jones Hop, whose habit renders it more suited to such methods of training than any other sort of Hop; I found that the expense of tying the bine to the horizontal strings was very great, the bine never took kindly to the string, so that the tyers were perpetually required throughout the summer, and that the produce was each year considerably less per acre than in another part of the ground polled in the usual manner, though in every other respect treated the same as the string piece. It is right to state that Mr. Gunner, of Alton, has his vines and vines trained in this way for some years, and is quite satisfied with the result. This gentleman writes as to the extra expense of tying—"It is really nothing when you think how much is saved in poles, how good the quality of the Hop is, how little liable to damage from wind, and how strong your plant will always be, for I believe if the string training is properly carried out there would be no such thing as a weak bine."

Training on wires, variously fixed, is practised in America, in Germany, and in France. In many districts of these countries poles are dearer than in England. At Spalt a grower states that they cost as much as a franc each, but then they are from 20 to 24 feet in length. Mr. Farnar, of Kyrewood, Tenbury, has patented a system of training Hops on wire, consisting of an arrangement, according to the fancy of the planter, of vertical wires communicating with horizontal poles. Large posts, stouter than telegraph posts, are fixed at the end of each row of Hops, to which

wires are fastened at the top and bottom. These wires run horizontally from post to post, and at every hill vertical wires are fixed between these two parallel horizontal wires, to which the bines are tied. By an improvement in Mr. Farnar's process, the iron work is so fixed that it may be easily taken down at picking time.

Several planters in the Hereford, Worcester, and Farnham districts have adopted this method, and speak favourably of its advantages. The first cost of it is put at £46 per acre, and it is calculated that it will last for 20 years in an efficient state, while the usual method of poling is estimated at £37 *ros.* as first cost, independently of the necessary yearly renewals of poles. The main objects of these patents have been economy of cost and labour, and to obviate the necessity of cutting the bine. The latter has, at all events, been achieved, and time will prove whether the former has been attained. The great objection to the string plan



FIG. 28.—AMERICAN MODE OF TRAINING HOPS ON STRINGS.

is that it is unnatural for the Hops to be trained horizontally. The nature of this plant is to climb spirally towards the light, making its revolutions with the course of the sun. Besides these "normal axial twistings" round the support near, each internode of the plant during its own development makes independent revolutions, varying in number according to its growth and other circumstances.* Mr. Darwin remarks that "the purpose of this spontaneous revolving movement successively directed to all parts of the compass, is obviously in part to favour the shoot finding a support." It is manifest that a horizontal line would be quite out of the natural upward sweep of this movement, and that each internode must be fastened down to the slender string, as it commences its separate course. The axial twistings will be consequently multiplied, and the vigour of the whole plant diminished by these constrained efforts. In the case of vertical wires, it is believed that the bine would require constant tying, as its reflexed hooks would not have a firm hold upon the smooth wires, and that "short turns" would be general, which are usually thought to be indicative of want of vigour in the plant, and fatal to the chances of a good crop.

The late Mr. H. Boys, of Northfleet, Kent, patented

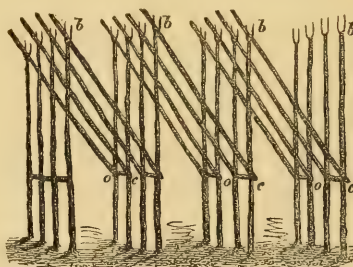


FIG. 29.—MR. COLEY'S VINEY SYSTEM OF POLING HOPS.

a method of training Hops along diagonally inclined hurdle rods, or old small poles fastened to uprights; Mr. Coley, of Maidstone,† invented a plan in 1868, on somewhat similar principles, which has been already largely adopted, and has many advantages. According to this plan, two stout thoroughly creosoted poles—16 feet or 14 feet, reduced to about 12 feet long—are firmly planted to each hill east and west. These have at the point *b* in the annexed illustration (fig. 29) two pieces of wire lashed to their tips to form a fork to receive a diagonally inclined pole of from 12 to 14 feet long, which rests at the point *c* in a staple fixed to the upright pole of the opposite hill. A stout piece of wood, *o*, is nailed to the uprights at each hill, to keep them firm. These uprights are fixtures; the diagonal poles are lifted out at picking time and stacked away for the winter, after a new method of Mr. Coley's; but there can be no reason why this

expense should not be saved, by simply replacing the diagonal poles, when stripped of bine, in their resting places in the staples and wires. They would hardly be more exposed to the weather than if they were stacked as at present, a great deal of labour would be saved, and the ground would be clear for all operations of manuring, digging, or ploughing. In Mr. Coley's system the evils of horizontal training are greatly modified, and the bine has a congenial support to cling to. High winds do not damage the Hops, and the plant being cut high does not bleed to any extent. Mr. Coley says in his pamphlet, writing of his last year's crop of Hops, "In the early Hops we picked at the rate of 1 cwt. 3 q. 4 lb. per acre extra on the patented plan, and in quality worth 10s. per cwt. more than those of the same sort grown upon upright poles. In a Colegate ground, picked after the severe gale of wind, we found on the new plan 4 cwt. per acre extra; these were sold at £5 8s. per cwt.; those adjacent, of the same sort, grown upon the upright poles, fetched £5 2s. per cwt."

The first cost of poling an acre in this way is given as £52 3s. 4d., as against Mr. Coley's estimate of £41 6s. for the old mode, while the after expense per acre for keeping up the poles for 14 years is estimated to average 15s. per acre in the former, and in the latter 14s. This applies to Golding ground, polled with his poles. Mr. Coley has invented a whole set of implements and tools suited for the working of his system, among which may be mentioned a long-handled bill hook with prong attached, for cutting the bines high up and pushing them off the uprights, and a 3-wheeled dung-cart for use between the rows. Mr. C. Whitehead, in the *Journal of the English Agricultural Society*.

RULES AT PLOUGHING MATCHES.

RAMBLING in these northern counties I have been attracted to some of their ploughing matches by the boast of the special merits of Yorkshire men and Yorkshire managements. I do not, however, think that people hereabouts, supposing they have the intelligence professed for them, practise what they know. In fact, so long as decisions are given by the crochets or pieces of wood or three men who chance to hold the judge's office, the competing ploughmen will always be in difficulties as to the style of work which will gain for them the object they desire.

To attain improvement in anything, we must lay down clearly what we want; therefore, to get good ploughing we must first tell the competitors the style we believe the best. First, as to depth, which is the most important point of the work, if 4-inch work produce as good crops as work at greater depths, then all the extra labour is thrown away. Again, if wide furrow-slices, well smashed in the severing and turning operations, produce as good crops as narrow slices, then the extra expense entailed through the greater distance travelled is also thrown away.

I hold the width and depth required should be announced, and the style of work expected should be also specified, then all the men would have the same data to go by, and would, therefore, be so far on equal terms.

Certain faults, when gross, should disqualify a man. For instance, a ridge so high that it becomes an impediment to the after operations of drilling, reaping, mowing, &c.; also deep, wide furrows, for the same reasons. These are points little thought of in decisions. Straightness is the thing that goes for half the way, although after the land is sown nobody can tell which has been the straightest work; but any one can see the ugly high ridges and deep furrows, and the reaping-machine will soon give annoying evidence of the evils of them. I would suggest a code of rules for the guidance of the judges as well as of the men, specifying the points of importance, and giving the figures which should belong to each part of the work when perfect. Let the following serve for a text, on which I should be glad to hear those who can, perhaps, preach better than myself:—

1. Four points for a ridge begun on the level, and ploughed within a sixth of the average depth of the rest of his lot.
2. Two points for perfect straightness of ridge.
3. Two points for the uniform depth required for all, except the two first feet, and two inches of the top of the ridge.
4. Two points for the perfect division of the lot into the number of furrows required by the width given.
5. Three points for narrowness of finished furrow, if straight.
6. Two points, straightness throughout.
7. Three points for perfect packing.

The vexed question of high-crested work has been excited in these parts through the being graded. Several years ago it was the toughest and difficult to lay at the high angle desired, unless the furrow is cut lighter at the heel than the shoulder, which enables them to make square work, *i. e.*, to expose the same width of share-cut as of coulters-cut surface. This style of ploughing is only beneficial on old turf and strong clays; under other circumstances high-crested work

* The Austrian Central Agricultural Society have offered prizes for a satisfactory solution of the question as to the relative superiority of wire and poles.

† On the Movements and Habits of Climbing Plants." By Mr. Darwin. Williams and Norgate.
See also "The Viney Principle of Growing Hops." By Mr. Coley. Published by West, Maidstone.

should be ignored, for it is false in depth, and the very worst for wide expeditious ploughing.

In hot climates the style of ploughing is vastly superior to ours, and more carries out the principle on which digging breasts (which can be applied to any plough) are made to act. They more perfectly smash up the soil, turning it well over into an even surface of shivered earth, imitating steel fork digging without its cost. Let us trust the day is not far distant when this system will be universal, for in this age of drills and hoeing cutting land up into solid furrows with a groove between to receive the seed is a folly if not worse, and it is being perpetuated by these matches. We note but the soil smothered, mingled, and well turned over, with its particles equally contiguous to each other, with space enough between for the free circulation of air and the descent of water; then let rules be formed to guide our match ploughing in the best means of attaining this object, and do away with farmers keeping ploughs for matches that are bad for everyday use.

I have been led away from my first intended observations to these matches, then allowed to pass. At Brandon, near Durham, on Tuesday, the 17th inst., I witnessed a spirited and close competition between wheel-ploughs. In the All England class there were seven Ransome's, one Hornsby's, and one Howard's plough; Ransome's took 1st and 2d, and Hornsby's 3d prize.

Second class, for men who had not won 1st prizes: there were one Hornsby's, two Howard's, and eleven Ransome's; Hornsby's took 1st prize, Ransome's 2d and 4th, the 3d going to the Bedford firm.

In the boys' class three Ransomes and one Hornsby competed, the Ipswich house taking 1st and 2d, and the Grantham house 3d. The work was very good, except the beginnings or ridges, the most important of all points; but the judges are most to blame for this, as they do not recognise unflinchingly any rule on this point. Straightness is a fault in all these machines, in these parts combined, moreover, with solid ribbon-like furrows, which the summer drought will cause to quit company, and leave the crop without that united foundation that gives strength.

Excepting the ridges, the work in all the classes was fair of its kind—in the high-crested style. At Sunderland Bridge, in county Durham, on the 18th, a very passable competition took place. Swing-ploughs prevailed, as is usual in these matches. Properly used, they can be dressed up in a suit of corduroy, the frequent ridges and furrows debaring the use of wheel-ploughs, except in the hands of those whose intellect has been sufficiently wide awake to lead them to drain the water out of the land instead of lifting the land out of the water, forgetting that then it still has a wet bed.

However, this Society was plucky enough to give prizes for double-furrow ploughs. First a makers' class, where only the houses of Bedford and Ipswich competed; but the judges never tested the draught, nor looked at the difference of construction of the ploughs, but, curiously enough, awarded the prize for the work least like that to which they awarded prizes in the single-plough classes. Thus, straightness, a well-set ridge, grand finish, and deep high-crested work have been recommended, and ridges and shallow ploughing, with a good finish. In the farmers' class two Ransome's, two Fowler's, and one Howard's competed; the best man had a right to win, and did, with Ransome's plough; the 2d going to the Bedford house.

I was more than pleased with the action of a few canny Scots, who obtained a dynamometer, and tested the ploughs (commercial) of the different firms as to their customers, the results of which stood as follows:—Ploughing furrows 6 inches by 9 deep, Hornsby's light swing-plough, which took the 1st prize in the champion swing class, registered $3\frac{1}{4}$ cwt. Fowler's first plough tried, and took 6 cwt.; the second—at the request of the owner, who had it in better condition for work, inasmuch as it did pack its work (but the farmer did not)—drew 7 cwt.; Howard's 5 cwt., and Ransome's 6½ cwt., which is just double what Hornsby's single-furrow plough drew; while Howard's was at the rate of 187 lb. per horse, and Hornsby's single-plough at the rate of 182 lb. per horse, still showing that a well constructed double-furrow plough must be a vast econo-miser wherever within the power of three, or even four, horses, where single ploughs are too much for two. *L. P. B.*

AMERICAN NOTES ON DAIRYING.

1. *Winter Dairying*.—The general impression among farmers who are engaged in the dairy business seems to be that when cold weather sets in there is no longer any profit in dairying; that the extra food required to produce the milk, and the greater care necessary to make butter and cheese at this season of the year, render it impossible to follow it with profit. This is a mistake, and the cause of it may be traced as soon as frost kills the grass, and the shepherds and Pumpkins are used. They regard the dairy season as over, and send their cows into winter quarters, which too often means close quarters and a bare living allowance of food and fodder.

Now, no dairyman who has had experience in making winter butter needs to be told that it can be made profitably, and that those who allow their cows

to shrink in their milk early in the season, or who dry them up on the first appearance of cold weather, fail to realise a large proportion of the profit that it is possible to make.

The true extra food and care are required for the cows; that with the usual stable conveniences the labour of milking in cold weather is very unpleasant; and that without special preparation and extra care, but a proportionately small quantity of butter, of an inferior quality, will be obtained from the milk. Yet there is no doubt but that, with the proper conveniences for the management of the milk and the requisite experience and knowledge on the part of the dairy-woman, an abundance of good butter can be made from a quantity of milk as in the summer, and of a good quality, and that the extra price which such butter will command at that season will more than compensate for the extra food and corn required on the part of the cows. When the farmer fully realises the importance of furnishing the cows with comfortable stables and liberal supplies of food, in order to prepare them for the service of the coming season, he will find but little time necessary to secure a flow of milk, and will be able to keep up to within two months or six weeks of the time of coming in.

It is urged against winter milking that it overtaxes and weakens the cows. This objection is surely a valid one, where the principle followed in wintering is the least possible care and the smallest amount of food that will bring them through in tolerable condition; but where the cows are fed and comfortably housed, even though milked up to a short time before calving again, the cow will usually be in a far better condition for the opening of the coming season than when she has been dried up and wintered in the usual manner. *Western Farmer*.

Where an excess of food is furnished over and above what is needed to meet the wants of the animal, and of a proper quality, the milk will make little, if any, draught upon the strength or constitution of the cow. On the other hand, the cows thus fed and comfortably housed, even though milked up to a short time before calving again, the cow will usually be in a far better condition for the opening of the coming season than when she has been dried up and wintered in the usual manner. *Western Farmer*.

2. When a farmer resides near enough to a city or town to make it profitable to keep cows, he will find that in the winter season, and has the proper facilities for doing so, he should endeavour to make it a point to have only good cows, and feed them well.

The mode of feeding to be adopted will in a great measure depend on whether it is designed to sell the milk, or to sell the butter produced from it only. In the former case, the main object is to obtain a large flow of milk without regard to its richness. To do this, the cows need to be fed to a large extent upon food containing a considerable proportion of liquid elements, to which bran must form the chief addition. The hay or straw used should be cut and pulped with Turnips, or Beet, or Mangels. The usual proportion of bran in this case is 4 lb. per cow each day, given at night.

If the pulped mixture can be fermented before feeding to the cows, they will give a larger yield of milk, and not so much of Turnip, than if fed unfermented. If the roots can be cleaned or boiled they will be still better and go further.

When butter making is an object, roots are to be avoided, and good sweet hay given, with the addition of 3 lb. per day of pea, oat, or barley meal to each cow, given raw, or if the hay is cut, which is better, the cut hay should be moistened with water, and the meal mixed with it. Unless some food rich in nitrogen is given to milk cows, it is but troublesome and unprofitable undertaking to attempt to make good butter from their milk during the winter season. *Canada Farmer*.

3. *Blankets on Milk Cans*.—Mr. Gardener B. Weeks, of New York, has addressed a communication to the Massachusetts *Ploughman*, condemning the practice, which has been advocated by some, of covering milk cans, that are to be taken to the factory, with thick woollen blankets or buffalo robes, with a view of keeping out the heat of the sun. In his article he says:—

"That the cans should be protected from the sun's rays, I admit; but it should be done in the way of a raised awning, or other appliance lifted above the cans. If a thick blanket or robe be laid directly over a can of milk from which the animal or natural heat has never been removed, and the milk then drawn any considerable distance to the factory, it will ordinarily so far injure the milk that it will sour in a few hours.

"I have had just this experience the present season at my cannery. Milk brought from a farm, 3 miles distant from the factory caused trouble to the cheesemaker day after day by souring prematurely. On inquiry I found that the driver of the milk team had lately adopted the habit of throwing a buffalo robe over his cans as a protection from the sunshine. As a consequence, this milk soured before morning, and soured all the milk in the vat into which it was put; this, too, notwithstanding a large stream of cold water—52 degrees—was passing around the vat all night. On directing the removal of the robe as a covering, the milk soured no more, and was not returned." This quote accords with similar experience which I have had in years before.

"In the cold part of the season, even in frosty weather, when milk is drawn but once daily, I have had the night's

milk very much injured, sometimes quite soured, because the dairyman had placed the can-cover closely upon the warm milk, and then set the can in a closed room or shed where the cool night air could not strike it. The can should have been placed under cover to keep out rain, &c., but in an airy place, and the cover should not have been put on at all.

"If milk is in any way thoroughly cooled—say to 60 or 65 degrees—then by all means has the advantage of the correspondent be followed and the milk covered. In default of this cooling, let the can be protected by a raised awning, which will allow free play to the wind. If neither can nor will be done, let the can go without any protection other than the usual tin cover."

4. *The Largest Dairy in the World*.—In his notes on the Pacific coast, Mr. X. A. Willard, of the *Rural New Yorker*, gives an account of a dairy on the coast of the largest butter dairy in the world. It is situated at Point Reyes, in Marion county, California. The ranch has a coast range of 50 miles, and contains 75,000 acres. He states that about 3000 cows are in milk on the estate, and they are divided up into 21 dairies, averaging about 150 cows to each. The proprietors commenced improving their stock about the year 1858, he gives an account of the Eastern cows with two thoroughbred Shorthorn bulls of the milking family, brought from Vermont at a cost of 10,000 dollars. One of the Vermont bulls was an exceedingly fine one, and his stock proved to be excellent milkers. A year or two after, 22 head of Devon cattle were purchased and introduced among the herds. This breed did not prove satisfactory, and it was discarded, and in 1865 they commenced again with Shorthorns, raising annually one-fifth of the calves from the best cows. In this way the stock has been improved so that a good flow of milk is obtained.

After remarking that the ranch at Point Reyes was broken up into numerous hills and valleys, some of the hills almost approaching the dignity of mountains, Mr. Willard mentions the following to show that the size of the stock may be influenced by the surface of the country. He says:—"This being surface, in some of the climbing of hills and descent into valleys. In quest of food, has had a strongly marked influence on the size and form of the stock. The animals are quite small for Shorthorns, and apparently more active than is usual with that breed, showing, in a very marked degree, what a controlling influence the surface of a country has in moulding the form of animals. The stock we found universally in fine condition as to flesh, and in every respect appeared to be in excellent health; but the smallness in size was a point of interest to us as showing how animals bred for several generations in a hilly country gradually adapt themselves to the surface over which they are compelled to travel in quest of food."

Home Correspondence.

The Opponents of Foxhunting have to make it clear that the interests of the many are sacrificed to the amusement of the few, and that the injury endured by the tenant of land is serious, and not counterbalanced by any public good. If considerable harm is done to the farmer by the occasional trespass of the hunting party, he has no right to be disturbed in the quietude of the neighbourhood of a well-kept pack of hounds, let this be shown by authenticated facts, not by vague assertions. Foxhunting is, in reality, the most democratic form of amusement which our aristocratic habits have as yet permitted. Men of all ranks are able to take part in it, and though its full enjoyment requires fortune, many a poor man on his own horse, or farmer on his cob, has as much pleasure in the day's sport as the noble squire aced up to his eyes, or the millionaire with a stable full as his purse. The privileges of rank are of very little use in the face of a big fence, and the plebeian may show the county magnate how to go. There is, however, another point of view from which the advantage of foxhunting is, I should say, incontestable. It is the one form of sport which is possible in a populous country, which inflicts the least injury, and gives the least disturbance to the maintenance and energy that civil life and increasing luxury threaten every day to sap. Do you think the vigour of the hunting-field does not tell in the senate and on the battle-ground? Is the soldier not better for knowing how to ride across country, and is the public man not likely to return to St. Stephen's more fit to do his duty if his wasted energy has been renewed amidst the music of the pack as he bounds over the green turf? Grouse shooting, deer stalking, salmon fishing, are noble sports, but they are out of the reach of most—the two former require for their extension the solitude which the banishment of a people creates, and to preserve largely is in many cases to provide a constant source of temptation or complaint. Why is it in Ireland the Irish tenant—the most determined advocate of his rights—never objects to foxhunting? Because he finds it does him no harm, rather good. Vulpicide, even in the case of "murder" is too common, is seldom heard of there. There is no human institution not liable to abuse, or from which some one may not suffer. It has been said, "that the love of the chase is an inherent delight in man, a relic of an instinctive passion." The creation of artificial solitudes, the dispossession of those who dwell upon the soil, have been the means by which this passion has often

improperly fulfil the duties of their station, or become corrupt, England will in all likelihood undergo great social changes. No institution or law can long exist in this country against popular opinion and the popular will ; and for any abuse of power on the part of our aristocracy, I have sufficient faith in my fellow countrymen to believe that they would, without shooting landlords or their agents, find a remedy. I earnestly trust that the remedy may never need application.

F. W. B., Stony Stratford.

HEXHAM

ting of personal property, but—local rates, and paying from the national fund those charges which are national and not local. Those in which the whole community is quite as much concerned as the union, viz., the county expenditure for the prosecution of felons, maintenance of police force, &c. The maintenance of pauper funerals, and of highways; the expenditure on the Poor Law Act; vaccination fees and expenses; the expenses of parliamentary and municipal registration, and of jury lists. All those are now paid out of the poor rate, but should be paid out of the national funds. In this way personal property would be brought to the national fund, and the ratepayers would be maintaining the roads used in its increase and enjoyment, and of those other items I have named, which

have hitherto been borne by real property alone, which, as we have already shown, (taxed at 44 per cent., but say 4 per cent., beyond its fair share.) That is to say that £132,500,000 of real property charged under schedule A, in England and Wales pays at present, over and above its fair share,

Taxes amounting to	£5,300,000
Now, in 1869, the various items I have proposed to place upon the Consolidated Fund were as follows, viz.:	
Payments to county, hundred, borough, or police rates	£2,564,735
Payments by overseers of Highway Boards	£3,549,469
Constables' expenses, and cost of proceedings before Justices	42,933
Payments by owners of Registration Act	73,723
Vaccination fees and expenses	64,378
Expenses allowed in respect of Parliamentary and municipal registration, and costs of jury lists	71,213
Maintenance of pauper lunatics	710,941

Total £4,189,294

But if these sums are paid from the Consolidated Fund, the real property of the kingdom bears 9 per cent. of the national taxation, in addition to all local rates, there would still fall upon it the sum of,

And upon the whole tax payable by community only

£3,812,258

Leaving real property still overtaxed by £4,187,742 Of the £3,812,258, personality and industrial incomes would pay £666,799, leaving £3,157,467 to be paid from taxes on expenditure, &c., of which all bear their share. In asking, therefore, to have the expense of these national objects paid from the national funds, I am asking only what is strictly just, and what was recommended by the Lords' Committee on parochial assessments in 1850.

I further propose to relieve real property by a rate in aid of the pound levied on schedules D, and E. This would only yield the very inadequate relief of £910,475, and would moreover act as a continual irritant to those paying under those schedules, and would at once be denounced as class legislation, whereas the relief I have proposed above would be both more effectual, more just, and less of an irritant.

By including in the assessment for local purposes all real property, from which profits are or may be derived, doing away with the distinction between "gross estimated rental," and "rateable value," abolishing all deductions for repairs and insurance. From the annual value of mines, quarries, and other property of a like nature where the heritage is actually removed and consumed, deductions would require to be made to recoup the owner in a certain number of years. I am aware that the equity of the rate levied by some authorities on rating, who hold that while the heritage is there it is liable to full rates, and when it ceases to exist the rate ceases, and that if deductions to recoup are allowed, the rate should continue after the heritage is gone. Now I deny the justice of this view altogether, for not only is the risk of working this class of property greater, but the owner is not merely losing his property, he is losing so much of it year by year, and the purchase money will remain to be taxed to the national exchequer. All deductions, however, for mere repairs and insurance should be abolished, as well as those allowed from titles.

(C.) By applying to the rating for the poor the principle already sanctioned by the Local Government Act, viz., rating land at a lower amount than houses and buildings. The principle is sanctioned by the Scotch Poor-law Act 1845 (43 & 44 Vict. 3d sec. 35) where "the Parochial Board, with concurrence of the Board of Supervision," may "direct that lands and heritages may be distinguished into two or more separate classes, according to the purposes for which such lands are used and occupied, and fix such rate of assessment upon the tenants and occupants of each class, respectively, as to such Boards may seem just and equitable." This principle should be extended to England. It has the support of the late Sir G. C. Lewis, and of Sir John McNeill, chairman of the Board of Supervision, and has given satisfaction in Scotland.

(D.) By distinctly defining and giving legislative sanction to the principle on which the annual value of the various classes of real property is to be ascertained. The superior courts have already laid down the principle upon which coal mines are to be rated, viz., that to the rent paid to the owner is to be added the fair annual value of all buildings, engines, tramways, shafts, stails, &c., provided by the tenant himself, deducting a certain percentage to recoup the owner for the loss of his heritage, and upon the same principle should all other mines and their adjuncts be rated. With regard to railways, docks, gas, and water works, which are seldom or never let, the court has held that the hypothetical tenant must be assumed; and taking the gross earnings, and deducting these from the working expenses, interest on tenants' capital, and depreciation of permanent and rolling stock, have endeavoured to ascertain what annual rent such tenant might be expected to give. This is just the process a judicious farmer follows in offering for a farm. He calculates from the character of the soil, and its locality, the gross annual produce, from which he deducts the working expenses, seeds, manures, feeding stuffs, depreciation of stock, dead and alive, and interest on his capital. The

balance should be the landlord's rent, though unfortunately, from excessive competition, he has frequently to give more than. There is one class of property on which we have no decisive case—that of mansion houses in the country. Locality has much to do with their value, and it is difficult to lay down any general rule; but as they are not built for profit, and are seldom let, probably 3 per cent. on the capital value of the house, gardens, and pleasure-grounds would be a fair rateable value. Woodlands are seldom let, and are therefore a regular annual return from them, therefore the simplest way of assessing them would be at the agricultural value of the land planted, with a reasonable percentage on the cost of planting.

II. *The Area of Assessment.*—It is now almost universally admitted that the area of rating should be co-extensive with the area of management, and the equity of this so much tested, it is scarcely necessary to enter into any argument in support of it. It was feared by some that one effect of the Union Chargeability Act would be to cause less attention on the part of the guardians, when the charge fell on the Union, and not on the separate townships. This has not been the case; the attention to the administration of the poor funds is quite as close now as it was before the passing of the Act. The benefit that would accrue from the application of the same principle to the highways, would be even greater than in the case of the Poor-law Unions. The districts should be uniform with the unions, and the roads maintained by a district rate, if they are to be maintained out of local rates at all. The Under-Secretary for the Home Department stated last session in the House of Commons that the management by parishes was a thing of the past, and certainly the rating by parishes ought to be so, and until the highways, turnpike, township, and *ratone tenure*, are all thrown under one management, and paid, if paid from the local rates at all, by a district rate, good roads will not be had.

III. *The Parties from whom the Rates should be Levied.*—That a large portion of the rates ultimately fall upon the owner is undoubtedly true, but first, how is the allocation in all cases to be made? There is so rapid and unforeseen increase in the expenditure, as well as by alterations in the law, are occupiers holding under leases saddled with a large increase of their rates? By the Acts 24 and 25 Vict., cap. 55, and 28 and 29 Vict., cap. 79, the occupiers, in many cases, had their rates increased by 4, 5, and even 6 times their former amount. To those who are thus, for 10 or 15 years, saddled with an increase which they could not foresee, and which took their farms, there is no redress, and they must go on paying till the end of their lease; and even those holding from year to year not unfrequently go on paying the increase rather than run the risk of being thrown out of their farms by seeking a readjustment of their rents, whereas if each party paid the amount which is fairly exigible from them, the hardship would be removed. The average incidence of the rates is stated by Mr. D. Baxter to be "three-fourths upon the owner and one-fourth upon the occupier of lands, and one-half on the owner and one-half on the occupier of houses." He further insists that it is much better that the proportion which each actually pays should be charged to him direct. The Select Committee of the House of Commons, 1870, also report "that it is expedient to make owners, as well as occupiers, divide the poor rates, and that on an occupation, say of £1,000 per annum, a rate of 2s. 6d. in the pound would be paid thus:—

	Owner.	Occupier.
In England	Nil	£125 0 0
In Scotland	£75 0 0	50 0 0
In Ireland	31 5 0	93 15 0

So that in no case have we exactly the proportions which the statute has been averaging the incidence of the rates in the United Kingdom, though Scotland approaches nearest to it. I do not, however, propose to saddle the owners with the Scotch amount, but with one-half of all the local taxes, leaving the other moiety to be paid by the occupiers. This, I believe, will be the proportion recommended by the committee, if again appointed.

A large portion of the rates, amounting for the year ending Michaelmas, 1869, to £4,417,391 (£4,164, is covered by the rates of the year ending Michaelmas, 1868, but the balance of £253,000, which at present contributes directly (except as ratepayers) no part of the funds they administer, are wholly irresponsible, are not even bound to submit their accounts to an official auditor, and render no account of their intromissions to those who supply the funds. To obviate in some measure the hardships experienced under the first head, and to give the magistrates a more direct interest in the funds they administer, I have recommended the formation of a Common Council Committee to make owners as well as occupiers liable for the rates, will ere long receive the sanction of the Legislature, so that the burden of any

increase in the rates may not fall so heavily on the occupiers. [The remainder of this lecture must be given hereafter.]

STOW-MARKET.

The Cart Horse.—At the first discussion meeting of this Club, this subject was introduced by Mr. HENRY CROSSE, as follows:—

I have chosen my own subject, and my first ideas upon it were instilled into my mind when very young; for when I rode a donkey beside my father, who was a great admirer of the Suffolk breed, and for many years a successful breeder, he used to point out to me a good one when we met a team, and tell me the good points and find fault with the bad ones. If on the subject of the draught horse I should have little extra novelty, perhaps you may think it the more excusable when I tell you I have been selected to act as a judge of agricultural horses 17 times at local shows, and six times at the Royal Agricultural Society's meeting; and the confidence thus placed in me has certainly added no little experience to my early lessons. Next to the *genus homo*, or the human being (for all climates), I should place *equus*, believing the horse to be the most useful, most valuable, and the staunchest friend to the human race of all animals. The elephant may suit the jungle, the camel the desert, the reindeer the Laplander, and the dog the Kamschatkan; but for the rest of the globe it cannot, I think, be disputed that the horse stands first in importance and usefulness. In the choice of a draught horse, whether a Suffolk or any other breed, I state as an opinion that there are three main special points which ought to guide either the breeder or purchaser—symmetry, quality, and action, and these may be defined by three other words—beauty, endurance, and pluck.

Symmetry in a horse many will say is a matter of fancy or taste, but it ought not to be so, for it has nothing to do with size or with substance, but may be nearly the same in all, from the pony to the draft horse. Any horse having four good legs sufficiently strong to carry his weight, and have a shape which will bear an equal weight or proportion on each leg. Take an animal with a very heavy forehead and light hind-quarters. Can such an animal possess symmetry? Reverse the shape, and it is equally out of proportion. Still I have many times found both these, to my eye, ill-shaped animals, much praised, and have known them work well. This only makes good the saying of an old Suffolk Nimrod, that horses may go well in any form, but hearse the hand some ones best. Now, my definition of symmetry in a horse is that the nearer you can divide his length in four equal parts of neck, shoulders, back, and hind-quarters, the nearer an animal exhibits perfection in a side view, and if you divide his body at the second long rib, each leg ought to have an equal proportion of its weight.

Next as to quality. It was told when a youth, of a veterinary surgeon at the London Hospital, who, to illustrate quality, had 2 inches of bone cut from the shank of a blood-horse and a draft-horse, and the bone of the race-horse weighed quite as much as the other, though not more than two-thirds of the size. Now one of the most estimable qualities of the Suffolk breed, especially to foreigners who come to purchase, is that his bone, as well as his muscle, shows plenty of quality; and if I see a Suffolk with a good clean shank and a well-hard bone, I tend to give a long way, in my opinion, towards securing both quality and endurance. It is often said that action in a draft-horse and in a hack are of two different kinds; but is it not rather the training from generation to generation that makes a great proportion of difference? Now the action of a cart-horse should develop itself in a firm quick step, not too long, as a long step requires greater leverage to get through dirt, and more power is exhausted than by a moderately short one, and a quick step is a sure sign of good pluck in any animal. As to the height of a cart-horse for agricultural purposes, one more than 164 hands high is too high, and one less than 15 hands high is too low for general purposes.

To summarise these remarks, let me describe in full what I consider perfection in an agricultural cart-horse:—

Well-shaped head, rather large, a long clean ear, full eye, neck rather long, but not too much arched, strong withers lying well forward to catch the collar at the proper angle for draught, and broad shoulders well spread into the back, back straight, ribs long and well rounded, hind legs bent at the hock, forelegs forward, hind-quarters somewhat round, but not sufficiently so to make them look short; the mane and tail of strong but not coarse hair, and with a fetlock about two inches long, broad knees, long hocks, short shanks and hard ankles or fetlock joints, and round hoofs well opened behind; and the nearer you can approach this description, the nearer the horse will be to perfection.

Till the steam-plough takes the place of those now used, the plough will always be the work which will wear out the farmer's horse more than any other. Observe your plough-horse on a hard headland, and you will see the horse with very sloping shoulders swerve from his work, where a horse with moderately upright shoulders will lay to his work, and walk straight. I am aware that in these remarks I am touching upon tender ground, for I find the fashion of the present

day is greatly in favour of very sloping shoulders. My experience is certainly not in their favour, and Professor Youatt, in describing the farmer's horse, writes that the shoulder should not be too much sloped, as workmen often find fault that a horse jobs when this fault is more in the shape of his shoulder than in the femur, for when he lays to his work the collar catches his windpipe, making him throw up his head and fall back; and when a horse is required to start a heavy load, or take a dead pull, it will be necessary to have horses that will lay to their work, for it is a mathematical certainty that a draught horse must pull from an angle at the shoulder, and if that angle is too sloping, the collar will catch the windpipe, and, if too upright, will press upon the withers. I can only explain the necessity for a stander horse, allow me to relate an instance I saw a few months since. A waggon was stopped at the bottom of the hill in the parish of Great Finborough, and when the driver wanted to start his load, three out of the four horses refused the dead pull, and had he not had one with a pair of upright shoulders, he might have stayed some time. On looking round I saw the three were of a favourite breed, and very much like animals I have also noticed. They had on collars thickest at the top. This, to me, had a very ugly appearance.

A word or two as to breeding. One point I have found too much overlooked in breeding, viz., hereditary weakness and disease. My advice is, never breed from an unsound animal, particularly do not breed from one unsound about the feet and legs. I have frequently been able to trace pedigree by brittle hoofs and bad ankles or fetlocks, for several generations, when acting as judge, and have found too many of our public favourites so very deficient, that even when only old enough to put to work their legs looked more than half worn out. To back my opinion as to the necessity for attending to the size of the ankles of a cart-horse, I will quote my brother, who lived at Onehouse Hall for 40 years, and who would never breed by horse or mare that he could not maintain in that condition for a generation, but would be sure to go wrong if continued; and I believe those who knew his horses will agree with me that they were equal to any in the country, and they were chiefly bred by himself. He never showed any, for he said he could not spare his best to be fattened up for that purpose, and he never saw one too good for his work—this remark I heard him make to the late Rev. Copinger Hill.

Thus far I have come to my remarks to the Suffolks, but I will now say a few words about other breeds. For the light lands of Norfolk they require a faster animal than we do for our district, and they breed and use them rather longer on the leg; and many of the Lincolnshire, or Fen breed, do not attain their full size, work as well as those of Norfolk or Suffolk, and in point of symmetry these and the Clydesdales sometimes even beat the Suffolk breed; but as working horses, I believe they will not stand the pace, do more work, or keep their condition so well as the well-bred Suffolk horses. On this point I had, some years since, the word of a gentleman who set two farms at the same time, one with Fen breed and one with Suffolks, and he had most of the Suffolks when the others were worn out. In most old descriptions that I have read of the Suffolk horse, he is described as low in his forehead, sluggish in his movements, and with a blaze in his face as bad as the splashes on the legs; and, by attention to breed, are chiefly vanished; and I have no doubt those imperfections which I have taken the liberty more particularly to notice, with other faults too commonly met with, may be also much improved, if not got rid of altogether, by further attention to breeding by sound animals.

To conclude, gentlemen, after 40 years' and more experience, I may perhaps be allowed to caution breeders not to sacrifice substance for quality. Symmetry for fancy, nor both for action, so long as strength and constitution are required in an agricultural cart-horse. I could continue the subject by relating many occurrences which have happened in my life amongst horses and men, but I shall be happy to have the subject discussed by others, whose modern experience can improve my, perhaps, too antiquated ideas.

DISCUSSION.

Mr. CROSSE had brought to the room, in order to better illustrate his remark, two oil paintings of Suffolk horses. He said one was the likeness of a horse that had taken many prizes, but he brought the two pictures in order to show what he considered the weak points, and to point out the good points of the other. He pointed out the deficiencies of the ankles of the mare, but said when she was shown the judges thought sufficiently well of her to give her a prize. The other was never thoroughly beaten, and was never shown but what he got a prize, excepting at Cambridge, when a Fen horse took the prize against the Suffolks. The horse was 16 hands half an inch high. The late Mr. Worlidge had an animal which looked half as big again, but when they got on to the weigh-bridges there were only 15 stones difference; one had weight and the other had not.

Mr. LINGWOOD referred to Mr. Catlin's Captain, whose blood came down to the late Mr. Crisp's Prince. Many that had descended from that blood might be a little swifter below, but they would not be so good as the late Mr. Crisp's Prince. He said he had seen a lot of farmers wanted to get rid of a good gelding for London work it must have some style about it. It would not do to have the very upright shoulders that had been alluded

to if they wanted a horse to sell well. The President would agree with him that if his mare had not got very upright shoulders, but still sloping, she would not walk and show as she did. We had now come to the year 1871, and if we wanted a useful gelding for London work there must be style about it, even though it was at the sacrifice of a little substance. (Mr. Lingwood) knew that the President's test point was the point of the knee appeared to be an advocate for an upright shoulder.

Mr. CROSSE: You must not call that an upright shoulder. He had always held that the angle of the shoulder of a hackney or for London work might be 45 degrees backwards, but a Suffolk cart-horse ought never to be above 25 to 30. The fastest walker he ever knew was bred by Mr. Crisp's Prince. She could walk five miles an hour, and she had the most upright shoulders.

The President said the point now under discussion was as to the uprightness or otherwise of the shoulder. Looking at it in a practical light, there might be a great deal in what Mr. Crosse had said, that more or less the upright shoulder did give a better pulling power to the collar. It was according to the law of the lever, and it would be a good thing to enable the animal to put its forelegs out better than in the case of an upright shoulder. For drawing a heavy plough an upright shoulder might do as well, and perhaps better; but still, as had been said, if they wanted to breed horses for London work they must be smartness. The fault that the Suffolk horses had run into was that they were a little light in the bone, a little small below the knee, and some of them had feet which were like to turn bad. These were the things which breeders must guard against. I do not think the Suffolk horse is a good horse for a frequent matter of complaint that the Suffolk horses could not stand the stones. This was an evil that ought to be eradicated if possible. In a Suffolk horse he liked to see a good loin and good hind-quarters. He liked to see a good shoulder lying well back, would like to see a long sweeping quarter, and this, with good action, made a perfect horse.

The VICE-CHAIRMAN (Mr. Heigham) was bound to say that the cart-horses in the eastern side of the county were generally superior to those in the western division of the county were greatly indebted to Colonel Wilson for introducing some most valuable stallions into their neighbourhood.

The President said his great object in buying the cart-horses was to see if West Suffolk could not, after a time, equal East Suffolk. There had not been first-class stallions travelling through their part of the county; but he was now trying to give the farmers in West Suffolk the opportunity of making use of some good blood. That he had done this the statistics showed, and the fact of making money was quite clear from the prices which he had given for them. He should like to see the horses of the western division equal those of the eastern. He purchased at the Newbourn sale the best yearling out of the famous Viceroy by Monarch. It was well known that Mr. Wolton had been breeding with great care for years past, and at the sale there was the best lot of animals, taken as a whole, that he (the President) ever saw in his life. He bought a four-year-old which was fortunate enough to win the first prize at the Lincolnshire Show. It was a horse of good, stout, useful animal. If he turned out well, he would be at their service.

Mr. CROSSE said reference had been made to horses for use in London, but it should be remembered that the objection to this evening's discussion was not of an agricultural cart-horse. The best horse he ever saw in his life for symmetry was Honest Tom, a Cambridgeshire horse, but his father was a Lincolnshire horse. It was the best shaped horse he ever saw in his life. It had four white legs and a white neck. It was a lean horse, but it was a good, stout, useful animal. If he turned out well, he would be at their service. Mr. Crosse then went on to speak of other descriptions of cart-horses, alluding to the Wolds of Somersetshire, where three cart-horses were put to a plough, where the work was to 12 inches deep, and he said that Suffolk horse would be of but little use there. He also alluded to Sussex, where they ploughed 15 inches deep, and to the Newcastles horses. As to breeding a smart-looking horse for London, Mr. Crosse spoke of the long neck, which was a fault, and which would be of no use. He then observed that if you wanted an animal with shoulders lying back like those of a hunter, you would not get one that could pull a dead pull.

A vote of thanks was passed to Mr. Crosse for his paper.

IXWORTH.

The Plough.—At a recent meeting of this Club, Mr. CASTLEDINE, agent to Messrs. Ransomes, Sims & Head, at Bury St. Edmund's, traced the history of the plough, coming down to 1785, when Mr. Robert Ransome patented an invention for tempering shares; and in 1808 he also patented the construction of the bodies in such a way as to admit of their being easily taken to pieces on the field, so that the plough might be put together in the field, and this patent formed the basis of the plough in use at the present day. The next point was the various kinds of ploughs, and the difference between the wood, iron, swing, and wheel, single and double ploughs. It was extremely difficult to get at the draught of a plough by one set of experiments, as, to thoroughly test it, different soils in different conditions should be tried. A series of experiments, however, tried by a member of the Society, represented by Mr. Catlin, showed that the old Norfolk and Suffolk wheel-ploughs, showed at least one stone in four in favour of the iron ploughs. He need not say that it was of the greatest importance to find out the form of plough which, doing the work well, should have the least draught. Experiments with wheel and swing ploughs showed an immense difference.

Two were tried with the cutting and turning parts exactly similar, but the one fitted with a short beam for swing ploughing, and the other with wheels, and although the swing weighed 4 cwt. less than the other, yet the draught of the former was 30 stones, while that of the latter was only 22. Although such a difference might not always be found, yet it was plain that wheel ploughs were much steeper, and were not subject to that jumping motion to which the others were liable. The weight of a plough had much to do with its working. To prove this Mr. J. E. Ransome took a plough weighing 3 cwt., the draught of which was 21 stones 5 lb. in a furrow 6 by 9, and added 1 cwt., when the draught increased to 28 stones, and then added another cwt., when it increased to 33 stones 5 lb.; showing an increase in this case of from $\frac{5}{8}$ to $\frac{6}{8}$ stones for each cwt. added. Another plough, weighing only 24 cwt., took a draught of 18 stones 5 lb. It was quite possible to get a plough too light for its work, and the draught mentioned showed the great advantage of using ploughs of a suitable weight. It was often thought that a short breast was lighter in draught than a long one, but the reverse was the case, as severe tests showed. The plough should be adjusted so as to work as a swing, and afterwards the wheels attached, and at the same time a slight pitch given to the share, as much power was swallowed up, unless the plough was set right. An immense difference had been found in draught with the same plough and on the same soil, because one man understood setting his plough and another did not.

Coming next to what might be now termed the plough of the period, he said, never in his life did he witness so much excitement about an implement as was shown at the Smithfield Club Show last week; everybody there was on the rush: "Have you seen the double plough?—whose do you think best?" As to the President's remarks, he said that the ploughs invented by Lord Somerville, and had been used for some time past for various purposes. They were formerly made in wood, but they then very much resembled two ordinary ploughs fastened together; now the recent improvements, which were becoming every day more appreciated, were rapidly coming into general use. By the use of these ploughs a great saving might be made in time, labour, and horses, as was shown by the following figures, the results of trials at Peterborough in 1867, and at Haslemere in 1870. On the average the draught of the various double-furrow ploughs present was as follows:—Ransomes, 6 cwt. 1 qr. 1 lb.; Howard's, 6 cwt. 1 qr. 26 lb.; Fowlers, 7 cwt. 25 lb.; while that of a single plough was 4 cwt. 1 qr. 1 lb. On light land the draught of Ransomes' double plough was 4 cwt. 1 qr. 23 lb.; Fowlers, 4 cwt. 2 qr. 14 lb.; and Howard's, 4 cwt. 2 qr. 15 lb.; while that of a single plough was 3 cwt. 21 lb., so that on both light and heavy lands the double plough was the better and man. Several other trials showed the same result, and on any land where a single plough could be worked by two horses, a double-furrow plough could be worked with three,—showing a clear saving. He received a letter from a gentleman in this very county—out Halesworth way—last Thursday, who had previously been very much prejudiced against these ploughs, but he had now ordered another, and said the man who had worked them had done it at half the cost of the others, and did it nearly as well. These ploughs would be found useful all the year round, and he was quite convinced in a few years they would be as necessary to the farmers as the single ones were now.

DISCUSSION.

Mr. HARRISON said he had tried these double-furrow ploughs on his farm at Crofton, but they did not use them as a general rule. It required two good strong horses to draw them, and they did not do more than two-thirds the distance that a single plough did, at the same time distressing the horses. For the first ploughing it was particularly useful, and especially for turning up the land after the sheep, and they also sometimes used it in ploughing a second time for the Barley crop. The plough, however, did not go so fast in proportion as the other, and he did not think it was worth the extra labour was saved. In his opinion the plough would never become generally used, as they could neither begin nor finish the work with it. Still, as a light-land farmer, he would not like to be without it.

Mr. CASTLEDINE said he did not maintain that a double plough could be worked with two horses. It was proposed to work it with three, and to save a horse and a man.

The President said the question was, which was the cheaper, the double or the single plough? In using the plough he was sure they were all agreed to put the third horse where he would tread the land as little as possible; and then came the question of expense. He presumed they must have a boy with the three horses; he would cost 6 s. a day. They must get two horses and a boy, the difference in wages between a boy's and the man's, which would be about 1 s. ad. Therefore they would save that amount and a horse, presuming the plough did double the work of a single one.

Mr. HARRISON did not think these ploughs were suited for heavy land, and he could not understand why an 8-horse power engine should not do the work of eight horses, instead of requiring a 14-horse power engine to perform it. There was a great deal of power wasted at present in the engines, and he thought they should draw the topsoil for steam-engines down most of their fields, so that there could not be more than one horse power lost in that way.

The Chairman said in certain things all men were

Conservatives—they were, to a certain extent, prejudiced against a new thing. Some of them could not remember the time when the labouring classes so disliked threshing-machines that there were riots about them. He thought they should take these ploughs into their serious consideration, for, if only occasionally, they might be very useful in getting the work forward, and in getting the soil in good condition at Barley sowing. He thought this plough, if they thought it would answer their purpose, might help them until science enabled them to do without their ploughs altogether. With steam cultivation, especially on light land, it was not so much ploughing as cultivating which was used. He hardly ever used a plough, except when turning in his layers for Wheat. A friend of his in Worcestershire, with some 3000 or 4000 acres of land, had lately turned his attention to growing Beet for distilling, and this year he had 1500 acres of Beet. He ploughed his land literally day and night, using Bude lights, never stopping, and he was told that he was getting on most successfully. He was surprised to find, however, that to acres a day was about all they get with the double engines.

A vote of thanks was passed to Mr. Castledine.

Notices of Books.

The Pearl of Story-Books. T. Nelson & Son. The Pearl of Story-books is the Bible; and the volume here announced is a collection of Bible stories told simply in the words of Scripture. The chapter and verse arrangement is so artificial, that it greatly interferes with a child's appreciation of a narrative; and the writer of this book has broken up the historical and biographical and narrative parts of the Old Testament into a succession of tales in which chapter and verse are disregarded, the words of the Bible, however, remaining untouched. We are interested in this, especially because, during many otherwise weary hours upon a sick bed, it has been the last year's occupation of a good practical farmer, who has frequently addressed our readers in these columns; and who, now that he is once more in the field, will, we hope, take up his professional pen again. The book which Messrs. Nelson have sent out is well printed on good paper, and issued in a good binding, and is well and interestingly written. The contents are well selected, and the duties of the Editor have been very well discharged.

Farm Memoranda.

BANFESHIRE, BOYNE DISTRICT: January, 1871.—The year 1871 is likely to be something akin to its predecessor as far as gone of it, frost being its most prominent feature as regards the weather; and were it not that ploughing was well forward in the fall, farmers would be thinking it very backward, as it is now five weeks since the plough was in the yoke, with the exception of one day, in some places. Carting of manure to the fields has been the only occupation that could be performed satisfactorily, which is now mostly finished, and all longing for fresh weather to get the remainder of the lea turned over.

We are afraid also of our Turnips being rendered useless by so much bare frost, but last year taught a useful lesson, and a great quantity has this year been furrowed up, and a good many of them are for many years past. Stackyards are standing out well in this district, the dry end of the year helping in a great measure to save straw; also some could not get it threshed in quantities as they could have wished. Want of water with those who had water-mills made it stand out longer than if there had been the usual supply; and, although steam-mills are legion, yet all could not get the use of them in time.

Our cattle trade has been very brisk for some time, and all are highly paid with prices for all kinds of stock, and we have the satisfaction to think that this district is again clear of foot-and-mouth disease, which was brought here by some English calves bought by a few farmers in this district; however, it was promptly subdued and thoroughly cleared out. Grain is also selling at remunerative prices, and turning out well, and altogether the farmers have been well pleased with the prospects of the new year; but in this district they are not so much so, as they are in many parts. For on every other farm a band of labourers is employed draining, and quantities of tiles lying here and there shows that the spirit of improving develops itself when the money comes in for agricultural produce. There is at present some talk of a steam-plough to be started in the Boyne district to smash our clays, and although it is as yet only talk, we are in hopes that at no distant date it will be a reality. *W. F.*

AGRICULTURE OF ABERDEENSHIRE.—This is not a great grain producing county. The acreage under grain crops, however, shows an annual increase. In 1855 the total extent under grain crops was about 190,000 acres; in 1866 it was 206,577 acres; in 1867 it was 207,768 acres; in 1868 it was 207,174; and in 1869 it had reached 211,222 acres, showing an increase in the course of 15 years of over 21,000 acres. The extent of land sown with Wheat is gradually decreasing in Aberdeenshire. In 1855 there were 340 acres under this crop, and in 1869 only 103; while there were still less last year. It is chiefly along the seaside that the Wheat patches are grown. The average yield of

grain per acre is not high, as evidenced by the comparatively little attention given to the cultivation of Wheat. From 24 to 30 bush, per acre is the average. The Wheat is chiefly sown in spring, and is thickly seeded. Barley is grown more profitably and much more widely. In 1855 there were 11,150 acres producing Bere and Barley. In 1857 it was 15,655 acres; in 1867 it had decreased to 13,247. In 1868 it was 14,086, and in 1869 it was 17,221 acres. Barley grows well in almost every district of the county, especially in those of Strathgibbie, Garioch, and Formartine. Bere is not nearly so common as it was twenty years ago. Barley having taken its place to a large extent. The latter is invariably sown on good rich loamy soil, after Potatoes or Turnips. The general time of seeding is the last ten days of April, and sometimes a few days into May. The quantity of seed sown averages from $\frac{3}{4}$ to $\frac{5}{4}$ bush per acre. This is with the hand; and if a machine is used, fully a bushel per acre is saved. The produce ranges generally from 4 to 6 q. per imperial acre, and the weight from 50 lb. to 55 lb. per bush. It has been computed that Aberdeenshire yields about 70,000 q. of Bere and Barley. A good deal of it is consumed at the distilleries in the county, and at those of Banff and Moray, in which last two counties there are more distilleries than in any other in Scotland, Argyllshire excepted. Aberdeenshire grows very heavy crops of excellent Oats. In 1855 the area under Oats was estimated at 172,087 acres; in 1866 it reached 194,915. The average yield has decreased since 1859, but has advanced again last year. It invariably grows well to straw, especially after Turnips, and the average yield per acre would be about 44 q. The annual produce of Oats is thus nearly 900,000 q. The weight ranges from 39 lb. to 44 lb. per bush, 42 lb. being very common in the middle and lower districts, but in the remote Highland districts it is sometimes as light as 32 lb., and of very inferior quality, scarcely suited for human food. Oats from Strathgibbie have frequently been exhibited at the London show weighing 49 lb. per bush. The time of sowing is from the 5th to the 20th of April, and from 4 to 7 bush per acre are used for seed according to the means employed for spreading the grain. To ensure a good crop it is necessary to have the lea turned over in time to catch the winter frost; but in the case of cleaned land ploughing as near the time of seeding as possible is invariably attended with the best results. Beans, Peas, Rye, &c., are not very largely grown, only about 200 acres of each being returned to the county. These are only cultivated by the leading feeders of cattle for home use. Aberdeenshire is more celebrated for its green crop than grain crop. Turnips grow excellently. In 1855 the extent under Turnips was about 80,000 acres, while in 1868 it was 94,295 acres, and last year slightly more. About one-fifth of this acreage is under Swedes, the rest being under yellows and globes. Occasionally over 30 tons per acre is reached, but the average yield is not more than 18 tons. The annual produce of Turnips in the county would thus be close on 1,700,000 tons. In order to guard against frost and the ravages of hares and rabbits, the farmers now endeavour to store as much of their Turnip crop as possible early in winter. The drill-plough is generally run through what cannot be lifted and pitted—a shallow furrow being thus turned on the bulbs. Storing has been much more resorted to within the past year or two. Besides securing the Turnips, these are only cultivated by the leading feeders of cattle for home use. It enables the farmer to have fresh supplies for his cattle in all kinds of weather, which all cattle-feeders know is a great advantage. The common width of the drills is 27 inches, and the land is as thoroughly cleaned as possible of weeds before the drills are formed. The distance between each plant after singling is invariably from 8 to 10 inches. Potatoes are only grown to meet the home supply. There were 7498 acres under this crop in 1855, and 8200 acres in 1869. Yet the Lucerne is sown pretty extensively, and used for cattle-feeding at the end of the grass season generally. In 1869, 1662 acres were sown with these crops. Flax was grown extensively 30 or 40 years ago, but has now almost entirely ceased to be grown. There were 700 acres under it in 1855, and only 13 in 1869. The total area under green crop in 1855 was 88,954 acres, as compared with 103,628 acres in 1869. For hay and pasture grass the county is considerably deficient. The figure is a large proportion of the total acres of cultivated land, that much of the first year's grass, as well as all the second and third—when there is a third—is pastured. It is found to pay better in this way than by making hay of it. The sown pastures are generally rich, and stand out well over the season with ordinarily moist weather. Grass and hay under rotation covered 200,665 acres in 1865 and 229,662 acres in 1869, exclusive of 27,554 acres of permanent pasture, meadow, or grass land not broken up for rotation. The figure is adduced show that the five-shift course of cropping is generally adopted, and that any deviation from it more frequently takes the shape of three years in grass than two succeeding white crops. *Scotsman.*

SCILLY ISLANDS.—[An Example Farm: the Home Farm: and General Agricultural Economy.] *The Home Farm.*—A farm near Old Town may be taken as an example of the larger farms on the Scilly Islands. It is situated on the south side of the road which connects Hugh Town with Old Town. The most fertile fields lie in the valley, near the road. On

the slope of the hill, facing north-east, is some good land, the value of which is increased by its being well sheltered from southerly and south-westerly gales.

As one approaches the brow of the hill, the soil becomes thin and broken up by large blocks of granite. One or two fields on the south-western slope are of better quality, but much exposed.

The farm is divided by stone walls into 18 fields, which vary in size from $\frac{1}{2}$ to $\frac{1}{4}$ acre, making a total area of 17½ acres.

On leaving the road, we entered a field of 1½ acre, covered with a plentiful pasture of excellent quality. Three oxen in the year have been fattened on this field alone.

Thence we passed into a field of Mangels, which promised well in spite of dry weather and late sowing. Here the soil was a deep sandy loam, containing so much organic matter that, in some of the darkest places, it appeared to be mixed with pure black peat.

The percentage of organic matter has doubtless been increased by the yearly application of large quantities of seaweed. This field and others near it, of a rather lighter texture, have been for many years cropped with early Potatoes, followed in the same season by Mangels.

As we ascended the hill we passed over land unsuitable for the cultivation of Potatoes every year, some of it being simply a micaceous sand. Here a four or five years' course is adopted. Some of the fields on the top of the hill were ploughed. Others, on which granite boulders lay thinly scattered, were either in natural pasture or sown with artificial grasses.

Descending the south-western slope of the hill for a short distance, we found that the land slightly improved in quality, but on account of its exposed situation is always kept down in grass or seeds.

The farm contains 104 acres of arable land and 7 acres of grass.

The former was cropped as follows:—

Seeds (kept down from four to seven years) ..	4½ acres.
Potatoes, followed by Mangels ..	½ "
Wheat ..	3½ "
Barley ..	3½ "
	10½ "

No general rotation is adopted, but the course of cropping is varied according to the situation of the fields. The live stock kept are one horse, 10 or 11 head of cattle, and three pigs. There are no sheep.

The land on the whole is clean and thoroughly cultivated, and the cattle looked healthy and well cared for, as is generally the case on the Scilly farms.

2. The Home Farm.—This farm is on the island of Tresco, of which it includes the greater part of the cultivated land. On the southern slope stands the residence of the proprietor, in a pleasant and picturesque situation.

The garden, with its living walls of Aloes and German its Orange trees and its Myrtles, presents more the appearance of a Spanish than of an English pleasure ground. The road to the house is sheltered on the one side by a plantation of Firs and Pines, on the other by various kinds of ornamental shrubs. At a little distance are two large ponds, stocked with swans and Egyptian geese.

The area of the farm is between 300 and 400 acres. We state it thus loosely because we could not ascertain the exact size. The ignorance of areas prevailed on these islands, and it was generally difficult to obtain even an approximate estimate.

The fields are much larger than on any of the other farms. The roads are good, numerous, and easily repaired.

The farm buildings are constructed of granite, and have slated roofs; they are in two distinct blocks—one recently erected, and the other built some years ago. The old block consists of engine-house (with engine of 8-horse power), barn, granary, and lofts (with two pairs of millstones), stables, chaff-house, cart-shed, carpenters' and blacksmiths' shops, and bailiff's house.

The chaff-cutter is driven by horse-power. The cart-shed is small, and distant from the stables.

The stackyard is near the shore, and very much exposed.

The new block of buildings, which is on the other side of the road, is altogether better adapted for the steam-farm, slaughter-house, house with copper for steaming food, piggeries, covered manure-pit, bull's house, cattle stalls, calves' shed, and root and hay house.

The root and hay house has a floor above, where is another chaff-cutter, driven by horse-power.

Provision is made for laying on water to each of the cattle. Thorough ventilation is obtained by means of sliding panels in the doors, and hinged shutters to the windows.

We heard that it is the intention of the proprietor to dispense with the old block of buildings by erecting others in proximity to the new block. Certainly the present arrangement is neither conducive to economy nor to convenience. For example, with a steam-engine of 8-horse power there should be no necessity for two horse-gears; all the chaff should be cut by steam.

Implementers are numerous, and of good construction. There are some good cottages near the farm buildings for the labourers.

Punctuality on the part of the labourers is strictly exacted, those being fined who are late in coming to

their work. The men receive from 12s. to 16s. a-week, with extra wages in harvest time. They are paid during illness, and a fat ox is killed for them at Christmas. A good deal of work is done by the piece.

Crops: Few Potatoes are grown, because the labour cannot be spared. Red and white Wheat is drilled in February at the rate of 7 to 8 pecks per acre. If sown in autumn it grows too luxuriantly. It is rolled when well up, but not hoed. The wireworm is often destructive. The harvest is in August, and the Wheat is mown. Mangels are drilled at the end of April, or at the beginning of May, in rows 2 feet apart, and at the rate of 7 or 8 lb. of seed per acre. The Orange Globe is the favourite variety. The plants are thinned by the horse-hoe, travelling at right angles to the rows. In the three years previous to 1869 notice was taken of the weight of the Mangels, and five roots were found, in many places, to weigh 118 lb.

The plan of storing on this farm is to throw the roots into a heap with their tops on, and to leave them without further covering.

Kohl Rabi is sometimes grown, but does not attain a profitable size, nor does it keep so well as Mangels. The turnip is very troublesome on all the islands. Parsnips are grown for the cattle.

In regard to Clover, Alsike succeeds as well as any kind. White Dutch does not stand, and grass will not last more than two or three years on the light sandy land.

The downs are being rapidly improved—the surface rocks removed by blasting, the Furze uprooted, and grass seeds sown.

Besides the crops above mentioned, Barley, Beans, Peas, Vetches, Turnips, and Carrot are grown on each, and in as large quantities, as their respective importance suggests.

The following rotation is used for part of the farm:—

1. Wheat, laid down with seeds.
2. Seeds, mown twice.
3. Vetches, followed by Turnips.
4. Corn, or, if grass is wanted, Mangels, laid down with seeds at the last hoeing.

Barley is sometimes grown after Wheat.

Live Stock: In addition to the working horses, two milcs are kept, and are found to be quite equal in value to the horses for certain kinds of work.

In winter the food of the horses consists of the following mixture:—Indian Corn, 20 bush; Barley, 10 bush; Peas, 20 bush; these are roughly ground together, and a liberal allowance given to each horse.

There were about 80 head of cross-bred cattle on the farm at the time of our visit.

Fattening bullocks are fed on pulped Mangels and Swedes, hay and straw chaff, and a little oilcake. A common dead weight is from 6 to 7 cwt. Calves are tied up for the first three or four months of their lives. This was, doubtless, the cause in part of their poor appearance. All the other cattle looked well.

The sheep are not confined to one breed, but South Down, Shropshire, Dartmoor, and Scillonian sheep, are all kept. The ram is turned among the ewes on September 15. Lambs are weaned in July, put on Clover, and given a little cake for a short time. From the Clover they go to Turnips. In the winter they are on the grass land. Ewes are chiefly kept on the pastures and downs, getting chaff, pulped Mangels, and oilcake when in poor condition.

Fattening sheep are kept on the grass land, and have hay and straw chaff, with 1 lb. each of oilcake per diem.

On St. Helen's the sheep are allowed to run wild, being only visited for clipping. Their number has long ceased to increase.

The sheep at Tresco suffer from the rot; and, as the diseased livers are thrown to the dogs, it is likely to continue.

A considerable number of breeding pigs are kept, and their progeny sold to farmers on the other islands. They are fed upon steamed Mangels and Swedes, together with some of the same mixed meal which is given to the horses.

Much interest is taken in poultry, of which all the principal varieties may be seen on the farm.

There are several poultry houses, with walls made of dried Ferns, near the farm buildings.

3. *Rural Economy.*—Rents are higher on St. Mary's than on the other islands. On St. Mary's the rent of good land is 30s. to 40s. per acre. Poorer soils, and those in exposed situations, let for considerably less.

All the islanders hold their land under one proprietor, who resides at Tresco. They have no leases.

The entry on farms takes place on October 11. The inciner has no payment to make for tillages or unexhausted improvements.

From £6 to £7 per annum is, in some cases, paid for a cottage with four good rooms, including, perhaps, a little garden ground; but there are many who, favoured by circumstances, pay a much lower rent. Rates are low, including only the poor and the road rates. Together these consist of from six to eight rates per annum, each 3d. to 4d. per pound.

There are but few paupers, and these are sent to a union in another part of Cornwall on the main land.

Native labourers are not numerous. The small farmers work for those who have larger holdings; and, in busy times, labourers come over from Penzance.

On St. Mary's labourers get 2s. 6d. per diem, with beer and supper in addition during harvest. On the other islands wages are lower. On St. Martin's 10s. a week is given.

The working day is from 6 A.M. to 6 P.M. in summer, half an hour being allowed for breakfast, and one hour for dinner. In winter it is from 8 A.M. till dark.

Piece-work is contracted for by the field, not by the acre. We heard that high prices were given.

The farmers on the islands appear to be prosperous. Few complained of high rents, and it is said that 5 acres suffice for the support of a family.

In the houses we visited there was no sign of poverty or distress, circumstances, but all the internal arrangements betokened the possession of plenty and abundance.

The prices of provisions are much the same as in other parts of Cornwall. In the following Table are given the prices of various kinds of food at three different periods:—

	1750.	1822.	1850.
Reef	Per lb.	Per lb.	Per lb.
Mutton	2s. 10d. to 3d.	4d. to 1s. 4d.	5d. to 6d.
Lamb	2s. 10d. to 3d.	4d. to 1s. 4d.	5d. to 6d.
Pork	2s. 10d. to 3d.	4d. to 1s. 4d.	5d. to 6d.
Butter	2s. 10d. to 3d.	4d. to 1s. 4d.	5d. to 6d.
Eggs	2s. 10d. per doz.	1s. 3d. to 1s. 4d.	10d. to 1s. 2d.

Barley bread is still eaten on St. Martin's.

There are two days in the week on which meat is offered for sale in the little market house at Hugh Town. Each farmer is his own salesman, and, as the joints are generally bespoken, the business is quickly despatched. Beef, mutton, and geese are sold at the same price per pound.

Shops are numerous in Hugh Town. The proprietors find it unprofitable to restrict themselves to a special branch of trade, so they keep a miscellaneous stock.

They will not always give money for farm produce, especially roots and butter, but oblige farmers to take their goods in exchange.

With respect to the state of agriculture on the Scilly Isles, we need scarcely say that there is much room for improvement. It certainly suffers from the smallness of the farms, and from the ignorance of the farmers on many points connected with good systems of husbandry. The latter defect might be remedied if the proprietor of the islands employed as his steward and as his bailiff, men well acquainted with the best methods of British farming. The one, in his personal intercourse with the tenantry, would have many opportunities of influencing their practice. The other, in his management of the home farm, might show to the islanders the style of farming best suited to their peculiar circumstances. *Journal of the Royal Agricultural Society of England.*

Miscellaneous.

TO FATTEN A CALF.—It has usually been thought impracticable to fatten a calf properly without giving him milk fresh from the cow. Milk is the best type of food for the young animal, because it possesses all the constituents necessary to build up every part of its system, and in the most soluble and digestible condition. Now, any food containing the requisite constituents, in a soluble condition, easily given in a liquid state, may be substituted for the new milk. Hay tea is sometimes used to bring up a calf. This is the soluble constituents of the hay obtained by cooking. But the best food to fatten a calf, without whole milk, is oil meal, molasses, and skim-milk for the first two weeks, after which a little oat or barley meal may be added. We have often made calves weigh 120 to 140 lb. at four weeks old on this food. We have one now that weighs 125 lb. at that age, never having had any new milk after the second day. Molasses may, perhaps, be considered a new food for this purpose, but, when fully understood, must be regarded as an important one. It is very soluble and easily assimilated by the young animal. Liebig is of opinion that starchy food is first converted into sugar before being assimilated by the animal. We all know how rapidly sugar enters into the circulation of the system. Sugar is found to take the place of animal fats in cold climates in keeping up the heat of the body. It may be considered as a substitute for the oil of the milk used in making butter. Oil meal is rich in muscle-forming food and phosphates with some resinous oil. Its constituents are mostly soluble and easily assimilated as food. Oil meal should be scalded, and allowed to form a thick mucilage before being mixed with the skimmed milk. The molasses may be added directly to the milk, and the whole should be blood-warm when given. The proper quantity for a young calf is a table-spoonful of oil meal and the same of molasses, divided into three parts, for one day's feed, added to the refuse milk. At the end of the first week each may be increased, and at ten days a spoonful of molasses and the same of oil meal may be given at each feed. At the commencement of the third week a spoonful of oat or barley meal may be added to each feed, but this should be cooked. This food, together

with the skimmed milk of the mother, will make an excellent calf for the butcher at five weeks old. Now the whole expense of this extra food is not more than one-tenth of the value of the butter made from the milk saved. At present, prices it will cost less than one dollar for five weeks; and an early calf of the weight mentioned will bring from 10 to 14 dols. The molasses may be of the cheapest sort, but there is none better than sorghum for this purpose. *Rural New Yorker.*

BUTTER FROM A GIVEN QUANTITY OF MILK.—With the view of learning the amount of butter to be obtained from a given quantity of milk, I have recently tried the following experiment at my creamery in Onondaga County, N.Y., where I receive milk from 300 cows. The milk delivered at the factory on Saturday evening, July 30, and Sunday morning, July 31, amounting to 5729 lb., as soon as received, was run into deep, cooler pans, and these were set into the tank of spring water. The temperature of this water is maintained uniform, at about 53°, by the introduction of an inch stream of water from the spring. In this vat the pails remained for about 30 hours, when they were removed, in order that by a free exposure to the atmosphere the milk might be soured. It might have produced a better result if the pails had been allowed to remain immersed in the water until the curd became loppered, but we feared that a long exposure of the milk to water, such as a degree of cold would cause a bitterness of flavour to the cream and the butter made therefrom. When about 48 hours old, the milk having soured and thickened, the cream was removed and kept until the next day. On Wednesday churning was done in large dash churns, operated by steam-power. From this 5729 lb. of milk there was produced 232 lb. of butter. This shows an average of 24½ lb. of milk as being required for a pound of butter, very closely meeting the opinion generally held by the two or three dairymen as much milk is used in making a pound of butter as in producing a pound of cheese. At the season of the year above named a yield of 1 lb. of cured cheese from 10 lb. of milk is very satisfactory. This would have produced 573 lb. of cured cheese from the milk used in this experiment, which gave me 232 lb. of butter. Cheese at that time was worth 14 cents a pound. Butter, to pay as well as cheese at this price, would need to sell at fully 35 cents a pound, allowing that the market price of butter is 20 cents. The cost of one half cent per pound more than those required for cheese. From this loppered milk, which in my case went to the pigs, there is sometimes made a kind of cheese used mainly by the German Jews. The curd is heated to a high temperature, is not salted, but is placed in small bags holding about half-a-pound, and subjected to moderate and long-continued pressure. When removed from this pressure the cheese is one side brown and the other white, the rubbers salt is rubbed upon the outside, and the curing is made in a cool damp place, as is the case with Limburg cheese. There is small demand for this kind of cheese, and if there was a large demand, the prejudice of the Jews will allow them to eat only that which Jewish hands have made. *Gardner B. Weeks, Syracuse, N.Y.*

The Week's Work.

JANUARY 28.—*Spring Seed-time* is said to begin in our southern counties with the close of the month; but the season, so far as gone, has been exceptional in many respects. Beans and peas when sown early corn better, yield a finer quality of straw, and have a better chance to escape fly, when plowing should now be proceeded with as soon as the land and weather will permit. Where the land was manured in stiches in the autumn, the seed may be dibbled in as soon as the land will carry the feet of the workmen in open weather without poaching. Where the land was not manured in autumn, and requires to be so now, much will depend upon the nature of the land as to whether it will carry the seed without poaching. In some counties the weather is unfavourable to specific artificial fertiliser for Beans and Peas at this season is a discovery which has not yet been made. They are both great consumers of potash, lime, and magnesia, and there is considerable difference between the two, Peas consuming more lime than Beans, which accords with the experience of farmers, and at the same time indicates the nature of the food they require in the form of manure. In our northern counties it is seldom that manure can be got in this time, and the only exceptional situations of low lying sheltered land, protected also in not a few cases by a breeze.

Wheat Sowing should now be proceeded with whenever there is a good seed-bed. At the same time it must be borne in mind that "a good seed-bed in February is better than a bad one in January." But improved drainage and manuring are qualifying many old rules, enabling farmers to plough and seed the land without the after consequences of the old time, when a heavy shower immediately after sowing rendered the re-ploughing and seed-bedding of heavy Wheat land advisable, which could be done, as it always can after Turnips, Cabbages, &c.; and land that could not well be re-ploughed, as leas, had to be harrowed and resown.

All this is now done away with, for on many soils when dry above the seed-drill may be kept close up to steam-plough and smasher as the case may be. The whole work, too, may be done earlier by steam than by horses, the seed being got into a better and more promising seed-bed.

Oat Sowing.—About the beginning of February, in many southern districts, preferred to a later period, so as to get the crop to cover the ground before the drought of May sets in; and in wet late seasons early sowing runs less risk of lodging and damage thereafter. Also in the North, where the climate is better suited for this crop, nature, in early sowing in all cases of high farming is preferable to late sowing, as it secures more grain with a finer quality of straw, also an earlier and better harvest. It must be borne in mind, however, during weather like the present, that the Oat is partial to a dry seed-bed, so that the later-sown may have the advantage where attention to this is neglected.

Field Operations of every kind should at all times be kept forward, but at this season they should be in France, weather permitting. True, the old rule "a week behind in seed-time is a month behind in harvest" has been greatly modified, as steam enables the farmer to overtake a week and even more of bad weather at this season. Steam also enables him to enter the field much sooner than can be done with horse-teams. These are unquestionably great advantages, which in a season like this should be turned to the best account.

Early Potatoes plant in dry warm sheltered soils in southern counties, where there is an increasing breadth grown to supply the growing demand of large towns. The state of the Continent, from which large supplies are imported, will no doubt this year induce farmers to plant a larger breadth than would otherwise be advisable. But, apart from the Continental supply, it is hardly possible to glut the English market with fine early Potatoes. The practical question is to grow an abundant crop, the produce per acre of some of the old varieties being so small. Low-lying lands subject to frost are not suitable for early Potatoes, but they may be grown at higher and more exposed elevations, and also further north than is generally credited; in point of fact, early Potatoes are now grown in Ultima Thule a month earlier for the table than they once were. But in the North they cannot be planted so early as in the South, though the difference is obviously less than is generally imagined. Some of the recently introduced varieties should be inquired after, for although the price is higher, the greater return does more than pay the difference in some cases, more especially for the second and third plantings.

Grass Lands.—Finish top-dressing and renovating. Grass seeds for the latter object may now be sown in open dry weather on what was top-dressed last month and the early part of this, and well harrowed in. The seed may also be sown in mild weather, as the rain will wash in and cover the seed without the harrow, but the weather should be settled before this plan is adopted.

Grass Hedges.—Clean off grass or any weeds that may appear, loosening the soil with the hedge spade where necessary. Prepare the ground for new fences, to be sown next month, and in March further North; to be sown also land for a forage crop. The plant ought to be most largely grown above purposes than it is, for, grown on waste ground in rows, it affords food and shelter for sheep at a season of the year when both are of the greatest value, and it is the best of our winter forage plants for milch cows.

Sewage Farming.—Now begins a new season of forcing forward all sorts of crops in our southern counties, commencing with warm dry soils. The first cutting of grass this year will be of greater value than usual in many places, where the town sewage cannot be got wash in guano and the other grass fertilisers with farm sewage, pond, or river water. Large areas of grass land can be irrigated at from 1s. to 5s. per acre, and are 5 cwt. to 10 cwt. of guano per acre sown on the surface before the second flooding, letting the water on slowly, so as to wash in and not wash off the fertiliser, the result would be no less surprising than useful to many a stockmaster this year.

Wooland Stocking.—This is the trying period of the year for hill shepherds whose flocks are not in the lowlands. When the ground is deeply covered with snow, a daily supply of hay is necessary, and great circumspection is required in times of drifting snow. Changes to rainy weather, when the fleece becomes wet to the skin, is also ruinous to hill-flocks. *W. E.*

Notices to Correspondents.

BOOKS: M. T. The "Veterinarian" appears monthly, and is published by Longmans, price 1s. 6d.
JERSEY HERD BOOK: A Correspondent writes:—"Can you tell me if a herd-book is kept in Jersey, and if so, where it can be got, and its price? Such a book would be most useful to breeders of Alderney cattle in this country." Perhaps some one in the island reading this notice may be able to tell us. In the catalogue of Alderney, exhibited at the Royal Agricultural Society's show at Oxford last year, the names of some of the imported animals have numbers against them, as if indicating the place in a herd-book.
Poultry: A New Subscriber asks about incubators. There is no difficulty in hatching artificially; the diffi-

culty is in rearing the brood after they are out of the shell. The following is an account of the artificial incubator we have seen. Mr. Thick, of 188, Waddington Road, Kentish Town, N.W., who is the designer, informs us that 70 per cent. of an ordinary batch of eggs are generally hatched and reared by his machine, and that the loss which is often suffered, owing to the difficulty of obtaining hens to sit when they are required, may be thus almost entirely avoided. Of course it is the rearing of the young birds that is the real difficulty connected with any artificial substitute for the hen; and this is facilitated here by packing the cages in which the young birds are fed around the central heat, and economising that in various ways by means of overhanging wooden grilles. The original source of the heat employed is a lamp, whose effect is distributed by a series of tubes passing through the water in the reservoir of the incubator. These tubes contain hot air supplied by the flame from the lamp, so that in addition to the heat created by the flame playing on the copper funnel in the centre of the reservoir, the hot air is economised and passes through these tubes, and thus the whole machine is heated by hot air pipes as well as hot water. The reservoir has also projecting boxes containing hot water, for the purpose of imparting warmth to the chicks after being hatched. The birds nestling under these boxes (which are ceiled with a lamb fleece) receive the necessary warmth just as when under the hen, the young birds are fed around the machine, which is strewn with gravel or sand. This assimilates them more nearly to the natural conditions when the hen nestles her chicks on the earth, whilst the warmth is given chiefly over their backs. The other artificial mother employs a series of strands of Berlin wool about eight inches long, strung on perforated zinc. Under these the bird nestles, and receives the warmth it requires. The vitiated air from the exhalations of its body passes upwards through the perforations in the zinc, and the bird is very often found to crawl through the strands, just as it is through the feathers of the hen. As the bird increases in size it is transferred to the bottom run of the machine, where the heat is not so great, and the bird is thus matured, as it were, against the time when it will be turned out into the open air. The directions for use sent with the machine are simple, and a young girl might safely be left in charge of the incubator. The eggs are placed in drawers, and by means of wooden lifts are pressed up against flannel bags containing bran; by this they receive the necessary warmth and pressure to insure their successful hatching.

Markets.

ENGLISH WOOL.

The demand during the last week has been very active, and prices are generally $\frac{1}{4}$ d. to $\frac{1}{2}$ d. per lb. dearer; indeed, more business would have been done had not many holders held for a yet greater advance.

HOPS.

BOROUGH MARKET, Jan. 25.

There is an active demand for Hops for speculation, and Weald of Kent with colour sell readily directly they are offered. The Belgian markets are a shade lower, and Alost and Poperinghe Hops are neglected. Old Americans are dearer.

HAY.—Per Load of 35 Trusses.

SMITHFIELD, Thursday, Jan. 26.

Prime Meadow Hay, 130s. to 140s. Clover, old 135s. 140s
New Hay 110s 120s
New Hay 110s 120s
Interior do 110s 120s
Straw 30 40

CUMBERLAND MARKET, Thursday, Jan. 26.
Sup. Meadow Hay 130s. to 140s. Interior do 120s. to 130s.
New Hay 110s 120s
New do New do
Interior do Interior do
Superior Clover 135s 140s
Straw 30 40

METROPOLITAN MEAT MARKET, Jan. 26.

Best Fresh Butter 21s. per dozen lb.
Second do 18s.
Small Pork, 45. ad. to 47. 8d. Large Pork, 3s. 8d. to 4s. 2d. per 8 lb.

METROPOLITAN CATTLE MARKET.

MONDAY, Jan. 16.

The number of Beasts is much smaller than last week, and although the trade is slow, prices have advanced on all descriptions. The supply of Sheep is unusually short; the choicest descriptions are readily disposed of, at a considerable advance; other kinds are not so much dearer, yet they are for the most part cleared with fair rates. There are very few Calves on offer, and these are sold dear. Our foreign supply consists of 285 Beasts and 110 Sheep; from Scotland there are 160 Beasts; from Ireland, 400; from Norfolk and Suffolk, 1000; and 545 from the Midland and Home Counties.

s. d. s. d.
Best Scots, Here- 6 0 to 6 4
ford, &c. 8 4 to 8 10
Best Shorthorns 5 8 to 6 0
ad quality Beasts 4 0 to 5 0
Best Downs and 6 0 to 6 4
Half-breds 6 0 to 6 4
Do. Shorn 6 0 to 6 4
Beasts, 2; Sheep and Lambs, 10, 7; Calves, 2; Pigs, 6.

THURSDAY, Jan. 26.

We have a much larger supply of Beasts than for some time past on a Thursday; there is, however, a good demand for them, at a slight reduction from Monday's quotations. Sheep are also much plentifully supplied; trade is pretty active, and prices are not much altered; choicest qualities

are scarce, and are readily disposed of. Choice Calves continue to be scarce and dear. Our foreign supply consists of 160 Beasts and 80 Calves.

s. d. s. d.
Best Scots, Here- 6 0 to 6 4
ford, &c. 8 4 to 8 10
Best Shorthorns 5 8 to 6 0
ad quality Beasts 4 0 to 5 0
Best Downs and 6 0 to 6 4
Half-breds 6 0 to 6 4
Do. Shorn 6 0 to 6 4
Beasts, 1450, Sheep and Lambs, 430; Calves, 110; Pigs, 10.

MARK LANE.

MONDAY, Jan. 23.

There was a moderate supply of English Wheat to this morning's market; the few dry samples brought the extreme prices of this day seemly, but the out-of-conditioned lots were very difficult of disposal. The attendance was good, but there was very little demand for foreign, and the few sales made were at last week's quotations. There was no change in the value of Barley, Beans, or Peas. The Oat trade was steady, and good Swedes brought an advance of $\frac{1}{4}$ d. to $\frac{1}{2}$ d. per qr. Barren Flour was held for high prices, but town-made was unaltered in value.

PRICE PER IMPERIAL QUARTER. s. d. s. d.
WHEAT, Essex, Kent, Suffolk. White 46 1/4 Red 52 1/2
— fine condition runs 48 1/4 Red 54 1/2
— Talavera 48 1/4 Red 56 1/2
— Norfolk 48 1/4 Red 58 1/2
— Foreign 48 1/4 Red 60 1/2
BARLEY, 6th & 7th, 34s. 3d. Cheviot 48 1/4 Malt 36 1/4
— Foreign, grinding and distilling 35 1/4 Malt 38 1/4
OATS, Essex and Suffolk 48 1/4 Malt 36 1/4
— Scotch and Ireland 48 1/4 Malt 38 1/4
— Irish 48 1/4 Malt 40 1/4
— Foreign 48 1/4 Malt 42 1/4
RYE, RYE-MEAL, Foreign 48 1/4 Malt 44 1/4
BEANS, Mazagan, 42s. to 47s. Tuck 49 1/4 Harrow 49 1/4
— Ragon 51s. to 53s. Little 49 1/4 Longpod 49 1/4
— Foreign 51s. to 53s. Egyptian 49 1/4
PEAS, White, Essex, and Kent, Boilers 36 1/4 Suffolk 40 1/4
MAIZE, Haps, 40s. to 44s. Grey 36 1/4 Foreign 38 1/4
FLOUR, best marks, delivered, per sack 39 1/4
— 2d ditto 38 1/4 Country 33 1/4
— Foreign 38 1/4 Per sack 37 1/4

WEDNESDAY, Jan. 25.

There was a firm tone apparent in the corn trade today, owing to the apparently near approach of the fall of Paris. Flour was again in good demand for export, and a further advance of $\frac{1}{4}$ d. to 1s. was noted on sacks and barrels. Wheat sold at extreme rates, though the condition of the English supply was inferior. Foreign Wheat was in good supply. The Barley trade was quiet, but values were unchanged. Malt was unaltered in price. The market was well supplied with Oats, for which the quotations were fully supported. Beans and Peas were sold quietly at former terms. Rapeseed was without change in prices.

ARRIVALS OF GRAIN, &c., INTO LONDON BY WATER CARRIAGE.

	Wheat.	Barley.	Oats.	Flour.
English & Scotch.	Qrs.	Qrs.	Qrs.	Sacks.
Irish	570	40	—	—
Foreign	6780	2510	3530	1 12 350 bbls.
	7350	2550	3530	—

LIVERPOOL, Jan. 24.—A fair attendance of country millers. Holders were exceedingly firm, and obtained an advance of $\frac{1}{4}$ d. to $\frac{3}{4}$ d. for flour, and $\frac{1}{4}$ d. to $\frac{1}{2}$ d. per cwt. for white descriptions of Wheat, on the rates of this day week; but the advance checked business, which was only to a moderate extent. Flour maintained Friday's improvement, but the trade was quiet. Beans and Barley unchanged. Peas $\frac{1}{4}$ d. per qr. dearer on the week. Oats fully maintained their late value, and Oatmeal $\frac{1}{4}$ d. per bu. higher. Indian Corn advanced 1s. per qr., but buyers operated reluctantly.

	Wheat.	Barley.	Oats.
AVERAGES.			
Dec. 17 ..	52s 5d	35s 4d	23s 4d
— 24 ..	52 7	34 11	23 6
Jan. 1 ..	52 3	34 11	22 5
Jan. 7 ..	52 3	34 11	22 5
— 14 ..	53 1	35 2	23 5
— 21 ..	52 9	35 9	23 9
Average ..	52 7	35 2	23 0

SEED MARKET.

The seed trade is in pretty much the position noted in our last. New English seed is offering somewhat more freely, but the high prices demanded prevent business. American red seed is very steady. The supply of white Clover seed on the spot is now very limited; quotations have consequently advanced $\frac{1}{4}$ d. to $\frac{1}{2}$ d. per cwt. Trefoil seed is firm. Foreign Italian continues to advance in value. Rape and Mustard seed realise full prices. We have a brisk inquiry for Haricot Beans. Bird seeds are slightly dearer.

JOHN SHAW & SONS, Seed Merchants,
16, Water Lane, London, E.C.

COALS.—Jan. 25.

Hastings Hartley, 15s. 3d.; Hartlepool Main, 17s. 1; West Hartley, 15s. 3d.; Walls End Braddell's Hetton, 17s. 6d.; Walls End Hetton, 18s. 6d.; Walls End Hawthorn, 15s. 6d.; Walls End Hartlepool, 18s.; Walls End Kellow, 17s. 6d.; Walls End East Hartlepool, 18s. 3d.—Ships at market, 28; sold, 26; unsold, 2; at sea, 20.

A Boon for Grape Growers.

MEREDITH'S VINE, PINE, PEACH and PLANT MANURE, to be had in sealed bags of ½ cwt., 1 cwt., 2½, and 4 cwt., with full directions for use. For further particulars, see Descriptive Circulars, to be had post free on application.

MILLER AND JOHNSON
(ESTABLISHED 1845).
Manufacture the highest quality of
ARTIFICIAL MANURES for ROOT, CORN, and
GRASS CROPS.
36, Mark Lane, London.

LONDON MANURE COMPANY (Established 1840)
have now ready for delivery, in the dry condition,
WHEAT MANURE, strongly recommended for Autumn Sowing.
DISSOLVED BONES, for Dressing Pasture Lands
PREPARED or FLOURED GUANO, for Corn and Roots, and
every other MANURE of known value.
AMERICAN GUANO, NITRATE of SODA, SULPHATE
of AMMONIA, ex Dock or Warehouse.
116, Fenchurch Street, E.C. EDWARD PURSER, Secretary.

ON SALE, MEXILLONES GUANO, imported direct
from the West Coast of South America.—This Guano is rich in
Phosphates, and is certified by the most eminent Agricultural Chemists
as a most valuable fertiliser.

Messrs. GUNSTON, SONS, and CO., Merchants and Importers;
or COX, BROTHERS, Brokers, Liverpool.

LAWES'S MANURES for GRASS LAND should
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NITRATE of SODA supplied ex Ship, or from stocks at Docks at
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Offices: 59, Mark Lane, London, E.C.
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LAWES'S DISSOLVED BONES
LAWES'S SUPERPHOSPHATE of LIME (MANURE
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LAWES'S CONCENTRATED CORN and GRASS MANURE.
These Manures can be obtained at any of the above addresses, or
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PERUVIAN GUANO, NITRATE of SODA, SULPHATE of
AMMONIA, and other Chemical Manures.
AMERICAN and other Cakes at market prices.

REES and CO.'S BIPHOSPHATED PERUVIAN
GUANO (Registered Trade Mark, Flying Albatross), is now
ready for delivery in quantity at the lowest price. It is believed to
be the best Artificial Manure yet produced. Its base is Peruvian
Guano, which contains 12 per cent. of Soluble Phosphates,
5 to 7 per cent. of Ammonia with Salts of Potash. See reports of Dr.
Voelcker, Dr. Anderson, Professor Wau, Mr. Ogden, and Mr. Sibson.
Delivered in 2 cwt. bags, each of which is secured by a leaden seal
bearing the Company's Trade Mark. The analysis is guaranteed so
long as the seals remain unbroken.

REES and CO.'S Biphosphated Peruvian Guano Company
(Limited), 39, King William Street, London, E.C.

REPORT and ANALYSIS by DR. A. VOELCKER.
Chemical Analysis of the Royal Agricultural Society of England.

"Analytical Laboratory, 11, Salisbury Square, Fleet Street, E.C.
London, January 15, 1870.

"Sir,—Enclosed you will find the results of a careful analysis of a
sample of your Biphosphated Peruvian Guano. These results speak
for themselves. I need therefore hardly add anything in commendation
of the high fertilising character of this valuable Artificial Manure.
The samples examined by me contained only 5 per cent. of moisture,
and fully the percentages of soluble and insoluble phosphates which you
understand you guarantee to furnish, and was in a fine state of
preparation. The more generally this Manure will become known to
Agriculturists, the more, I am convinced, will it be appreciated by
them.—Believe me, Sir, yours respectfully.

(Signed) "AUGUSTUS VOELCKER.
"The Secretary, REES and CO.'S Biphosphated Peruvian Guano
Company, Limited, 39, King William Street, London, E.C."

ODAM'S NITRO-PHOSPHATE or BLOOD MANURE.
ODAM'S DISSOLVED BONES.
ODAM'S SUPERPHOSPHATE of LIME.
ODAM'S NITRO BI-PHOSPHATE (or prepared) GUANO.

MANUFACTURED BY THE

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STOCK BREEDERS' MEDICINE CHEST, for allaying
pain in Cows Calving and Ewes Lambing, and Diarrhoea in Lambs
and Calves. Price complete, with Shilling Key to Farriery,
£2 10s. 6d. carriage paid.
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GISHURST COMPOUND.

Used by many of the leading
Gardeners since 1850.
Red Spider, Mildew, Thrips,
Green Fly, and other Blight, in
solutions of from 1 to 2 ounces
to the gallon of soft water, and
from 4 to 6 ounces to the gallon
of water for Vines and
Winter Dressing for Vines and
Fruit Trees. Has outwitted many
preparations intended to supersede
it.

Sold Retail by Seedsmen, in
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PRICES PATENT
CANDLE COMPANY
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SEEDSMEN, GARDEN FURNISHERS, AND HORTICULTURAL DECORATORS,

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SEED GROUNDS, ERFURT, PRUSSIA.

SENECIO ARGENTEUS.

NEW HARDY PERENNIAL BEDDING PLANT.

As a very WHITE FOLIAGED plant, that will grow freely in any common border, and when once planted will take care of itself, being perfectly hardy, we believe that this plant will gain universal favour. It forms dense compact rosettes, in the style of *Centaurea candidissima*, 3 or 4 inches high, and 4 to 6 inches across, retaining their whiteness throughout the year. The beauty and rarity of this species have drawn forth almost rapturous descriptions from the few travellers who have reached its alpine fastnesses. We have proved it for the past two winters, and recommend it with the utmost confidence as one of the most valuable hardy plants that it has ever been our good fortune to introduce. First-class Certificate Royal Horticultural Society.

Price 5s. each, 50s. per dozen.

BEGONIA GERANIODES.

The Snowdrop itself scarcely surpasses the whiteness of the blossoms of this plant, which, as an ornament for greenhouses, blooming profusely during the autumn and winter months, is really charming. The habit is very dwarf and compact, with neat foliage, and flowers nearly an inch across. Introduced by us from Natal, and figured in the "Botanical Magazine" for 1866, tab. 553b.

Price 5s. each.

JAS. BACKHOUSE AND SON, NURSERIES, YORK.

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Containing a SELECTION of NOVELTIES, and of all the most approved older kinds, many home-grown and others drawn from the most reliable sources.

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From Rev. G. PINDER, *Hartford House, Bournemouth, late Honorary Secretary of the Hunts Horticultural Society (where it has been most successfully exhibited)*.—"Unquestionably one of the most superior kind. It is a Pea of large size, full pod, and excellent flavour. It is also a great bearer, with not too vigorous a growth, and altogether a first-rate and productive kind."

WOOD & INGRAM**BEG TO OFFER THE ABOVE EXCELLENT VARIETY,**

Which is about 10 days earlier than Champion of England, splendid flavour, and very heavy cropper. Individual Peas very large, and of a beautiful dark green colour; pods long, and well filled from end to end.

Height, 4 feet. Price, 2s. 6d. per Quart.

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THE AUSTRALIAN PEA.

A late Wrinkled variety, grows about 7 feet high, and is unsurpassed for general use. Produces a succession of pods, and keeps growing and flowering on until cut down by frost. The pods grow in pairs, and are well filled with Peas of delicate flavour. Should be sown in succession from March till June. "One peculiar feature in this splendid Pea is the extraordinary thickness and succulent nature of the husk or shell, which keeps the Peas green and tender long after the outward appearance of the husk would lead one to think they were old."

Sold at 3s. 6d. per quart, in sealed packages.**TESTIMONIALS RECEIVED BY THOMAS KENNEDY AND CO.**From Mr. W. CARMICHAEL, *Gardener to H.R.H. the Prince of Wales, Sandringham—December 29, 1870.*

"Your new 'Australian Pea' is a first-rate one, a decided improvement on *Prize-taker*, and a great bearer. I know of no sort which boils such a beautiful green colour. I will grow it largely for the Royal table."

From Mr. JAMES M. MCINTOSH (*late Gardener to His Grace the Duke of Buccleugh, Drumlanrig Castle, Eden Cottage, September 30, 1870.*)

"I have much pleasure in recommending the 'Australian Pea' as the best for a general crop yet brought out. I have repeatedly tested it against all others, and have no hesitation in giving my unqualified testimony to its unsurpassed merits. The pods, which are a little curved, are produced in twos, containing from seven to nine peas each, of moderate size, and of exquisite flavour. It is an abundant bearer, and produces a succession of pods for a long time."

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NURSERY and SEED ESTABLISHMENT, DUMFRIES.—January, 1871.

NEW CUCUMBERS.**HEATHERSIDE RIVAL.**

The following notice of it is from the *Gardeners' Chronicle* of September 3, 1870:—"We have on several occasions during the present season received examples of the above-named Cucumber, and in all the points which, as we take it, do so to constitute a good Cucumber, we have found none to equal the Heather-side Rival. In this variety we have undoubtedly the nearest approach to a model Cucumber we have seen. It is of fair length, from 15 to 18 inches, about 1½ inch in diameter, perfectly uniform in thickness from the stalk to the very tip; there is no long neck or handle; the surface is smooth, of a dull green colour, with a small setting of black spines; these are small, and distantly situated. The flesh is exceedingly firm, of excellent flavour, and the core or seed part not exceeding about one-third the diameter of the fruit. This is a prodigious bearer, and capitally adapted for either summer or winter fruiting.—B."

THOMAS THORNTON confidently recommends this very fine variety, grown extensively here this season, especially to exhibitors, as it grows to 24 inches in length. **2s. 6d. per packet.**

DEAN'S EARLY PROLIFIC.

Mr. Barron, Superintendent of the Royal Horticultural Society's Gardens, in writing to the raiser of this fine variety, says:—"Your Cucumber, Dean's Early Prolific, is a wonderfully fine sort, just about perfect in form, there being scarcely any neck, and it is even and uniform throughout, and very solid."

It is a most useful and valuable kind, and shows from two to six fruits at a joint, and is first-rate for winter work. It is of a dark green colour, grows about 14 to 16 inches long, very solid, crisp, and of good flavour. It is one of the parents of Heather-side Rival, but does not grow so long as that variety. **1s. 6d. per packet.**

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AMERICAN ROSE, and other NEW AMERICAN and other POTATOS, price on application.

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STEVENSON'S
ABYSSINIAN MIXTURE,
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This invaluable mixture has re-
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THE CHEAPEST and MOST EFFECTUAL

MEALY BUG, SCALE, and THRIP DESTROYER.

One trial will be required to give it a pre-eminence over all other Insecticides. It has been in the hands of most experienced Gardeners for trial, and the under-named Nurserymen and Seedsmen will be happy to furnish a Printed List of Opinions and other particulars on application, and also to receive orders for the same. Sold in bottles at the following prices, viz., 2s., 3s., 6d., and 6s.

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" Chester " Radcliffe & Co., Dick, 129,
" Dickson & Sons, James, 102, High Holborn, London
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" Dickson & Thornhill, Perth S.W.
" Downie, Laird & Laing, " Smith & Son, W., Aberdeen
" Edinburgh " Stuart & Mein, Kelso
" Downie, Laird & Laing, " Sutton & Sons, Reading
" Forest Hill, S.E. " Veitch & Sons, Chelsea, S.W.
" Drummond & Sons, Dublin Mr. Wm. Cutbush, Barnet
" Drummond & Sons, Stirling " F. Fraser, Lea Bridge Road,
" Garaway & Co., Bristol " N.E.
" Henderson & Son, E. G., St. " J. Knapton, Richmond,
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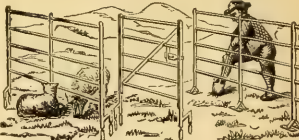
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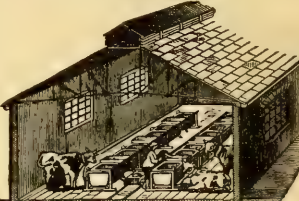
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For List of Agents, see *Gardeners' Chronicle*, p. 66, 1871.

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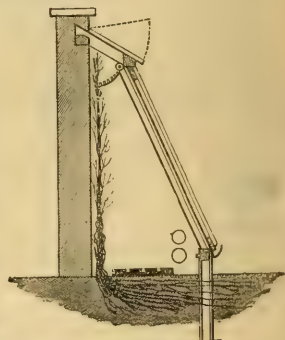
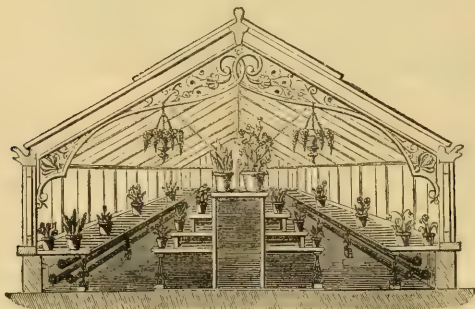
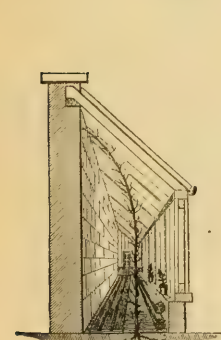
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AND

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A late Wrinkled variety, grows about 7 feet high, and is unsurpassed for general use. Produces a succession of pods, and keeps growing and flowering on until cut down by frost. The pods grow in pairs, and are well filled with Peas of delicate flavour. Should be sown in succession from March till June. "One peculiar feature in this splendid Pea is the extraordinary thickness and succulent nature of the husk or shell, which keeps the Peas green and tender long after the outward appearance of the husk would lead one to think they were old."

Sold at 3s. 6d. per quart, in sealed packages.

TESTIMONIALS RECEIVED BY THOMAS KENNEDY AND CO.

From Mr. W. CARMICHAEL, *Gardener to H.R.H. the Prince of Wales, Sandringham.*—December 29, 1870.

"Your new 'Australian Pea' is a first-rate one, a decided improvement on Priestaker, and a great bearer. I know of no sort which boils such a beautiful green colour. I will grow it largely for the Royal table."

From Mr. JAMES M. MCINTOSH (*late Gardener to His Grace the Duke of Buccleugh, Drumlanrig Castle, Eden Cottage, September 30, 1870.*)

"I have much pleasure in recommending the 'Australian Pea' as the best for a general crop yet brought out. I have repeatedly tested it against all others, and have no hesitation in giving my unqualified testimony to its unsurpassed merits. The pods, which are a little curved, are produced in twos, containing from seven to nine peas each, of moderate size, and of exquisite flavour. It is an abundant bearer, and produces a succession of pods for a long time."

THOMAS KENNEDY AND CO. beg to call special attention to the above splendid PEA, which is pronounced by competent judges to be one of the best for a general crop yet introduced. The 'AUSTRALIAN PEA' is described in our new and desirable CATALOGUE OF VEGETABLE AND FLOWER SEEDS can be had Free on application.

NURSERY AND SEED ESTABLISHMENT, DUMFRIES.—January, 1871.

TO THE TRADE.—SEED POTATOS.

H. & F. SHARPE

INVITE THE ATTENTION OF THE TRADE TO THE FOLLOWING VARIETIES OF

SEED POTATOS,

Which they have grown from the finest selected stocks. The quality is very fine, and prices low.

EARLY SANDRINGHAM KIDNEY
RACEHORSE KIDNEY
AMERICAN EARLY ROSE KIDNEY
MONA'S PRIDE KIDNEY
EARLY ASHLEAF KIDNEY
RIVERS ROYAL ASHLEAF KIDNEY
WALNUT-LEAVED KIDNEY
MYATT'S PROLIFIC KIDNEY
AMERICAN EARLY GODRICH
DAINTREE'S EARLIEST
LEVERHURST EARLY PROLIFIC
KIDNEY

EARLY DALMAHOY ROUND
DRUMMOND'S EARLY PROLIFIC
ROUND
EARLY OXFORD
FOXES SEEDLING
HANDSWORTH
GOLDEN GLOBE
ROUND FRAME
MARTIN'S GLOBE
PORTFOLIO
YORKSHIRE REGENT
FLOURBALL

EARLY KING
" BRITISH QUEEN
" FLOUNDER
WHEELER'S MILKY WHITE
EARLY LAFSTONE KIDNEY, TRUE
BERKSHIRE KIDNEY
WALKERS IMPROVED REGENT
FLUKE KIDNEY
RINTOUT EARLY DON
PATERSON'S VICTORIA
YORKSHIRE REGENT
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Special quotations may be had on application.

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"I am much pleased with your Guinea Collection of Garden Seeds received to-day; they are peculiarly well and liberally selected."—Rev. J. LUKIN, *Pwlltrockan.*

ONE GUINEA COLLECTION.

Carriage Free.

1 qt. Wheeler's First Early PEAS	1 pkt. Bromham Hall MELON
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1 " British Queen PEAS	1 " Henry's Prize LEAK
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1 pkt. Wheeler's Extra FINE BEET	1 " Spanish ONION
1 " Green Curled BROCCOLI	1 " James' Keeping ONION
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1 " BRUSSELS SPROUTS	1 " Silver Skin ONION
1 " Walcheren BROCCOLI	1 " Myatt's Garnishing PAR-ROT
1 " BROCCOLI	1 " Jersey PARSNIP
1 " Elston's Mammoth BROCCOLI	1 " Giant FARSNIP
1 " Adams' Early WHITE BROCCOLI	1 " Woods' Frame RADISH
1 " Wheeler's Imperial CABBAGE	1 " Olive RADISH
1 " COCOTUT CABBAGE	1 " Mixed Turnip RADISH
1 " Red Fickling CABBAGE	1 " SUMMER SPINACH
1 oz. Early Horn CARROT	1 " Winter SPINACH
1 " Snow Superb Winter CARROT	1 " Snowball TURNIP
1 " James' Green-top CARROT	1 " Amey Red Stone TURNIP
1 pkt. Early London CAULI	1 " Omelette Turnip
1 " ELWORTH CRESS	1 " SUMMER SAVORY
1 " Seal's extra fine CELEERY	1 " CAPSICUM
1 oz. Curled CRESS	1 " CHILLI
1 " AUSTRALIAN CRESS	1 " TOMATO
1 " Wheeler's Longford CU-CUMBER	1 " VEGETABLE MARROW
1 " Stockwood's Ridge CU-CUMBER	1 " SWEET MARIJORAM
1 " GOURDS	1 " SWEET BASIL
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The Two Guinea and Three Guinea Collections are most liberally selected, and are sent Carriage Free.

5 per Cent. Discount for Cash.

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WHEELERS' COCOTUT CABBAGE.

Large Packet, 1s.; Small Packet, 6d. Post Free.

"I consider the Cocotut Cabbage the best I have ever grown."

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"The Cabbage Seed which I had from you last year has turned out excellent, not one in a thousand run to seed. All my neighbours have desired me to get some for them this year."—WM. SMITH, *Penally.*

For List of Agents, see *Gardeners' Chronicle*, p. 65, 1871.

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"Wheeler & Son's Little Book, or Select Seed List, deserves our warmest eulogy as a work of art. The Flower Seed department affords an opportunity for several happy illustrations, and the Farm List is well treated."—*The Field.*

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JAMES CARTER and CO., having harvested their Stocks of FARM and GARDEN SEEDS in splendid condition, are now prepared to make special low quotations for large quantities. Messrs. CARTER'S ILLUSTRATED FARMER'S CALENDAR is in the Press.

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Vegetable, Agricultural, and Flower Seeds, MISCELLANEOUS PLANTS, SUITABLE FOR BEDDING and DECORATIVE PURPOSES, &c.

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1871. | SEED POTATOS, GARDEN IMPLEMENTS, &c. | 1871.

GENUINE AND OF THE BEST SELECTIONS.

All but very small parcels carriage paid.

OUR Priced Descriptive CATALOGUE of the above, with Cultural Directions, also ILLUSTRATED SHEETS of new and desirable VEGETABLES and FLOWERS, IMPLEMENTS, &c., are now ready, and will be forwarded post free on application.

James Dickson & Sons.

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Newton Nurseries, and 102, Eastgate Street, Chester.

Telegraph Cucumber Seed, True.

HERBACEOUS CALCALORIA PLANTS.

W. MEADMORE offers 6 Seeds for 1s. 12 ditto, 1s. 6d. Will produce four or five at a joint. Strong plants of CALCALORIAS, in large 60s, 6s. per dozen; second size, 4s., including packages.

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BIRD'S KING OF THE CUCUMBERS.—

The best for exhibition. Length 24 to 30 inches. White spine, handsome fruit, short neck or handle. Price 2s. 6d. per packet.

BIRD'S QUEEN OF MELONS.

The best green-fleshed Melon, handsomely netted, fine flavour. Average weight 5 lb. Price 1s. 6d. per packet. May be had of all the Seed Trade, and of

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Fire Forcing Seakale.

GEORGE CLARKE has a few thousands, very good clean stuff, to offer as under:—1st, extra fine, 1s. per 100; 2d, good, 8s. per 100. Remittance or reference to accompany orders from unknown Correspondents.

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1,000,000 Robinson's Drumhead Cattle Cabbage, 3s. 6d. per 1000.

100,000 Red Fickling Drumhead Cabbage, 5s. per 1000.

50,000 Early Battersea and Enfield Cabbage, 5s. per 1000.

50,000 Little Fickling Cabbage, 5s. per 1000.

All strong and healthy plants. Samples on application.

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W. VIRGO and SON, Womersley Nursery, Womersley, near Goudford, Surrey.

WHEELERS' SEEDS ARE THE BEST.

Sweet-scented Flowers.

"Give me Cabbage Roses, Sweet Peas, and Wall-flowers. That is my idea of a garden. Corsican's garden is the only sensible thing of the sort. ***

"No flowers are admitted that have no perfume. It is very old-fashioned. You must get her to show it you."

"It was agreed that after breakfast they should go and see Corsican's garden. *** It was formed upon a gentle southern slope, with turfen terraces walled in on three sides, the fourth consisting of arches of Golden Yew. The Duke had given this garden to Lady Corsican, in order that she might practise her theory, that flower-gardens should be sweet and luxuriant, and not hard and scentless imitations of works of art. Here, in their season, flourished abundantly all those productions of Nature which are now banished from our eyes, neglected senses, huge bushes of Honeysuckle, and bowers of Sweet Pea and Sweet Briar, and Jessamine clustering over the walls, and Gillyflowers scenting with their sweet breath the bricks from which they seem to spring. There were banks of Violets, which the southern breeze always stirred, and Mignonette filled every vacant nook. As they entered now, it seemed a blaze of Roses and Carnations, though one recognised in a moment the presence of the Lily, the Heliotrope, and the Stock. *Lo! air.*

SWEET-SCENTED FLOWERS

The following Twelve Packets of Seed, Post Free, 4s. 6d.

HELIOTROPE	MIGNONETTE
GILLYFLOWERS	SWEET WILLIAM
CANDIDUST, Sweet	SWEET PEAS
ALYSSUM	WALL-FLOWERS
MATTHOLIA BICORNIS	CARNATIONS
MIGNONETTE	

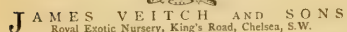
We can also offer the following fragrant Flowering Plants:—

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WALL-FLOWERS, 12s. per doz.	CARNATIONS, 12s. per doz.
WOODHINE, 12s. per doz.	PERPETUAL ROSES, 12s.
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NEW and CHOICE SEEDS:

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Complete Collections of Vegetable Seeds,

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10s. 6d., 21s., 42s., 63s., and 84s. each.

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Dell's fine dark Crimson BEET	Per packet—	d
Williams' Alexandra BROCCOLI	1 0
Backhouse's Winter White Protecting BROCCOLI	.. ..	1 6
Osborne's Winter White BROCCOLI	.. ..	1 0
Williams' Early Nonsuch CABBAGE, the earliest and best in cultivation	.. ..	1 0
Wheeler's Cocoa-nut CABBAGE	.. ..	1 0
Sandringham Sprouting CABBAGE	.. ..	1 0
Williams' Matchless Red CELERY (The two best)	.. ..	1 0
.. .. White CELERY (in cultivation)	.. ..	1 6
Woolley's Improved Telegraph CUCUMBER	.. ..	1 6
Digswell Prize ENDIVE	per oz.,	1s. 6d.
Lee's immense Hardy Green Cabbage LETTUCE	.. ..	1 0
Williams' Victoria Cos LETTUCE	.. ..	1 0
Webb's Climax MELON, the finest flavoured Green-fleshed variety in cultivation	.. ..	2 6
Williams' Paradise Gem MELON, scarlet flesh, splendid flavour, the earliest in cultivation	1 6
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Chineford's Champion Marrow PEA, the finest flavoured Wrinkled Marrow in cultivation	3 6
Earley's Defiance TOMATO, 14 days earlier than any other in cultivation	.. ..	2 6

NEW AND CHOICE FLOWER SEEDS.

Williams' superb strain of PRIMULA, Red, White, or Mixed, 11. 6d., 21. 6d., 31. 6d., and Neill's extra choice CALCEOLARIA, 11. 6d., 21. 6d., 31. 6d., and	5 0
Weatherill's extra choice CINERARIA, 11. 6d., 21. 6d., 31. 6d., and	5 0
Williams' superb strain of BALSAM, 11. 6d., and Wiggins' prize strain of CYCLAMEN, 11. 6d., 21. 6d., and	3 6
Eckford's fine strain of VERBENA..	1 0
AGAVE DENSIFLORA, fine for sub-tropical work	2 6
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LEPTOSIPHON ROSEUS, very pretty	1 0
Parsons' new White MIGNONETTE	2 6
PERILLA NANKINENSIS ATROPURPUREA FOLIS LACINIATUS	1 0
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List of the best Seeds in Cultivation, interesting and instructive to all who have Land, from a Lady's Flower Garden to a Nobleman's Domain, and from a half Acre allotment to a Farm of 1000 Acres. It has been sent Post Free to our Customers throughout the Kingdom; a few copies still remain, applications for which must contain Six Stamps (the cost price of the Book, including postage, being Sixpence).

"I have to thank you for kindly sending me your Little Book. Its excellent arrangement renders selection very easy, and its pictures make it quite a book."—Rev. J. HARRISON.

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"I take this opportunity of expressing my great satisfaction with the polite attention you have paid to my orders, and also to say that your Seeds have fully borne out your recommendation—in many cases exceeded it. I shall at all times feel great pleasure in recommending my friends to you, as the very best House to do business with, as they will receive prompt attention, genuine and reliable Seeds at a reasonable price."—HENRY BAKER, *Stroud*.

"The 15s. Packet of Garden Seeds is a most liberal allowance for the money."—Rev. H. J. POTTS, *Treculla House, Llangarron*.

"I am much pleased with your Guinea Collection of Garden Seeds received to-day; they are peculiarly well and liberally selected."—Rev. J. LUKIN, *Pwllcrochan*.

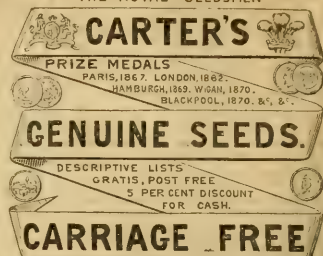
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PEAS, Carter's First Crop, 1 qt. Advance, 1 qt. Premier, 1 qt. Bishop's Long-pod, 1 pt. Prizefighter, 1 qt. Lawson's Supreme, 1 pt. Champion of England, 1 qt. Carter's Victoria, 1 pt. Veitch's Perfection, 1 pt. Broad Windsor, 1 pt. Best French, 1 qt. Scarlet Runners, 1 pt. BEANS, Nonsuch, 1 pt. Broad Windsor, 1 pt. BERT, St. Oystin, large pkt. KAIL, Cottage's, large pkt. New Asparagus, 1-lb. pkt. Dwarf Snow, 1-lb. pkt. ALBERT SPROUTS, large pkt. BRUSSELS SPROUTS, best, large pkt. BROCCOLI, Carter's Champion, large pkt. Snow's Winter, large pkt. Adams' Early White, large pkt. Purple Sprouting, large pkt. CABBAGE, Carter's Early, large pkt. Enfield Market, large pkt. Dwarf Nonsuch, large pkt. Tom Flaming, large pkt. Savoy, best curled, large pkt. CARPASCUM, large pkt. CARROT, Early Horn, 1 oz. James' Intermediate, 1 oz. Selected Scarlet, 1 oz. POT HERBS, 2 pkts	CAULIFLOWER, Carter's Dwarf Mammoth, large pkt. CELERY, Incomparable Dwarf White, large pkt. CRISP, plain, 4 oz. Australian, 1 oz. CUCUMBER, Carter's Champion, 1 pt. ENLIVE, French curled, large pkt. LEAF, Avon Castle, large pkt. LETTUCE, Carter's Giant Drumhead, large pkt. Victoria, large pkt. MUSTY KILL, 1 pt. MELON, Carter's Excelsior, 1 pt. Reading Improved, 1 oz. PARSLEY, Student, 1 oz. PARSLEY, Dunnet's, Garnish, large pkt. RADISH, Wood's Frame, 2 oz. Early Scarlet Short-top, 2 oz. Musty Turnip, 2 oz. R.C.P., for salad, 5 oz. SPINACH, Summer, ½ pt. TURNIP, Early six-weeks, 1 oz. Yellow Malta, 1 oz. Red Stone, 1 oz. TOMATO, Red, pkt. VEGETABLE CREAM, Moore's, 4 pkts. POT HERBS, 2 pkts
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SEEDS CARRIAGE FREE.

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30s. COLLECTION OF VEGETABLE SEEDS.

Packing and Carriage Free. Suitable for Medium-sized Gardens.

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42s. COLLECTION OF VEGETABLE SEEDS,

Packing and Carriage Free, Suitable for a Large Garden, contains:—

PEAS, Carter's First Crop, 1 qt. Advance, 1 qt. Prizefighter, 2 qt. Champion of England, 2 qt. Bishop's Long-pod, 1 qt. Lawson's Supreme, 1 qt. Strathmore, 1 qt. Carter's Victoria, 1 qt. Broad Windsor, 2 qt. Monarch, 1 qt. Green Nonsuch, 1 qt. French 1-lb. sort, 2 pt. Scarlet Runners, 1 pt. BERT, St. Oystin, 1 qt. Pineapple, 1 qt. KAIL, Cottage's, large pkt. New Asparagus, large pkt. Dwarf Snow, large pkt. ALBERT SPROUTS, large pkt. BRUSSELS SPROUTS, best, large pkt. BROCCOLI, Carter's Champion, large pkt. Snow's Winter, large pkt. Wilcox, large pkt. Adams' Early White, large pkt. Knight's Protecting, large pkt. Purple Cape, large pkt. CABBAGE, Carter's Early, large pkt. Tom Thumb, large pkt. Enfield Market, large pkt. Dwarf Nonsuch, large pkt. Early York, large pkt. Sugar-loaf, large pkt. Savoy, dwarf curled, large pkt. Savoy, Drumhead, large pkt. Savoy, Dwarf Lin, large pkt. CARPASCUM, large pkt. CARROT, French, Forcing, 1 oz. Early Horn, 2 oz. Selected Scarlet, 3 oz. James' Intermediate, 2 oz. Lion's Curry, 1 oz. CAULIFLOWER, Carter's Dwarf Mammoth, large pkt. Whitechurn, large pkt.	CELERY, Incomparable Dwarf Manchester Red, large pkt. CORN SALAD, large pkt. CRISP, plain, 5 oz. Curled, 4 oz. Australian, 1 oz. CUCUMBER, Carter's Champion, 1 pt. Lynch's Star of the West, pkt. ENDIVE, French curled, large pkt. Imperial Batavian, large pkt. LEAF, Avon Castle, large pkt. LETTUCE, Carter's Giant White Cos, large pkt. Carter's Giant Brown, large pkt. Drumhead, large pkt. MUSTY KILL, 1 pt. MELON, Carter's Excelsior, 1 pt. Turner's Gem, pkt. ONION, Giant Maderin, 1 oz. SPINACH, Summer, 2 oz. James' Keeping, 2 oz. Silverkin, 1 pt. ORACH, 1 pt. Parsley, Dunnet's, Garnish, large pkt. RADISH, Wood's Frame, 2 oz. Musty Turnip, 2 oz. RAMPION, 1 pt. R.C.P., for salad, 10 oz. SALSIFY, 1 pt. SAVOY, 1 pt. SCORONERA, large pkt. SZCZUPNIK, Early six-weeks, 2 oz. White Turnip, 2 oz. Orange Jelly, 2 oz. TOMATO, 1 pt. VEG. TABLE CREAM, Moore's, 4 pkts. POT HERBS, 4 pkts.
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SCOTT'S Superb Strain of PETUNIA. New Seeds.
Single Dark Purple, 1s. Single Dark Striped, 1s.
Single Mottled, 1s. Single White Striped, 1s.
Single Extra Choice Mixed, 12 varieties, 6d. and 1s.
Double, producing a good percentage of extra double flowers, 1s.
For all other varieties of New and Choice FLOWER SEEDS, also
OF VEGETABLE SEEDS, see J. SCOTT'S DESCRIPTIVE CATALOGUE
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BUTLER, McCULLOCH AND CO.'S
SPRING CATALOGUE now ready. In addition to the
General Lists of Vegetable and Flower Seeds, it contains Select
Descriptive Lists of all the new, rare, and choice Vegetable and
Flower Seeds of the present season. Sent free and post paid on
application.
97, South Row, Covent Garden Market, London, W.C.
Established upwards of a Century.

Unequaled Prize Seeds.
CALCEOLARIA, Dobson's Prize, 1s. 6d., 2s. 6d.,
3s. 6d., and 5s. 6d.
CINERARIA, Dobson's Prize, 1s. 6d., 2s. 6d., 3s. 6d., and 5s. 6d.
PRIMULA, Dobson's Prize, Alba and Rubra, 1s. 6d., 2s. 6d., 3s. 6d.,
and 5s. 6d.
BALSAM, Dobson's Prize, 1s. and 2s.
CYCLAMEN, Persian, 1s. and 2s. 6d.
SCARLET INTERMEDIATE STOCK, 6d. and 1s.
PETUNIA, a splendid strain, 1s. and 2s. 6d.
In sealed packets, post free.
J. DOBSON AND SON, Seed Merchants, Woodlands Nursery,
Isleworth, W.

New Begonias from Seed.
MR. WILLIAM BULL can now supply
BEGONIA VETICHA, ^{THE RARE} at 5s. per packet. This succeeds best, if
propagated from seed.
BEGONIA HYBRIDA ELEGANTISSIMA, at 5s. per packet.
Charmingly pretty free-blooming hybrid.
BEGONIA SEDENI, at 5s. per packet. This has magnificent
flowers.
BEGONIA BOLIVIENSIS, at 2s. 6d. per packet. Handsome bright
scarlet flowers.
BEGONIA PEARCEI, at 2s. 6d. per packet. Bright yellow flowers.
BEGONIA WELTONIENSIS, at 2s. 6d. per packet. Free blooming;
flowers of various colors.
BEGONIAS, mixed, at 2s. 6d. per packet. Saved from choice sorts.

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MR. WILLIAM BULL'S CATALOGUE
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ALL POTATOS  CARRIAGE FREE BY RAIL.
MESSRS. SUTTONS' Descriptive LIST is now
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Potatos has been selected with great care, and can be relied on as
perfectly true to name. Lowest price per cwt., sack, or ton,
forwarded on application.
SUTTON AND SONS, Seed Growers, Reading.

The Gardeners' Chronicle

SATURDAY, FEBRUARY 4, 1871.

MEETING FOR THE ENSUING WEEK.
MONDAY, FEB. 6—Entomological 7 P.M.

REFERRING to the recent discussion upon
the merits of NEW GRAPES, it would be well
if the chord which MR. PEARSON has struck
(p. 1704, 1870)—viz., "I cannot think any of these
late-leaving Grapes are fit for a cold or cool
house; they appear to me to require as much heat
as the Muscat of Alexandria to have them in per-
fection"—could vibrate through the ears of every
Grape grower in Britain, not only in relation to
new Grapes, but also to many of those which we
have known from our childhood. The fact is—
and the credit of the conclusion we have much
pleasure in according to one of the most accom-
plished Grape growers in the country, MR. SPEED,
of Chatsworth—"our English summers are not
long enough to ripen those fleshy thick-skinned
Grapes, unless the Vines are started into growth
much earlier than they would start naturally;
and hence to grow them to perfection they
must not only be started into growth by
the end of February at the latest, but to
bring them to full perfection they must be
kept growing by sufficient heat until the fruit
is thoroughly matured." This is the real axis of
maturation in Grape growing. Plants of the
eastern hemisphere will not ripen their fruit
here unless they are subjected to a tempera-
ture sufficiently high to enable them to do so.
If they did, why not Dates, and other fruits of
the same clime? Correctly speaking, half the
people who eat and admire Grapes do not know
what a good Grape is, or ought to be. The
compound of sugar and water held together by
a little gelatinous matter, as we find it in an
ordinarily grown Hamburg, is no more than
Grape as it ought to be and is, when properly
grown, than the Gladstone thin port of the
grocers' shops is the vintage of "32" or "47."
We hear of Grapes grown upon open walls, in
ground-vineries, orchard-houses, and similar

places; they are doubtless, in a season like the
past, sweet, refreshing, and eatable. "In our
sallet days, when we were green in judgment," we
have eaten scores of bunches of them, but at the
present time we regard them as Grapes which
a SPEED, THOMSON, HENDERSON, or any
gardener who has some respect for his reputa-
tion dare not place upon his master's table.
Grapes as they are generally grown, and Grapes
as they ought to be grown, are two entirely
different things, and until the public get to know
them in the latter character the counterfeits
will sell.

Calling after Christmas, some few years back,
at Berry Hill, we were asked what we thought of
Barbarossa [Gros Guillaume], and some other
Grapes, when the first-named was unconditionally
condemned. MR. SPEED cutting berries from each
of the Black Grapes he had, Barbarossa, Alicante,
Hamburg, Lady Downe's, and one or two
other kinds, they were handed to us; and after
tasting them we were bound to confess that by
the flavour we could not tell Barbarossa from
Black Hamburg, nor could any other person.
Yet at the present time we have fine handsome
well-coloured bunches of the same, grown in a
house to which we could not give the necessary
heat without injuring other things, and which are
really not worth eating. Nearly half a century
ago, when residing in Yorkshire, we had the
charge of a fruiting Pine stove, in which were
several Vines; that at the far end being Charl-
worth Tokay, or Muscat of Alexandria; that at
the cold end, the Syrian—the others being Ham-
burgh and Frontignans; and, as there was no
means of retarding these Vines, they started into
growth regularly in February, the earlier varieties
being ripe in June and July, the Tokay in August,
and the Syrian was generally allowed to hang
until Christmas. Now this Grape, thus treated,
attained full maturity, the bunches and berries
were large and handsome, of the finest
transparent amber colour, and the flavour
scarcely inferior to a well-matured Muscat. As
for keeping, we rarely saw a decayed berry, so
that, thus managed, the Syrian may certainly
be pronounced one of the finest Grapes in
cultivation. This not only makes good MR.
SPEED'S conviction, but it also shows that
to grow them properly, especially for late
keeping, our Grapes must be assorted. The pro-
perty of giving the Muscat a house to itself has
never been disputed, and the same may be said
of the Hamburg—not but that the latter is of a
social turn, and no doubt some of the new Grapes
require special treatment. That much maligned
Grape, Mrs. Pince's Black Muscat, we had
ripe in August, 1869, and it hung perfectly until
March. Last year it was ripe with us in July,
and some of the bunches still remaining are as
fresh and plump as they were three months back,
and seemingly to remain so. Now these bunches,
hanging in a house which has been full of
lustrous anemones and other plants, have had
full air and no fire-heat. Hamburgs, Muscat
Hamburg, Canon Hall Muscat, Muscat Tro-
vèren, and some others, damped early in October
and had to be cut. Mrs. Pince's Muscat is still
fresh and good, and exquisite in flavour, not so
large in the bunch certainly as MR. PEARSON'S,
which we have seen, but nevertheless good.
This Grape, we are convinced, in order to keep it,
requires treatment entirely different to that of the
Muscat of Alexandria and other thin-skinned
Grapes. They require cool and dry treatment,
or they damp. Mrs. Pince's, on the contrary,
will be none the worse for a little moisture in the
atmosphere, so long as it is kept moving; indeed,
we believe it would keep better in a well, than
the thin-skinned Grapes under the most careful
treatment. Still we must admit, the Grape is a
little erratic in its likings. Thus at Burghley,
a fortnight back, MR. GILBERT, who is not a
second-class Grape grower, assured us that
neither upon its own roots, nor grafted upon the
Hamburg, could he grow, set, or ripen Mrs.
Pince's Muscat fit to be seen at table. With us it
is not prolific, but with its growth we have no fault
to find. In a few years, when the Vines become
thoroughly established, we have no doubt it will
prove a first-rate Grape. Some complain of its
being full of stones; with us it is almost stone-
less, certainly much more so than Lady Downe's.

Golden Champion upon its own roots, as we
received it from MR. THOMSON, we cannot grow
at all. Grafted upon the Hamburg and Barba-
rossa it has produced some good bunches, but in
both cases they have cracked and speckled and
rotted, both forced early, and started late. It

also becomes discoloured directly it is ripe, and
hence, under favourable circumstances, it can
only be regarded as a summer Grape, to be
eaten as soon as ripe. Madresfield Court we
regard as a fine handsome Grape, but we fear
not a keeping one. Royal Ascot may safely be
recommended to amateur growers as a hardy
free growing Grape, which cannot fail to give them
satisfaction. Royal Vineyard and Champion
Muscat (MELVILLE) we have crossed out as
being unworthy of cultivation.

Such is our experience with some of the more
recent Grapes. Many more are coming into
cultivation, several of which we know to be very
good; but to mention them here would be
premature. What we would advise is to aim at
a higher state of maturation; to bring out and
concentrate the vinous as well as the saccharine
qualities of the crop. Till then, much rubbish
will pass with the uninitiated as genuine
productions. P.

—The following extract from a letter just re-
ceived from Cannes, will interest many of our readers—
"We have had 100 men sent us, some wounded, others
invalids. DR. C. BUKERSLEY has 16 bad cases in an
hospital with two French doctors; they are nursed
admirably by the *petites soeurs*, and what is very interest-
ing is the new method of dressing the wounds one of
these two, DR. GIMBERT, has introduced. He has tried,
instead of lint, EUCALYPTUS LEAVES. The leaves
have a caty smell, they are merely laid on the
wounds. The balsamic nature of them not only cures,
but after a few hours all the unpleasant odor of the
matter ceases." M. J. B.

—Among recently published works, to some of
which we shall have occasion to allude more fully on
another occasion, we may mention *New Tracks in*
North America (CHAPMAN & HALL), a book full of
information respecting New Mexico, California, and
other western and south-western districts of the North
American Continent, and containing many particulars
as to climate and vegetation which will be serviceable
to gardeners and botanists.—*Strange Dwellings* (LONG-
MANS), an abridgement of the Rev. J. G. WOOD'S
interesting "Homes without Walls," *The Sun,*
Ruler, Fire, Light, and Life of the Planetary System,
by R. A. PROCTOR (LONGMANS).—*Metallography, the*
Student's Handbook of Metals, for the use of schools and
science classes, by T. A. BLYTH (LONGMANS).—*A*
Manual of Structural Botany, for the use of classes,
schools, &c., by M. C. COOKE, M.A. (HARDWICKE),
3d edition.

—The *American Gardeners' Monthly* speaks of a
new species of ECHINOCACTUS, E. Simpsoni, as grow-
ing on the Sierra Nevada of California, close to the
snow. It attains the dimensions of a large Cabbage,
and has been used (and removed, *bien entendu*) as a
vegetable in lieu of Artichokes. Our contemporary
states of the plant as truly beautiful, round as a globe,
and completely covered with snow-white spines.

—In reference to the contents of what may be
designated recent periodical literature, we may men-
tion that the number of the "Proceedings of the Ameri-
can Academy of Arts and Sciences" for June, 1870,
issued in December of the same year contains a
revision of the North American Polemoniaceae, by
Prof. ASA GRAY, and comprising a descriptive list of the
plants belonging to the order above mentioned, which
contains general of such importance to horticulturists
as Phlox, Collomia, Gilia. It is abundantly clear that
many fine species have still to be introduced, and as they
are of a "hardy" nature for the most part, DR. GRAY
is doing horticulturists a service by calling attention to
them. The very beautiful annual shown by MR.
THOMSON, of Ipswich, at one of the meetings of the
Royal Horticultural Society in 1870, and figured in the
October number of the Botanical Magazine, tab.
5863, is referred by DR. GRAY to Gilia (sect. Leptosi-
phon) micrantha. Of this plant we shall shortly
publish a figure.

—It is stated in the *Philadelphia Ledger* that
there are now no less than 214 weeds, which have
been introduced into the United States from foreign
countries, and principally from England. As a proof
of the rapidity with which useless plants are acciden-
tally brought over the sea, it is said that in 1837 there
were only 137 foreign weeds known in this country.
As far back as 1672, a curious little volume, called
"New England's Rarities," gave a list of 22 plants
which the author considered had sprung up since
the English had kept cattle in New England. The
author mentions the "Plantain," which, he
says, the Indians call the "Englishman's foot,"
as though produced by the tread of the white
settlers. The name "Yellow Toad-flower" it is
stated, was originally introduced into the province of
Pennsylvania, as a garden flower, by a MR. RANSTEAD,
a Welshman, residing in Philadelphia, from which it
has derived the name of "Ranstead's Weed." In
1758 this weed had overrun the pastures in the
inhabited part of Pennsylvania, and was the cause of
bitter complaints from the agriculturists of that day.
Chickweed, it is stated, was introduced in South

Carolina as food for canary birds, and in 10 years spread for upwards of 50 miles, and now occupies the outposts of civilisation. The "Scotch Thistle" is said to have been brought to America by a clergyman, who carried with him a bed stuffed with thistle-down, in which some seed remained. Feathers being cheap in the new country were substituted for the down, which was emptied out, and the seed, springing up, soon filled the country with Thistles.

— Amongst the NEW ARRANGEMENTS made by the ROYAL HORTICULTURAL SOCIETY for the present season, we have to announce the following:—Mr. EYLES, Superintendent of the Society's gardens at South Kensington, retires from that office, and assumes that of Superintendent of Flower Shows, in conjunction with his business as consulting landscape gardener. Mr. BARON, Superintendent of the Chiswick Garden, is appointed, and will for the future act as Superintendent of the Society's gardens both at Chiswick and South Kensington, thus combining the management of the two gardens. The Society will, by this arrangement, retain the services of both its very efficient officers.

— The *American Horticulturist* says that "the NEW GREENHOUSE at WASHINGTON, for the erection of which Congress made appropriation at its last session, is nearly completed. It is 470 feet in length. One section of this building will contain Grape cuttings, now on the way from Europe, embracing every variety grown in that country. Another section will be devoted to the propagation of medical plants derived from foreign points, with a view to their future culture in the United States. Still another division will receive assignments of choice imported floral productions; and yet another will be devoted to experiments in the growth of fruits native to Russia and other powers, now exchanging with this department."

— THE MAXIMUM TEMPERATURES in England, during the week ending January 28, ranged from 46° at Blackheath, to 36°·2 at Wolverhampton, with a mean for all stations of 38°·6, or 11° above the mean for the several places in Scotland, where the extremes were represented by 39° at Paisley, and 35°·7 at Edinburgh. THE MINIMUM TEMPERATURES at several stations in both countries were below 20°. In England the lowest were 18°·9 at Salford, and 19° at Hull, whilst the highest were 25° at Blackheath and 24° at Leeds; and in Scotland the lowest were 18° at Perth and 18°·3 at Leven, and the highest were 26°·5 at Greenock, and 25° at Edinburgh. THE MEAN TEMPERATURES in England were lower than those of the preceding week. They ranged from 34°·2 at Portsmouth to 29°·8 at Wolverhampton, with a mean for all stations of 31°·6; and in Scotland from 31°·4 at Aberdeen to 27°·8 at Paisley, with a mean for the several stations of 29°·5. RAINFALL.—At most of the stations in the two countries little or no rain fell. In England, the greatest fall was recorded at Blackheath, where a little more than half an inch fell; and in Scotland, at Glasgow, 0·13 inch. The mean fall for England was 0·15 inch; and for Scotland 0·04 inch. (See Mr. GLAISHER'S Tables in our present issue.)

— Mr. GILBERT, gr. to the Marquis of Exeter, Burchley Park, Stamford, informs us that he intends to meet at the next meeting of the Royal Horticultural Society one or perhaps two specimens of what he considers to be the true MONTSERRAT PINE-APPLE, and also of the Black Jamaica. He would be glad if other Pine growers would also show fruit of the former variety, as there seems to be a great diversity of opinion as to which of the two varieties mentioned is the true Montserrat, and which it would be well to clear up. "In the North of England,"

writes Mr. GILBERT, "what is recognised as the Montserrat in the South, is there called the Black Jamaica. By having specimens of both, from different growers, the Fruit Committee will be enabled to give a definite decision. The great value of these two varieties is worthy of the attention of your readers. Certainly, they do not produce such large fruit as the smooth-leaved Cayenne, the Charlotte Rothschild, or the Providence, but they are much superior in flavour, and always out up yellow, and without the black heart which is so objectionable at the table. I am sorry that the Society has not made special classes for such varieties, as they stand no chance whatever with fruit double their size, though the latter are infinitely inferior in flavour."

New Garden Plants.

DENDROBIUM CELOGYNE, n. sp.

Aff. *Dendrobium fuscum*, Griff. 1. Labelli lacinia antica semiovata obtusiuscula nervis nervisque obscure carinatis.—Flos solitarius terminalis. Perigonium mollius coriaceum.



MR. W. WILSON SAUNDERS, F.R.S.

Sepalum dorsale lanceolatum. Sepala lateralia latiora mento valido angulato, obtuso. Tepala anguste lanceolineria. Labellum medio trifidum, carinae tenae bene obtuse a basi ad basin laciniae mediae, mediae tamen basin non attingens. Papillae geminae utrinque extus in basi. Laciniae laterales semiovatae antica obtusiuscula, lamina antica ischio angustissimo separata semiovata obtuse acutiuscula, nervis nervisque obscure carinatis incrassatis. Columna semiteris; androcinium obscure retinens reticulum alium excedens. Antherae processus terminalis obtuse conica.

"The bulbs are 2 inches apart, on a woody rhizome about 14 to 2 inches high, four-sided, and bear two leaves, about 4 or 5 inches long, rather broad. The flowers are on a very short stalk, from apex of bulb." The flower is as large as that of a fully developed *Dendrobium fuscum*, Griff. (*Sarcopodium fuscum*, Lindl.), straw colour outside, with some purplish lines inside, with a mosaic of such blotches and streaks. Lip blackish-purple, orange at its broadest base, side lobes pallid, whitish straw colour, with many purplish streaks. Column purplish above, purplish blotched on a pale ground beneath, orange at its base.

The outside appearance is very much that of some *Celogynae* such as *C. brunnea*. The discoverer of the plant is once more the Rev. Mr. Parish, of Moulmeine. For a flower, and a description of the vegetative organs, we have to thank J. Day, Esq., of Tottenham, by whom it

has been recently flowered. It will form an interesting addition to the group. *H. G. Rehb. fil.*

W. WILSON SAUNDERS, F.R.S.

It would be difficult to find a better representative of a particular class of plant-lovers and plant-growers—unhappily far too limited in point of numbers, than Mr. W. Wilson Saunders. Loving plants for plants' sake, his leisure, his knowledge, his means, have been employed for many years and in ample measure in their study and cultivation. Gifted with a taste at once discriminative and catholic, Mr. Saunders has never allowed himself to be swayed unduly by prevailing fashion, but if certain plants have once commended themselves to his notice by reason of their intrinsic beauty or their botanical interest, no change of fashion, no falling off in popular repute, has ever sufficed to shake the attachment that he has once felt to be worthily bestowed. To love plants well, one must know them well, and Mr. Saunders' passion for plants is founded on this thorough knowledge. No casual admirer he is, but a true-hearted

naturalist, in whom familiarity with the objects of his study, so far from breeding contempt, engenders increasing admiration.

A true-hearted naturalist, indeed, he has ever shown himself, not only in his appreciation and study of God's works, but also in the helping hand and prudent counsel he has always so readily extended to those engaged in similar pursuits to himself. We need but refer to his public services in the case of the Royal Horticultural Society, of which body he is a most active Vice-President. Every one at all familiar with the proceedings of that body, with its official business as with its more public exhibitions, knows how great is the debt of obligation under which the Fellows labour to Mr. Wilson Saunders. He has always striven to keep the Society in the straight paths of horticulture, and so far as it has laid in his power, has not suffered it to deviate from the main objects for which it was founded.

Firm in the expression of his own convictions, no one has been more fortunate in conciliating the paths of horticulture, and so far as it may happen to differ in opinion. This happy faculty, we suspect, has proved over and over again of immense service 'at the Council board, while it has secured from all who have been thrown into contact with him such a measure of respect and esteem, that we need not hesitate to express our opinion that no one enjoys more fully or more deservedly the full trust of the horticultural public than Mr. Saunders. We have naturally dwelt on Mr. Saunders' services to horticulture and horticulturists, but it must not be overlooked that the same qualities which have endeared him to one class, have been, and are, manifested towards other classes of Nature-students. Entomology in particular owes to Mr. Saunders a corresponding debt to that incurred by botany, while the Linnean Society, which body has the advantages of his services as treasurer and Vice-President, has no more ardent friend or helpmate than he. Of Mr. Saunders' extensive and most interesting collections of plants, at first accumulated at Wandsworth, and since then removed to the more congenial locality of Hillfield, Reigate, we may have occasion to speak on another opportunity.

Not the least of the services rendered by the subject of our notice to botany and horticulture has been the publication of a series of selected illustrations from the treasures at Hillfield, under the title of the "Refugium Botanum," in the preparation of which Mr. Saunders has had the assistance of Professor Reichenbach and Mr. J. G. Baker. It is difficult to over-estimate the value of such a publication in furtherance of the botanical knowledge of classes of plants, for the

elucidation of which good figures are more especially important, such as the smaller-flowered Orchids, succulent plants, and the most potted plants in general. Our woodcut has been taken from a recent photograph.

NEW CROTONS.

We give this week an illustration of another of Messrs. Veitch's Crotons, to which we have already referred on more than one occasion. The present variety, *C. variegatum* var. *interruptum*, is remarkable for the curiously "interrupted" leaves, which are well shown in the illustration (fig. 31). Some of the leaves are twisted, while others not unfrequently present very remarkable forms, resembling saddles, pitchers, cups, and other unusual forms. The colour is a dark green, with crimson midribs.

AMERICAN BOULEVARDS.

UPON paying a second visit to America during the spring of last year, I found New York provided with a new boulevard. The wealth, fine buildings, and colossal commerce of that city demand corresponding grandeur in the way of thoroughfares, and now that the Central Park is reaching completion, fine approaches to it become desirable. The east side of New York, like that of London, seems to have been always somewhat below par, while in the west end people seek for green lawns, pretty flower-beds, and other luxuries of fashionable life. One side is in fact a type of elegance, the other of industry. That vigorous attention is being bestowed upon the ornamentation of the best part of New York is evident by the formation of the new boulevard above alluded to, which stretches nearly across the island on which the city stands and which may be stated to be the main artery of a vast transition section above Fifty-ninth Street.

People cannot readily understand the nature of this boulevard, and its bearing upon the future of New York, without a drive along its direction; but it is assuredly the most important improvement in the history of the island. To the southward is the city, through Broadway and Eighth Avenue; to eastward and westward the river; to the northward the park, of which you have already given a plan (see p. 1186, 1866); while to the westward is the boulevard opening into rural scenery. This forms a sort of barrier, as it were, between the hard and utilitarian on the one side, and the soft and refined on the other. It terminates in a circle of 150 feet radius, thus affording a large space for the convergence of several of the more important streets and avenues. Its outside circumference is broken by the width of the streets, but is carefully and exactly capped with blocks of blue stone of an average length of 6 feet, so hewn that they follow out their circular direction. These stones are 12 inches above the surface, and present a smooth appearance. There are no sharp corners, the angles being rounded to a natural curve.

The inner circle is of 40 feet radius, likewise curbed, macadamised and treated with great care in the preparation and finish. In its centre is to stand a fine group of statuary, yet to be selected. Rows of trees, set apart at distances of 20 feet on the exterior of the outer circumference, have been planted. A finely-asphalted foot walk completely encircles the outer enclosure, and is 20 feet in width. From this circle stretches away the boulevard in a north-westerly direction; it is 150 feet from curb to curb, with 22 feet of walks on each side, making the complete width 194 feet. A foot walk traverses the middle of the drive, thus separating it into two roadways of 40 feet in width, by a pathway 22 feet wide; and, again, on either side of these two drives are the two walks just mentioned, each of which is 22 feet in width. These

longitudinal divisions of the boulevard are well designed, as they will afford vehicles going up the island a clear stretch on the right drive, while those coming down must pursue the left. Such broad sidewalks are also good contrivances; indeed, the entire arrangement is somewhat similar to that carried out in the case of the Champs Elysées in Paris.

Making the roadway is a subject of some interest. The substratum of the natural soil is first worked, and if the base is of solid rock, rough material is then thrown over its surface. A steam roller, weighing 10,000 lb., is then applied to make the bedding compact, and when it is closely compressed the putting down of the Tilford road begins. This consists in placing rock quarried on the spot, and of the average size of a paving stone, without symmetry, but rough, soft and granite-like in its primary formation, upon end, with the broad base down, breaking the joints by making the parallel lines prevent a succession of lateral crevices in one direction which might weaken the road materially. This mass of stone closely joined together makes a solid body, which a few years of travel renders as non-porous and

Seventy-first Street the country, in the neighbourhood of the boulevard, is excellent; the ground is high-lying, and the drainage admirable; a capacious sewer carrying the waste to the Hudson River. The scenery here begins to partake both of the beautiful and picturesque. Glimpses of the Hudson are just visible, and the opposite shore, with its wood-clad hills, rises into view. To southward and eastward the boulevard, almost a level stretch, goes back to the circle, joining the Merchant's Gate at the park. Imagine this highway, planted as it will be in future years with double rows of shade trees, with clean wide walks, a succession of centre pieces dotting it like miniature parks, and the grand effect of this boulevard will be at once apparent.

It will thus be seen that ornamental New York is connecting itself with beauty in the shape of gardenesque scenery, something after the manner in which we are managing our Thames Embankment. New York, I know, has other improvements of a similar kind in contemplation, let us, therefore, trust that we, too, may march onward in the same direction. The great work to which I have just alluded is worthy of the first city in the world, as far as commercial importance is concerned. You yourselves have pointed out objects worthy of the attention of the Board of Works; I have indicated in former papers what a fine boulevard might be made of Oxford and Cambridge terraces, and in many other localities improvements might also be effected, such as would give our at present too utilitarian capital an air of comfort and of beauty of which few people would think it susceptible. *J. Norton, Oxford Terrace, Hyde Park.*

PINE WOODS IN FRANCE.

DEPARTMENTS OF THE GIRONDE AND DORDOGNE.

THERE are large tracts of country in the Landes of these departments fit only for the growth of the Pine tree. Along the sea coast the Pine woods now afford a most efficacious protection against the encroachments of the sea. Some 50 years ago great apprehension existed of the destruction of the Medoc country by inundation, as the banks of sand which are the only barriers against the ocean were observed to be yielding. The idea then occurred of planting the Pine tree (*P. maritima*), in order to bind the sand, and the result has been most satisfactory. This is a remarkable instance of what may be effected by natural means when artificial means fail.

Pine wood property in the interior became very much more valuable upon the breaking out of the American civil war, owing to the failure of the supply of resinous substances from that country, and considerable fortunes were realised in consequence. An acre of Pine wood produces from 55 to 77 gallons of resinous matter, and it sold at that time for 3s. and 4s. per gallon. The Pine has since fallen to one half that amount, but the profit per acre is still calculated at from £2 8s. to £2 16s. An acre of good Pine plantation, 50 years old, is now worth £30, which is treble what it was 30 years ago.

The preparation of resin has become an important industry in the Landes districts, and employs a considerable number of hands. The liquid matter is obtained by tapping the trees, to the stems of which are fixed small earthen pots, into which it runs. A tree may be tapped when 20 years old, and will support this process for 30 years. *J. R. J.*

DIGGINGS FROM OLD MINES.

DO PLANTS ABSORB WATER BY THEIR LEAVES?

THERE is little new under the sun. Old saws bear a striking resemblance to modern instances. I was much struck with this fact lately in looking through the "New Gardeners' Dictionary," an abridgement apparently of Miller's larger work, and published at a later date. In



FIG. 31.—CROTON INTERRUPTUM.

closely crystallised as cement. Having been placed as described, iron bars are used to wedge the stones into position, and the pointed heads are then trimmed off with hammers to an even surface. Macadam stone is then applied. This stone is also quarried on the spot, and consists of huge boulders broken into fine bits, which are made to pass through a ring 2 inches in diameter. The macadam stone, rolled compactly and sprinkled with still finer chips, then remains as the surface. Experience has proved this mode of road-making to answer the purpose perfectly.

The centre walk is cut at every block by the intersecting street, and this gives it the character of a succession of small centre-pieces. These centre-pieces stand 12 inches above the roadway, and are about 200 feet long by 22 wide. They are surrounded by a blue stone curb nicely dressed, and consist of blocks varying from 6 to 12 feet in length. They are 18 inches deep, standing on end, and of a thickness of 6 inches; they are laid upon a bed of gravel and stone, with 18 inches of stone inside the centre piece, to give them sufficient stability: they are set nearly plumb.

In the vicinity of Fifty-ninth Street the surface draining is complete. The road has a crown of 4 inches, which gives an admirable watershed toward the gutter. From its southern terminus to

this book we find Mr. Dodart vigorously opposing the current notions concerning the circulation of the sap. Instead of the same juices going and returning, he contends for two several juices; the one imbibed in the soil, digested in the root, and from thence transmitted to the extremities of the branches, for the nourishing of the plant; the other, received from the moisture of the air, entering in at the extremities of the branches; so that the ascending and descending juices are not the same.

One of his chief arguments is, that if two trees of the same kind be transplanted on one day, after first cutting off their roots and branches, and if after they have taken root again some of the new shoots put forth each year be cut off one of them, it will not thrive half so well, notwithstanding its root and trunk being entire as the other. This Mr. Dodart conceives to be a proof of the plant's deriving nourishment by the branches, and concludes it to be of an aerial nature because formed of the moisture of the air, dew, &c., whereas that imbibed from soil is terrestrial. ("Hist. de l'Acad. Roy." 1709.) The writer of the "New Gardeners' Dictionary" apparently accepts these views, and proceeds:—"The sap of a plant, then, is a juice furnished by the earth, and changed into the plant, consisting of some fossil parts, other parts derived from the air and the rain, and others from putrefied animals, plants, &c.; consequently in vegetables are contained all kinds of salts, oil, water, &c., and are probably all kinds of metals too, inasmuch as the juices of vegetables always yield somewhat which the loadstone attracts." This passage reads as if the writer thought that plants absorbed these in the form in which they were found in the plant. But the following extracts render this doubtful. He goes on to state that this juice, the sap, enters the plant in the form of fine and subtle water; the nearer the root the more it retains of its proper nature, and the further from the root the more altered it has sustained, and the nearer it approaches to the nature of the vegetable. When it enters the root it is earthy, watery, poor, acid, and scarce oleaginous at all. In the trunk and branches it is "further prepared, though still acid, as we see by tapping a tree in February, when it distills a watery juice, apparently acid. In the buds or germs it is more concocted, and here, having unfolded the leaves, these come to serve as lungs for the circulation and further preparation of the juice." For these tender leaves, being the most delicate, are the most exposed to heat and cold, moist nights and hot scorching days, and they alternately expanded and contracted, and the more on account of their reticular nature." This is rather too mechanical a view of the functions of leaves, but then it must be remembered that in those dark times the influence of light and the chemical force of the sun were not known nor understood, and the idea was that the sap flowed wholly in virtue of the effects of caloric on the air-vessels, dilating them with heat, and contracting them with cold.

By such means the juice is still further digested as it is further in the petals or leaves of the flowers which transmit the juice now brought to a further subtilty to the stamina; these communicate it to the farina or dust in the apices—where, having undergone a further maturation, it is shed into the pistil, and thus having acquired its last perfection, it gives rise to a new fruit or plant. Again, the root consists of an infinite number of vasa absorbentia being dispersed, through the interstices of the earth, attract or imbibe the juices of the same; consequently everything in the earth that is dissoluble in water is liable to be absorbed, as air, salt, oil, fumes of minerals, metals, &c., and of these the juices are the most constant.

From the Rev. Dr. Hales' treatise on "Vegetable Statics," the following views are taken:—"For the sap in all vegetables does probably receive, in some measure, from the tops of branches, as the sun leaves them; because, its rarifying power then ceasing, the greatly rarified sap and air mixed with it will condense and take up less room than they did, and the dew and rain will then be strongly imbibed by the leaves, whereby the body and branches of the vegetable, which have been much exhausted by the great evaporation of the day, may at night imbibe sap as dew from the leaves;" for by several experiments recorded in the first book of "Vegetable Statics," plants were found to increase considerably in weight on dewy or moist nights.

And by other experiments on the Vine it was found that the trunk and branches were always in an imbibing state, caused by the great perspiration of the leaves, existing in the blossoming season; but when the night the perspiring power ceases, then the contrary imbibing power will prevail, and draw the sap and dew from the leaves, as well as moisture from the roots. According to the Rev. Dr. Hales' experiments, by fixing mercurial gauges to the stems of several trees which do not bleed, it was found by the drawing up of the mercury several inches, that they were always in a strongly imbibing state. Again, by fixing three mercurial gauges in the stems of the same Vine, that while some of the branches change their state protruding sap into a state of imbibing, others continued protruding sap, one nine, and the other thirteen days longer.

Further particulars of these experiments would be most interesting, and especially if it could be pointed

out how the mercurial gauges were adjusted and connected with the plants so as to measure the imbibing powers of the stems. For if of stems why not of leaves, especially as all such instruments are so marvelously improved since the experiments of Hales were made? [The mode of conducting Hales' experiments, and the results obtained, may be found in any text book of Physiology.]

We quote one more sentence, as an antidote to dogmatism on such nice points:—

"When we consider that the great work of nutrition in both plants and animals is chiefly carried on in the capillary vessels, where Nature selects and combines as shall best suit her different purposes the several mutually attracting, nutritious principles, which were hitherto kept disjoined by the motion of their fluid vehicle, we shall find that Nature has made abundant provision for this work in the structure of the vessels, whose composition is made up of nothing else but innumerable fine capillary vessels and glandular portions or vesicles."

Or, in other words, and to use the language of Dr. Lindley, plants are permeable to fluids in all directions, and currents may be reversed in them without inconvenience. *Antiquator.*

Home Correspondence.

The Proposed "Challenge Cup."—I regret to see the letter on the subject of the challenge cup offered by the Royal Horticultural Society, and that one so mistaken in its ideas, the more surprising to see the name of so good an exhibitor at the end of it. Allow me to correct several misapprehensions under which Mr. Baines labours. I will take them in the order in which they stand in his letter:—(1.) It was never proposed that the plants in each collection should all be of the same sort. Each gardener is to name any 20 kinds of stove or greenhouse plants he chooses, without reference to those named by the other competitors. This, in the first instance, will be a great test of the skill of the exhibitors in the selection of plants. (2.) The marking, and the honesty of the exhibitors, must be discussed together. It is considered that the former can be effectively done—how, I need not mention. The latter is a subject I would rather not say much about, but an old exhibitor, like Mr. Baines, must know, as well as I do, that plants are continually shown by men who never grew them, or else have only had them in their possession a few days; and I think I am correct in saying, that no man, who does not do so fairly, has any object in his plants being looked at, at reasonable intervals of time. More than this, I am quite prepared to propose something like the following: to publish the names of the competitors and the plants they have selected at the beginning of each year, and then if any prize be gained in a fraudulent manner the person proving the same is to receive the prize money instead of the exhibitor. (3.) As regards the prize held out, Mr. Baines exclaims, "The challenge cup," "flattery ignoring money attached to it." Now the Society offers in addition three prizes—1st, £20; 2d, £15; 3d, £10, and then the entrance fees are to be added to these amounts. Say there are ten competitors (I believe I am justified in saying that the cup would not be given unless that number enter), that would be £50; allow for expenses £20, there would then be added £15 to the first, £10 to the second, and £5 to the third prize, making a total of £35 first, £25 second, £15 third, for the stove and greenhouse plants three years old. If Mr. Baines will kindly point out any schedule in which anything like this amount has ever been offered I shall be obliged; and moreover, the greater the number of competitors, the larger will the prizes become. I see no reason why, in course of time, the first prize should not be worth £100. Lastly, the principal idea is to let every man start fair. Young gardeners have not large plants ready to their hands, and why should they be excluded from showing what they can do? A man with the experience and knowledge that Mr. Baines has cannot surely be afraid of competing on equal terms with his younger brethren in the profession. *W. Marshall.*

—I had anticipated sealing the plants as the method of marking them. This has been tried in places which I could name, and found insufficient. The tape which was used was cut, an exactly similar stamp was procured, and the seals were manufactured as will, *T. Baines, The Gardens, Southgate House, Southgate, E.* [Good heavens! Where are the police? Eds.]

The White Cedar.—Is not the writer of the article in the Transactions of the Scottish Arboricultural Society, quoted by you at p. 103, in his Britannicum of the White Cedar, confounding one tree with another? According to Loudon's "Arboretum Britannicum," vol. iv., p. 2475, the White Cedar of America is the *Cupressus thyoides* of Linn., and a perfectly distinct plant from the *Thuja occidentalis*, of which the writer will find an account in the same useful and comprehensive work (vol. iv., p. 2454). I also beg to refer him to a "Catalogue of Coniferous Plants with their Synonyms," published by the late Dr. Lindley and Mr. George Gordon in the Journal of the Horticultural Society for July, 1850, where he will find *Cupressus thyoides*,

Linn., named *Chamecyparis spheroides*, at p. 207, and *Thuja occidentalis*, Linn.; synonyms, *T. obtusa*, Mönch., *Cupressus Arbor-vitæ*, Targione Tozzetti: described at p. 206. I have paid some attention to *Coniferae* for some years, but have never seen a plant of *Thuja occidentalis* that gave the least promise of ever making a timber tree in this country, or being of any other use than a cheap, useful, hardy, ornamental shrub, and a very good hedge plant. I recollect some years ago having seen the plant in the walking round the nursery at Knap Hill, in Surrey, now belonging to Mr. Anthony Waterer, where there are many very beautiful hedges made of the *Thuja occidentalis*. *C. F. P., The Grange, Kingston, near Taunton.*

The Tubular Boilers at Tedworth.—My attention having been drawn to Mr. Higgs' report (p. 77) of the above boilers, allow me to observe that it would prove instructive to many of your readers were it supplemented by information, as far as may be practicable, as to why and in what part of their construction the boilers failed. The simple fact of no less than five consecutive boilers failing in the comparatively short space of 15 years ago has the pleasure of suggesting this suggestion. I may, however, observe parenthetically that, as far as I know, "upright tubulars" have a singular propensity to fracture—when they do fail—in the lower ring in which the tubes are inserted; hence my apprehension that the Tedworth boilers may have failed in the part indicated; hence also one of the chief advantages of the "Duplex" boiler. I have found the "tubular saddle" perform its work most ago (say, and that its form of construction renders it less liable to fracture than the old form of "upright tubular." *Wm. Gardiner, Lower Ealington.*

Budding the Manetti.—Allow me to ask whether, after budding the Manetti an inch below the ground (see p. 75), the soil is to be raised up to the level of the bud, or not? If so, I should imagine some grafting composition round the bud would be advisable to keep out wet. *S. B.* [The earth need not be returned after budding the Manetti stocks an inch below the ground; neither is any grafting composition necessary. Treat the budded Manetti stocks in the same way as you would budded Dog-rose stocks. *W. P.*]

Raising Vines from Eyes.—As the season for putting in Vine eyes is approaching, allow me to advise your readers to try the following plan, which I have practised for the last four years without failure in a single instance, and which Mr. Miller—who, among others, has witnessed the results of the system—deemed novel enough to notice in your column some time ago (p. 1634, 1870). The system is founded upon the theory that every healthy Vine eye ought to make a vigorous cane the first year, unless checked by an accident, which happens in a vast number of cases by the system of striking the eyes in pots, and transferring them from one pot to another. The *modus operandi* is simple, and is as follows:—Get as many pieces of good turfy loam, 6 inches square, as you intend putting in eyes; cut a little hollow in the centre of each, and lay them close together like a bed, or pile them up in any house where there is plenty of light, and where the temperature is about 55° or 60°. Prepare your eyes in the usual way, about the end of February, and insert one in the centre of each turf, and cover with a little light soil. In a few weeks they will be throwing their quill-like roots round the edges of the turf, and just about to encroach upon each other's territory, when they must be transferred to turves of larger dimensions, according to the time that is likely to elapse before you will be ready to plant them out, or pots will then, or what is easier, just set the 6-inch turves farther apart, and fill the spaces between with finely-sifted loam and sand. Into this you will find the roots to ramify in great quantity round the central turf, and when you plant or pot, take hold of the sod fearlessly, and the roots will come away from among the light soil, hanging like a fringe round the turf, and without damage to a spongiole. Set them on the ready prepared border, cover the roots with a little soil, and planting is finished. We have frequently practised this operation in a blazing sun without the plants flagging. They rush up with astonishing rapidity, and the roots get a grasp of the border the first year, before the fibre gets decayed and sodden, which is of some importance. When the plants are intended for potting, crack the pots and fill them up with soil till within 4 inches of the top, bring them into the house where the young Vines are, set a sod in each, and fill up to the level of the soil. Since 1867 I have never had a Vine plant in this way, and have never failed in filling the roof with wood, such as is not always seen the second year, and have fruited the supernumeraries every year since, and heavily. The viney referred to by Mr. Miller was an early house, next to the late house, which we desired to enlarge, so that they have been thrown into one. We finished cutting the crop of Hamburgs in this house last April, planted it in May with late Vines that have filled the house as ever; and in the autumn of 1870 a heavy crop of this season without touching the permanent Vines. *J. Simpson, Wortley, Jan. 26.*

Hyacinth Culture in Glasses, &c.—On reading in last week's *Gardeners' Chronicle* an article on the growth of hyacinths in glasses, and that in glasses, I thought a few words upon another, and I venture to think, an improved mode of growing these spring

* I offer this phrase to those who have robbed us of the handy term "spongioles," without giving us a practical equivalent in its stead.

favourites, would be acceptable. I refer to planting in glass dishes and other vessels (in fact, any bowl, pan, or stand, whether of glass, terra cotta, or China, will answer the purpose) in cocoa-nut refuse. Before the advent of the latter material I used to grow almost all sorts of spring bulbs very successfully in Sphagnum Moss and water, simply laying a few lumps of charcoal at the bottom of the dish, then filling up with the Moss, planting the Hyacinths in it, and watering as required. This plan answered very well, but the Moss was difficult to get, when cocoa-nut refuse made its appearance it was at once substituted and found to answer better in every respect. When planting now I use a composition of two-thirds cocoa-nut refuse, the other third being silver sand and a little charcoal broken rather finely but not powdered. The bulbs are planted so as to leave the crown a little exposed, and the whole is covered with the beautiful fat green Moss, which may be obtained at any hedge bank, it then forms a pretty and attractive border at the outset, which is an advantage, whilst the Moss excludes prevents it drying too rapidly, and also covers the light. There should not be any hole for drainage in the vessel used, and if a Fern-stand is employed the drainage hole should be tightly corked up. The cocoa-nut refuse will not easily turn sour, but if by any chance too much water is given the surface will be spoiled by simply turning the hand flat over the top of the dish, whilst elevating the dish with the other, so as to pour the water out at one side. My experience goes to show that Hyacinths grown in water in glasses cannot compare with those grown in the way described; the bulbs root strongly and quickly, showing a correspondingly increased vigour in leaf and flower, nor are they so liable to checks from sudden changes of temperature. I send you a photograph of three Hyacinths grown last season, with what success you will see. They were planted exactly as I have recommended, and all through their growth occupied the window of a sitting-room. Every fine day they were allowed to stand out on the window sill, during the middle of the day, and when beginning to show their flower buds were treated with weak guano-water. I regret that the names of the varieties were not preserved when planted, the colours were as follows:—No. 1, put in the 2, fine deep pink; No. 3, dark blue. This will enable you to form an idea of the beauty of the pan last spring. I commend this method to the notice of all your readers who like to grow bulbs in the parlour or sitting-room, as it combines the cleanliness and prettiness of the Hyacinth glass with a more natural medium for the bulbs to root and grow in; and if any one doubts whether the flowers will be as fine, let him try, and I am sure he will not regret having tried Hyacinth glasses. *James Tynan, 68, Great George Street, Liverpool.* [Very successful. Eds.]

Palmise Heating.—I hear nothing now of Palmise. Theoretically, it seems admirable. Has it failed in practice? Or is the expense of the arrangement thought to outweigh its benefits? *S. B.*

Orchid Cultivation.—I have had much pleasure in reading the account of the noble spike of *Odontoglossum Bluntii*, produced by "G. H.," who is evidently an original grower, or at least, who has his own notion of culture. Probably this fact has something to do with his success. No doubt numbers of plants have been roasted and stewed to death, and there is little doubt but that thousands have perished, and that multitudes live on in a miserable state, by being in too low, too dry, or too airy a situation. I am speaking of position and situation, not management, such as soil, watering, potting, shading, &c. If "G. H." had obtained an orthodox piece of information, instructing him how to manage his Orchids, and if he had followed it to the letter, he might not have had the success which has fallen to his lot. I have observed in my practice that there are certain positions in a particular house in which certain plants will grow faster and better than in any other place in the same house. Besides there are houses which are not favourable to the growth of plants, and there are others so scientifically constructed that they will grow nearly any sort of plant. The atmospheric balance is in favour of development or growth, the conditions tend towards nutrition, give to the plant what it requires atmospherically, and take nothing away to its disadvantage. With such advantages a cultivator has a fine chance of success, because plants are not such passive, inert organisations as some people suppose. Only place them where they can help themselves, and they work like night and day; in fact, they do more for themselves than we can possibly do for them. We have no exact information of the peculiar conditions under which this magnificent result has been produced; we have no size of the bulb given which has produced so fine a flower spike; we have nothing as to the time the plant had been growing to the time of blooming, cost, &c.; and these are frequently blank items important to gardeners, who are frequently lamenting that they are at times impossible. But if "G. H." has secured a small plant, and caused it to improve so much in a short time that it has produced flowers finer and better than any other in the same period; and if no particular structure has been applied to produce this success, then may we hope to be favoured by our acute friend with information? If

it is management, we may trust the secret may be made known. I have seen some wonderful results produced, some magnificent plants splendidly grown and superbly bloomed, by men who had the love of their profession in their heart, who watched the plants placed in their care, who noticed when they grew and when they declined, and who finally found out the position they required, and arrived at glorious success. I believe we have but an imperfect idea of what some of our Orchids are destined to arrive at. I have seen *Ansella* Calanthe with branching spikes 10 to 12 feet long, and *Calanthe Veitchii* with spikes over 5 feet, branching. I believe *Dendrobium Bensoniae*, *Parishii*, and others—many others—are capable of being improved indefinitely, and in the mean time let us try to find out the most certain, safe, speedy, and economic method of arriving at perfection. *Wm. Payne, Chester.*

Bougainvillea glabra.—Will Mr. Harrison, Tynesfield Gardens, kindly state at what temperature he keeps his greenhouse in which the Bougainvillea is grown, both in summer and winter? This will be of much service to a great many besides myself, and will help to solve the question as to being a greenhouse climber. If it can be proved to be so, a great many more plants will be grown that are at present. If he will also describe the treatment he gives it, he would benefit a great many in no small degree. *Cavendish Richardson, Sur., C. McNeven, Esq., Perryfield Gardens, Goldstone, Surrey.*

American Garden Fork.—At the last meeting of the Royal Horticultural Society, Mr. Robinson exhibited a collection of American garden tools, which he had recently brought from that country, and which were said to be the best forms of the different articles in use there. Amongst them, with the exception of the subject of the annexed illustration (fig. 32), a garden fork, there was nothing which appeared specially worthy of introduction into our gardens. The fork in question is described by Mr. Robinson "as a very strong and handy implement, and the best tool for digging of any of the fork-kind used in the United States. The insertion of the tines is noticeable: about 6 inches of the lower part of the handle is of metal, and in this there is cut an oblong eye 1½ inch by ½ inch, through which the tines are passed. They are firmly held in place by two little iron wedges one on each opposite side. The back of each tine forms an obtuse angle, the fronts being quite flat, and the points ground fine at the back. It is made of the best cast-steel."



FIG. 32.—AMERICAN GARDEN FORK.

Persistence of Life in Bulbs.—Reading the interesting account of the long persistence of life in a bulb in the Edinburgh Museum of Science and Arts, at p. 71, has induced me to send you a note. I think is not an uninteresting account of the vitality of the Tulip. When a young man I was in the employ of Mr. H. Groom, of the most celebrated bulb growers of that day, and it was his practice to have his Tulip ground trenced about 30 inches deep every third year. When this was being done any curious roots or buds that had been found were taken that he was not sure of the names, he would throw into the bottom of the trench, ordering them all to be chopped up, he at the same time standing by to see the operation properly performed. By some means, on one occasion, two bulbs escaped, for, in three years after, in trenching the ground again, these roots were found to be plump, and in good condition. They were at once planted, and bloomed well, but late, the following spring. *J. Dale, Gr. to the Honourable Society of the Inner Temple.*

Propagating Centaureas.—The system which I have followed in the propagation of this beautiful bedding plant, and one by which a good stock may easily be obtained, is to plunge the plants in the flower garden in the pots, and in the autumn to lift them and, taking off only the decayed foliage, to keep them in a cool airy place until January, when I cut them back, place them in a warm humid atmosphere, and they at once throw out side-shoots in great abundance; these I take off with a portion of hard wood, and place each cutting singly in a small thumb-pot in a nice bottom-heat, where they quickly root. After it has rooted round the pot, I put it on into a larger 60, and still keep it in a little heat, until the roots have again worked round the pots, by which time the plant will be very effective, and will only need hardening off before being removed to its place in the flower garden. The advantage of placing the cuttings in single pots is that the roots,

which are very tender, are not broken. In plunging them in pots in the flower garden, we have also the same advantage, as well as that of being enabled to keep them in a smaller compass during the winter. *W. Stapleton, Spring Grove House, Isleworth.*

Pinus Sinclairiana.—In your last number you mention that it appears, from the researches of Dr. Engelmann, that the so-called *Pinus Sinclairiana* is not a real existence, and that the plate given by Hooker and Arnott in the "Botany of Beechey's Voyage" represents the foliage of *P. insignis* in association with the cone of *P. Montezumae*. If it were a matter capable of being solved by research, I should at once yield to the superior advantages possessed by Dr. Engelmann, and accept the opinion he might have formed in preference to my own. But the utmost that research can do here is to tell that no tree answering to the description of *P. Sinclairiana* has yet been found. I do not apprehend that Dr. Engelmann can mean that the botany of the wide districts between San Francisco and Mexico have been so thoroughly examined as to allow him to assume that none can be found. The question is thus restricted to a comparison of known materials; and although I should be very apt to put great faith in his opinion, I should not attach more to it than I would do to the opinion of any other eminent botanist in whose judgment I had confidence; nor should I hesitate to prefer my own if thoroughly convinced that I was right. In the present instance I am not prepared to accept the interpretation put on Hooker and Arnott's description and figure by Dr. Engelmann, or to assume that the cone belonged to one species and the foliage to another; and if it were so, I would not refer the leaves to *P. insignis*—they seem to me to be too stout and too strong and rigid, as figured; and still less show signs of being the cone of *P. Montezumae*. Hooker, indeed, in his original description of the species, says that it approaches, in the form of its cone and its scales, to *P. Montezumae*, Lam., but that the leaves are somewhat different. But it has always appeared to me that the cone belonged to a different section from *Montezumae* altogether. That species is a thorough *Pseudo-Strobilus* both in leaf and cone, that is, it has five leaves in a sheath, and the cone is rather globose, not stout and rigid as the cone of *P. Montezumae*, on the other hand, to which I think Hooker and Arnott's cone and leaf both belong, having only three leaves in the sheath, and the cone, being stouter, has rarely any tendency to a curve. It is long since I have felt the slightest doubt or difficulty as to *P. Sinclairiana*. It is to me, as plainly as anything can be, both cone and leaf, an unusually large example of *Pinus ponderosa*, which again is only a large variety of *Pinus ponderosa*, the variety which differs greatly in size of cone and leaf, diminishing into the forms which I described as *Pinus Beardsleyi* and *P. Craigiana* in the north (Scott's Mountain), swelling into *P. Benthamiana* to the south of San Francisco, and still larger into *P. Sinclairiana* further to the south. *Andrew Murray, P.S.* Since writing the above I have looked into Parlato's "Monograph," and find that he has seen the thing in the same light that I do.

How to Destroy Crickets.—Your correspondent, Mr. Edwards, can get rid of his crickets by using "Penny's phosphoric paste," which any chemist will obtain for him, together with full directions for its use. There are other makers of the paste, but, after several trials, I find none so effective as this. When I took cage of these pests, some two years ago, they had become swarmed with crickets, and the *Pinus* fruits were not fit for the table through their depredations. By a few weeks' perseverance with the paste I gained the upper hand of them, and I have since kept it in use. I believe it is impossible to wholly exterminate them. *Wm. Armstrong, Woodstock House, Hendon, N.W.*

—The best preparation, and one which I can recommend for destroying crickets, is phosphorus paste. To make it, have always a quantity of phosphorus, and use *Charles Curtis, Old Charlton.* [Caution is necessary with this substance; it is effectual, but poisonous. Mind the crickets on the hearth. Eds.]

Boilers and the Frost.—Mr. Debnam, at p. 108, called attention to kitchen boiler explosions, and to the remedy, I think, to be applied, was to remove, or to near the boiler, similar to those used for steam. But it should be borne in mind that the safety valves in steam boilers are never exposed to the action of flame, whereas kitchen boilers are usually set at the back or behind the fire, and having in most cases their entire surface exposed to the action of the flame from the grate. A valve so acted upon will in the course of a few weeks' use become totally unfit to act, so as to relieve the boiler in case of extreme pressure. Several letters bearing on the same subject have recently appeared in the various London newspapers, in which one writer recommends a fusible plug, sold by a Boiler Protection Company in Manchester. I have good reason to believe that even this is not a reliable safeguard, especially in limestone districts; the end of the plug, which is screwed into the surface of the boiler, becomes coated with a deposit from the water very quickly, which thereby prevents the action of the necessary heat to cause it to melt, which latter process must take place before any generated steam can escape. Another writer proposes to fix an upcast pipe in the surface of the boiler, and carried up the flue; but under many

be found in the "fat" catalogues, but that, I have reason to believe, is their only existence in the country at the present time. For example, where I have established plants in 6-inch pots of *Hovea* and *pannosa* be procured, or scores of other fine exhibition plants which I could name? If any person can send me the two plants in question, I will willingly return a guinea for them. This will show Mr. Marshall that his proposition cannot be accepted, and, I am convinced, that there are too many experts in the gardening world for any mark to be attached which could not be removed without detection. No, no; we must have free trade in this direction, every grower procuring what he wants, and the like, with the like, the only condition being that the size of the pot shall not exceed 6 inches, and the number of plants that agreed upon. To verify the correctness of the selection and purchase, two gardeners, or a gardener and nurseryman, of undoubted respectability, should be appointed to see the plants in the locality where they are to be grown, and their report to the Council should be deemed sufficient. Whether they shall see them periodically or only at the time of purchase, is a matter for discussion. To the honest man nothing is so irksome as *espionage*, and, I understand, it is not less so to the nurseryman, the honest one. Every man who has had any experience in the cultivation of exhibition plants knows that half the success lies in the selection of good plants at the commencement, health and vigorous growing of them, and consequent success in the exhibition. When I want a dozen plants to grow on for specimens, I either go to London myself and select them, or depute some competent and trustworthy friend to do so for me. It is scarcely natural that when the selection is left to a nurseryman or his assistants that they should always be so careful and as for travellers' promises, I never trust them at all. Several years back the representative of a London firm called upon me, and, stating that they had (of course) the finest stock of Heaths and Camellias in the country, I ordered two or three dozen of each, on the condition being that if vigorous and well feathered to the base I did not care about their being large, the Camellias especially not to exceed 18 inches in height. When they arrived, the Heaths were poor attenuated things; not one of the Camellias had a branch or leaf within 18 inches of the base, and some of them were only leafless sticks. Reversing the address card, I returned them whence they came, allowing the consignors the privilege of paying carriage both ways. The man who has to grow plants should always select them for himself, and if he has only £5 to expend, he should select well, and well, and well, in travelling expenses. So convinced am I of this, that I would scarcely accept a present of hard-wooded plants unless I could select them myself. Thirty years ago, plant growing received an immense impetus from the development of the pot and shift system of cultivation, but now it has fallen into such a state of neglect that there are scarcely a dozen places in the country where collections of hard-wooded plants are grown in the best manner, and consequently to meet with a young gardener who knows the treatment of the more rare and difficult kinds is almost an impossibility. For seven months I have been looking out for men of the kind for myself and friends, and have at last obtained two. One takes charge of a select collection of plants belonging to the proprietor of the *Notts Guardian*, and the other grows plants in and about the large garden establishment in England. For such men I have almost constant inquiries from both gentlemen, gardeners, and the trade. Had I been aware that Mr. Marshall was so much interested in this class of exhibition plants, I should have been glad to have him visit the large garden business establishment. For such men I have almost constant inquiries from both gentlemen, gardeners, and the trade. Had I been aware that Mr. Marshall was so much interested in this class of exhibition plants, I should have been glad to have him visit the large garden business establishment. For such men I have almost constant inquiries from both gentlemen, gardeners, and the trade. Had I been aware that Mr. Marshall was so much interested in this class of exhibition plants, I should have been glad to have him visit the large garden business establishment.

Notices of Books.

UNDER the title *Beiträge zur Biologie der Pflanzen* (Herausgegeben von Dr. Ferdinand Cohn. Erstes Heft.) sind sechs zum theil farbige tafeln: Breslau 1870; 8vo, pp. iv. and 132" (Williams & Norgate) has lately been published an important work, which is intended to record the observations on the biology of plants which have been made in the vegetable-physical department of the University of Breslau. It contains five very interesting papers, all of which will well repay the trouble of

perusal. The first, by Dr. Schroeter, is devoted to the obscure genus *Synchytrium*, which at present has not been recorded in this country, but which will, no doubt, after the excellent indications of the paper before us, soon be a member of our flora. Meanwhile, one or two species appear in "Fucked" Plants of the Rhine," the characters of one of which, *S. mercurialis*, No. 1607, are thus given:—Tubercles, especially on the nerves of the leaves, confluent, green, depressed at the apex, with a snow-white umbilicus; spores oblong, grey, generally binate; zoospores globose, hyaline, with a single oily nucleus. The interest of the genus depends on the formation of resting-spores in the parenchyma of the mother plant, but still more in the production of zoospores armed with a single filiform appendage, and thus showing a strong analogy with *Peronospora*, though there is neither the characteristic mycelium nor the external coniferous threads. The second memoir, by the same author and Dr. Cohn, is one of importance to the cultivators of the curious tribe of Cacti, as it relates to a particular kind of rot which depends upon a slightly branched species of *Peronospora*. This should be carefully read by all our large and small growers, though it may be impossible, from the known habits of the genus, to apply any external remedy, it may be practicable to shave off the part affected as soon as the parasite makes its appearance, without any injury to the plant. We may remark that the matrix of *Peronospora* is not so generally swollen after the manner of a gall, as is stated in the text; *P. parasitica* often occurs without producing the slightest deformity. When the parts on which it grows are deformed, the swelling is sometimes if not always due to the action of a Cystopus, which often accompanies the *Peronospora*. The third memoir, by Dr. Cohn, on a parasite which occurs on the larva of *Agrostis segetum*, is again of much interest. The abundant large globose conidia, and the subsequent spores, resembling those of *Endogone*, or what, perhaps, is more to the point, of *Chionophye*, which occurs in that dreadful disease, the fungus-rot of India, but which has lately been asserted by the most accurate growers, as being entirely new, and the illustrations leave little to be desired. The fourth memoir, by Dr. Schroeter, treats of the rot which sometimes occurs in the genus *Pandanus* under cultivation. We doubt, however, whether the *Melanconium* and its attendant *Nectria* have anything to do with the disease, which commences at the crown, and has been attributed to cold. It is, however, well worthy of observation, whether the *Nectria* or *Sphaeria* which so often occur on dead branches are really the cause of decay, or whether they are subsequent growths. The decay in shoots of Currants (see p. 105) which so often exhibit the common *Tubercularia* and the *Nectria*, of which it is a mere condition, affords a good example, though others are equally obvious. The concluding memoir, by Dr. Cohn, relates to one of those curious aquatic productions which exhibit such a multitude of interesting phenomena. It is stated to be related to *Lyngbya*; but supposing this to be correct, there is certainly some reason to believe that it is a form of *Spirulina*, the yellow-brown is, however, against such an association. The paper also contains some observations on the analysis of spring water. We can conscientiously recommend the work to all who are interested in these obscure members of the vegetable world.

The fourth part, concluding the first volume of the third series of *Hooker's Icones Plantarum* (Williams & Norgate), has been issued, containing 25 lithographs of plants, chiefly subjects of botanical interest only, *Phyllanthus Grisebachianus*, a *Rubiaceae* plant, with its spiny branches, has, disregarding the flowers, a great resemblance to *Colletia cruciata*, while the pendulous flowers have something of the form of those of *Mitella*. We do not lay much stress on mimicry in plants, though we cannot gainsay the remarkable resemblance to *Colletia*. *Monococcus echinophorus* is a singular Australian plant, allied to *Phytolacca*, and representing in Australia the American genus *Petiveria*. Unlike most of its allies, this plant has but a single carpel. *Buttonia natalensis* is apparently an exceedingly handsome climber, or trailer, with the foliage of some *Bignonia*, and flowers resembling some of the *Passifloras* of the Dutch East India. It should take note of this, and introduce it into our gardens forthwith. We are glad to see that several *Rubiaceae* are illustrated, as that order is much in need of such elucidation.

—Under the title *Flora*, a Dutch publisher issues a quarto series of coloured lithographs of garden plants, with descriptive text, by Mr. Witte, the Curator of the Botanical Garden, Leyden. The drawings, by Mr. Wendel, are spirited and faithful; altogether the best specimens of chromo-lithography that we have seen from Holland. The plants are mostly well-known garden favourites, chosen apparently for their beauty. The part before us contains 44 quarto plates, with 176 pages of text (Dutch), may be had from Messrs. Williams & Norgate, at the price of 36s. It would form a beautiful table-book.

—The *Gardener* for February contains some capital practical articles, including one (illustrated) on succulents as bedding plants. A list of suitable plants

is given, which cannot fail to be useful.—The *American Horticulturist* contains a greater variety of interesting articles than usual, and is written throughout in a pleasant chatty style. Mr. Robinson's remarks on horticultural prospects are quoted with approval.—The current number of the *Florist and Pomologist* contains a coloured figure of the double-flowered variety of *Lilium tigrinum*, a good article on the culture of *Tritoma Uvaria* by Mr. Earley, one on pyramid Peas and Apples by Mr. Tillery, and other serviceable matters.—The *People's Magazine* contains some unusually interesting illustrations, such as the boring machine in use in the Mont Cenis tunnel, illustrations of the new Pacific Railroad, of which we read so much just now, and views of some of the historic interest to all time at Sedan and elsewhere.—

Pharmaceutical Journal gives the continuation of Mr. Stoddart's paper on the Medicinal Uses of Plants; an article of Mr. C. Cooke's on a drug furnished by *Hyedichium spicatum*, &c.—*Asiatic Journal* (Bell & Daldy), edited by a well-known lady naturalist, continues to merit the hearty approval of the little folks for whom it is intended. It is an admirable publication for our children. The present number contains an article on the value of the Editor, and a fable translated from the Danish—"The little tree which was discontented with its leaves"—the moral of which is excellent.—The *Journal of Botany* increases in interest and value. In addition to "critical" articles of great service to British botanists, there are in the present number a continuation of Mr. Baker's monograph on the genus *Xiphophora* (Fries). The correspondence columns gain greatly by constant and useful, and the kind of reports so given an alphabetical catalogue of the new genera and species of plants published in British periodicals for the year 1870. This will prove a most valuable record, and we heartily thank the Editors for this interesting addition to their journal. Doubtless there were good reasons for not including the *Journal* of the Linnean and other societies in the list, and for confining the record to those publications which may be supposed to have a comparatively limited circulation among botanists. Still, we believe the Editors would have done well to have included reference to all the newly described plants of the year, wherever published, even if from considerations of space, mere citations, without the accompanying descriptions, had been given.—The plants figured in the current number of the *Botanical Magazine*, and to which we shall allude more fully at another time under the head of Plant Portraits, are *Amayllis Rayneri*, *Gladiolus dracocephalus*, *Cirsium Grahami*, *Fogogone Douglassii*, and *Cyrtanthera chrysostephana*.

Florists' Flowers.

(Continued from p. 131.)

RESUMING the sketch of the novelties of the past year, commenced at p. 78, I have to remark that one of the most popular of the new flowers of the year will be Mr. Parsons' white-flowered Giant Mignonette. Whenever it has been shown it has gained a First-class Certificate. It will amply repay pot culture, and be a welcome addition to the greenhouse and conservatory.

A kind of spasmodic attempt was made at the early part of the summer to bring bedding Pansies to the fore, and a sort of craze was set on foot, and there came a hot, dry summer, which literally roasted the plants up, and the occupants of many a bed were stricken down with a pestilence. Even the bedding *Violas* had to succumb in many instances, how could the less wiry Pansies stand the severe test? Messrs. E. G. Henderson & Son's Golden Bedder (which, by the way, appears to be identical with Cloth of Gold as sent up by Mr. T. S. Ware) received a First-class Certificate; it is a fine yellow, set well, and bedding qualities have not been met to the test. The First-class Certificate given to Mr. Hooper for his two fancy Pansies, Mrs. Shirley Hibberd and Sunshine, were among the surprises of the year. For the past two or three years I have noted the former as a washy, worthless flower, thin in texture and dull in colour; the former had a muddled appearance, and is in size and colouring inferior to many of the fancy Pansies in cultivation. Besides, the habit of growth of the fancy Pansy is, as a general rule, much against its usefulness as a bedding plant. In Charbel, a new white self Pansy, commended as a bedding variety, could be seen by any one having a knowledge of Pansies, our old friend Great Eastern, under a new name. The praise bestowed on it, however, was fully deserved, for it is the best early-blooming white bedding Pansy in cultivation. Of fine fancy kinds, Messrs. Downie, Laird & Laing, as is their wont, offer what is said to be a very fine batch of new flowers.

The new *Nealagium* have already been described in these columns. In *Admiration*, *Charlemagne*, *Iron Duke*, *May Day*, *Pollie*, and *Syren*, Mr. Foster gives us six magnificent flowers; and the same may be said of *Duke of Edinburgh*, *Exemplar*, *Holkar*, and *Magnificent*, the productions of Mr. Hoyle. Mr. Wiggins followed suit with a batch of 18 new varieties.

New Zonal *Perlagiums* were not so plentiful as in former years; but it becomes more and more difficult year by year to detect wherein they are improvements on existing kinds. Raisers still produce them; certifi-

* Contributed to the *Biologie of Plants*. Edited by Dr. Ferdinand Cohn. First Part, with six partly coloured plates.

cates are still given, though with a sparing hand; but the floral enthusiasm they once evoked is subsiding, and they are even being elbowed from the flower garden. But one First-class and two Second-class Certificates were given during 1870, though there were many new varieties. The higher award went to Master Christine (Cannell), having the habit of the old Christine, but with a bright rosy-pink hue on the flowers. King of Trumps (Eckford), bright pale orange-scarlet; and the Magnificence (Benson & Son), a strange-scarlet, each received the lower award. Mr. George and Dr. Denny both exhibited fine and promising flowers; of those raised by the latter, Mr. W. Paul distributes six varieties. From the Continent as well as from English raisers there are constantly arriving new varieties of the double-flowered section; and if numbers necessarily implied improvement, there would be no lack of it. In Crown Prince Mr. Cannell has a fine new pink variety of undoubted merit; and his King of Doubles is said to be equally good. Perfection (W. Paul) is reported to be the deepest coloured of all the pink-flowered doubles. Besides these, none of the others have put in appearance as new kinds.

The Nosegay section is now as numerous as the Zonals, and quite as perplexing; while this unhappy feeling shows itself in another direction, and people are found anxiously asking what is a Nosegay? and what a hybrid Nosegay Perfection? Who shall say? New classifications of the sections are indeed suggested, so as to improve on the present indiscriminate nomenclature of the different groups, for a general bewildering prevails. Likewise from some country horticultural societies, who, following the lead of the Royal Horticultural Society, have placed in their schedules a class for "Zonal Perfectionisms," comes a wail of complaint that their exhibitors cannot comprehend this satisfactorily; they have no difficulty in understanding Madame Vaucher as a Scarlet and Christine as a Zonal Geant, and they beg for a return to these terms. Of new Nosegays, the very best are David Garrick (Bell & Thorpe), with fine deep crimson flowers; George Peabody (Downie & Co.), brilliant deep scarlet, very rich in colour; Pink May Queen (Downie & Co.), the flowers of a charming hue of deep pink; Pride of Surrey (George), deep fiery crimson; and W. E. Gladstone (G. Smith), crimson-scarlet, dashed with carmine on the edge of the petals.

In the Gold and Bronze section, the most striking additions are the Black and Downie & Co., Mrs. John Lee (J. & C. Lee), awarded a First-class Certificate by the Floral Committee; and Reine Victoria (Downie & Co.). The last-named was finely shown at one of the exhibitions at the Crystal Palace. The Variegated Zonal section, notwithstanding the charge of sameness, has, during the past year, received an accession of four fine varieties, each of which received First-class Certificates, viz., the Rev. E. R. Benyon (Grieve), Lothario (Carter & Co.), Miss Goring (E. C. Henderson), and Ealing Rival (Stoddard); all of which were shown in superb condition and finely coloured. Of Silver-edged Variegated Zonals, Princess Beatrice (W. Paul), and Mrs. Rousby (C. Turner), are very promising. Of the ordinary variegated section, i.e., the leaves green, edged with cream or white, Mr. W. Paul received a First-class Certificate for Avalanche, a capital companion to Waltham Bride, like the older variety having a short-jointed vigorous habit, with flowers of a pure white. Ivy-leaved Perfection Queen (Carter & Co.) a strong growing variety, having the leaves edged with, and some altogether yellow. It is very distinct in character, and therefore of value in a collection.

If there is one hardy flower that more than another deserves, and is destined, to rise in popular estimation, that flower is the Penstemon. The advance made during the past few years has been something remarkable, and Continental, in common with home-grown flowers, show the marks of improvement. I think I am right in stating that the Royal Horticultural Society offers prizes for cut spikes of Penstemons at one of their summer shows—this is a step in the right direction, for spikes of Penstemons will make a very attractive exhibition. Notwithstanding the rapidity with which new varieties of Penstemons appear, it is rarely, indeed, that one of them puts in appearance at a show. To be thoroughly appreciated, they require to be seen growing in beds, as Mr. Laing has them at the Stunton Nursery, Freston Hill. They are a pleasant sight, and a great treat to the florist. Messrs. Downie, Laird & Laing offer Colonel Long, Delicetissimus, George Arner, Lady Boswell, Magenta, Novelty, Rev. C. Peach, Pollie King, Stansfield Rival, and W. E. Gumbelton; a capital group of ten varieties, every one of which will repay cultivation.

Not less appreciable is the new batch of herbaceous Phloxes, of the Decussata section, to be distributed by the same firm. There is a special fitness in the production of this batch of flowers, till now, apart from their intrinsic value as varieties, inasmuch as one of the results of the war in France will probably be to lessen the number of new varieties of the herbaceous Phlox usually received from the Continent. Out of a batch of seedlings that scarcely contained an indifferent flower, Mr. Laing selected A. F. Barron, bright lilac, with large crimson centre, the flowers of very fine quality; Flora M. Naby, delicate rosy-pink, with rich

glowing magenta eye; Lothair, pale scarlet, shaded with greyish-lilac, distinct and lilac; Miss Macrae, pure white, with dark purplish-crimson centre, extra fine; Mr. Laing, delicate soft rosy-lilac, a lovely variety; and Princess Louise, pure white, with a striking rosy-carmine eye.

Mr. Turner has quite a wealth of new Picotees, and makes up a list of seven varieties he is to send out in the coming spring, or, at least, some of them. Of these, there is one red-edged flower, named Linda (Fellows), a light-edged flower, of good size and substance. The remainder are included in the rather numerous division of rose and scarlet-edged flowers, and of these, Ne Plus Ultra (Payne), a heavy, pale rose-edged flower, with stout and finely-formed petals and good substance, received a First-class Certificate from the Floral Committee at Oxford. The others in this division are Coronet (Fellows), Empress Eugénie (Kirtland), Pauline (Fellows), Purity (Payne), and Queen of Roses (Gibbons).

Of new forcing Pinks, Messrs. E. Shenton & Co. received a First-class Certificate for Flower of Eden, of a pale cream colour, and by many considered not to merit the award made to it. Mr. T. S. Ware had at some of the spring shows a forcing variety named Mrs. Pettifer, the flowers, not large in size but produced with great freedom, white, with rosy-crimson blotches in the centre. Of the show type Mr. Turner has Eustace, Mildred, Sabina, Sebastian, and Scerb, all fine varieties of large size and well-laced.

The way of Primulas, a First-class Certificate was awarded to Turner for a striped semi-double variety named Semi-duplex striata, with stripes and spots of pale rose on a white ground. Such a distinct species as *P. verticillata simensis*, shown under the name of P. Conti, and awarded a First-class Certificate, so richly deserved this award, and will in all probability prove so useful for cross-breeding purposes, that no one could take exception to the action of the Floral Committee.

The Tropaeolum as a bedding plant is not to be suffered to die out, as a new batch of five varieties will shortly be sent out by Mr. Thomas Thornton. Of these Etina and Vesuvius are trailing varieties, the former with vivid crimson, the latter with rich bright orange-crimson flowers; while Compactum coccineum majus, Lustrus, bright rosy-crimson, a very effective variety; and Yellow Dwarf, bright yellow with slight crimson spots, belong to the Compactum type. A dry season is said to be inimical to the duration and effectiveness of bedding Tropaeolums. This was scarcely corroborated even in an exceptionally dry season like that of 1870.

On this soil, or in very exposed positions, they failed, but on moderately good ground, where they were planted early, they made an early growth, which being somewhat dense in character, kept the soil cool about the roots of the plants, and thus preserved the floral effects. The Tropaeolum is likely to be in much request for bedding purposes, especially as we are tiring of the well worn but rather surfeiting bedding Pelargoniums.

The Verbena raisers continue to ply their peculiar avocation, notwithstanding its oft-vaunted depreciation. That Mr. Perry should take four First-class and one Second-class Certificate, and Mr. Eckford three First and one Second-class Certificate, is a pretty sure indication that our florists are still moving along the path of improvement with the Verbena. John Laing, Mrs. George Prince, Perfection, and the Rev. C. Peach were the varieties in Mr. Perry's batch that received the highest award, and Mrs. Boulton the lower. In Mr. Eckford's case he got two Certificates, one for a class for George Peabody, Mrs. Dods, and Peter William, and a Second-class for Miss Charlotte Mildmay. Each succeeding year adds to our stock of bedding varieties some two or three at least of good useful flowers for the purpose, and the Verbena appears likely to be much more thought of in the flower garden in the time coming than in the time present.

In Mr. Robert Parker's fine type of Viola lutea grandiflora named major, we get a good useful summer and spring bedding plant. These varieties of Viola lutea grandiflora are almost inexhaustible bloomers; one named Yellow Dwarf has remained in full bloom throughout the winter, and during the hardest frost, and will be a "bright gleam of pure yellow" during the spring.

Another most useful yellow-blooming plant for spring work is Mr. W. Ingram's fine type of Belvoir Yellow Dwarf Wallflower, of a dwarf branching growth, and very effective, being so free-blooming. With some such a strain Mr. W. Paul took a First-class Certificate at one of the spring shows of the Royal Botanic Society, under the name of Waltham Dwarf Yellow. A distinct class-blooming Wallflower had previously been shown by Messrs. Carter & Co., under the name of Yellow Tom Thumb; and it is hardly possible that the three could vary very much. I see no difference between them, but under what name obtained, it will be found of great service to spring gardeners. R. D.

Obituary.

WE greatly regret to have to record the decease, a few days since, of Dr. MIQUEL, Professor of Botany in the University of Utrecht. Professor Miquel occupied high rank among systematic botanists for many years. His publications are numerous, and mainly devoted to

the elucidation of the plants of the Dutch possessions in the Indian Archipelago, in Surinam, as well as to the flora of Japan and of New Holland. Besides these undertakings, for which Prof. Miquel enjoyed special advantages, we may mention numerous monographs on particular families, such as those on the Figs, Peppers, Cycads, Casuarinas, &c. Prof. Miquel's services to botany were by no means confined to his public writings; on the contrary, he was ever willing to communicate freely from his stores information to all applicants, and in the distribution of specimens proved himself most liberal. Botanists will feel that they have lost by the decease of Prof. Miquel not only a distinguished collaborator, but a most amiable, kind-hearted friend.

THE WEATHER.

STATE OF THE WEATHER AT BLACKHEATH, LONDON, FOR THE WEEK ENDING WEDNESDAY, FEBRUARY 1, 1871.

1871. MONTH AND DAY.	Reading of				At 9 A.M.			
	Barometer reduced to 32° Fahr.	Dry Ther- mometer.	Wet Ther- mometer.	Dew Point.	Hygrometrical Deduction from Glaisher's Tables, 5th edition.	Degree Humidity.	Weight of Vapour in a Cubic Foot of Air.	
January and Feb.								
	Inst.	Deg.	Deg.	Deg.	Deg.		Gr.	
26. Thurs.	29.86	28.3	27.8	25.8	77	90	1.6	
27. Friday	30.04	29.8	29.8	28.5	77	91	1.4	
28. Satur.	30.04	29.8	28.1	27.7	74	94	1.4	
29. Sunday	30.02	31.2	31.3	30.5	80	80	2.0	
30. Monday	30.02	31.2	31.2	30.5	81	80	1.6	
31. Tues.	30.02	29.7	28.6	25.0	82	77	1.7	
1. Wednes.	29.97	31.3	30.5	25.0	80	80	1.9	

1871. MONTH AND DAY.	TEMPERATURE OF THE AIR.				WIND.		RAIN.
	Highest.	Lowest.	Range in 24 Hrs.	Mean.	Direction.	Horizontal Movement.	
January and Feb.							
	Deg.	Deg.	Deg.	Deg.	Miles per Hour.	Inches.	
26. Thurs.	34.2	25.8	8.4	29.3	N.E.	300	0.01
27. Friday	34.8	25.8	9.0	29.7	N.E.	300	0.00
28. Satur.	33.4	25.4	8.0	29.4	N.E.	215	0.00
29. Sunday	35.7	27.2	8.5	31.4	N.E.	145	0.00
30. Monday	32.7	23.0	9.7	27.8	N.E.	185	0.00
31. Tues.	33.7	23.3	10.4	27.1	N.E.	210	0.00
1. Wednes.	36.6	29.0	7.6	32.5	E.	345	0.01

Jan. 26.—A very fine day. Generally cloudy. Snow fell lightly in the afternoon.
 — 27.—Variable, very fine day; generally cloudless at night.
 — 28.—(Overcast throughout. A little fine snow fell occasionally.
 — 29.—A generally fine day, though cloudy. A little fine snow fell.
 — 30.—Overcast; this snow fell almost continuously throughout the day, but ceased about 9 P.M.
 — 31.—Overcast till night, then variable. Generally fine.
 Feb. 1.—Overcast. Snow fell in the morning, and thin rain at night.

TEMPERATURE OF THE AIR AND FALL OF RAIN AT DIFFERENT STATIONS.

DURING THE WEEK ENDING SATURDAY, JANUARY 28, 1871.

NAMES OF STATIONS.	TEMPERATURE OF THE AIR.				FALL OF RAIN.			
	Highest.	Lowest.	Range of 24 Hrs.	Mean of all.	Highest.	Lowest.	Range of 24 Hrs.	Mean.
Portsmouth	34.2	25.8	8.4	29.3	34.2	25.8	8.4	29.3
Blackheath	34.2	25.8	8.4	29.3	34.2	25.8	8.4	29.3
Birmingham	34.2	25.8	8.4	29.3	34.2	25.8	8.4	29.3
Bristol	34.2	25.8	8.4	29.3	34.2	25.8	8.4	29.3
Wolverhampton	34.2	25.8	8.4	29.3	34.2	25.8	8.4	29.3
Nottingham	34.2	25.8	8.4	29.3	34.2	25.8	8.4	29.3
Sheffield	34.2	25.8	8.4	29.3	34.2	25.8	8.4	29.3
Nottingham	34.2	25.8	8.4	29.3	34.2	25.8	8.4	29.3
Leeds	34.2	25.8	8.4	29.3	34.2	25.8	8.4	29.3
Liverpool	34.2	25.8	8.4	29.3	34.2	25.8	8.4	29.3
Manchester	34.2	25.8	8.4	29.3	34.2	25.8	8.4	29.3
Salford	34.2	25.8	8.4	29.3	34.2	25.8	8.4	29.3
Bradford	34.2	25.8	8.4	29.3	34.2	25.8	8.4	29.3
Sheffield	34.2	25.8	8.4	29.3	34.2	25.8	8.4	29.3
Hull	34.2	25.8	8.4	29.3	34.2	25.8	8.4	29.3
Newcastle	34.2	25.8	8.4	29.3	34.2	25.8	8.4	29.3
Edinburgh	34.2	25.8	8.4	29.3	34.2	25.8	8.4	29.3
Glasgow	34.2	25.8	8.4	29.3	34.2	25.8	8.4	29.3
Dundee	34.2	25.8	8.4	29.3	34.2	25.8	8.4	29.3
Cardiff	34.2	25.8	8.4	29.3	34.2	25.8	8.4	29.3
Paisley	34.2	25.8	8.4	29.3	34.2	25.8	8.4	29.3
Greenock	34.2	25.8	8.4	29.3	34.2	25.8	8.4	29.3
Leith	34.2	25.8	8.4	29.3	34.2	25.8	8.4	29.3
Perth	34.2	25.8	8.4	29.3	34.2	25.8	8.4	29.3
Dublin	41.5	25.8	15.7	...	...	...	...	34.0

JAMES GLAISHER.

Miscellaneous.

PANSIES.

WHEN the earliest south winds softly blow
 Over the brown earth and the waning snow
 In the last days of the disrowned March—
 Before the silver tassels of the Larch,
 Or any timid bud or blade is seen,
 Or in the woods the faintest kindling green,
 And all the earth is veiled in azure mist,
 Waiting the far-off kisses of the sun,
 They lift their bright heads shyly, one by one,
 And offer, each in cups of amethyst,
 Drops of the honey-wine of fairy land.
 A brimming beaker poised in either hand,
 Fit for the revels of King Oberon,
 With all his royal gold and purple on
 Children of pensive thought, and airy fancies.

be appearing above ground, and to bloom them in perfection, if in beds, throw hoops over them and cover them in frosty and bad weather with mats and canvas. If they are planted in patches in the open border cover them with large pots or hand-glasses. *J. D.*

Notices to Correspondents.

BLACK GRAPES: *A Constant Subscriber*, 1. Lady Downe's Seedling, black. 2. Black Alicante, black. 3. Old-acre's West's St. Peter's, black. 4. Madresfield Court, black. You may add—5. Trebbiano, white. 6. White Tokay, white.

BOOKS: *W. D.*, "Brown's Forester," or "Grigor's Arboriculture." We know of no book that gives accurate rules for judging seed and grain samples.

CLOSE PRUNED VINES: *Jones*. We cannot tell. If you have left any buds at all, we should say you will. It in a great measure depends on the proper maturation of the wood of last year.

CYPRESSUS MACROCARPA: *E. L. G.* There can be no doubt as to "dimorphism" of the leaves of most cypresses and many junipers. The first leaves on the young plant, and often the leaves of young shoots, have the juniper character, while the older assume the cypress character. These junipers leave so much alike in all species in which they occur, that it would be presumption to attempt to say from a specimen of them what the species is to which it belongs.

We therefore cannot give an opinion upon the young leaves sent, but the nurseryman to whom the plant was obtained is a man of position, and with a character to lose, we should have no hesitation in trusting to his assurance. *A. M.*

FRUIT TREES AND RABBITS: *C. C.* asks if any of our correspondents will kindly inform him of a good preparation to rub on young fruit trees to prevent their being barked by rabbits.

FUNGUS: *H. M.* The Fungus on the leaf of a Passion-flower is Sclerotium durum, a state probably of Polystictus vulgaris, or some closely allied species. *M. J. B.*

INSECTA: *F. Z. L.* Linnaeus gave uniform terminations for the specific names of the smaller groups of moths (*aria* and *ata* for the Geometers, *alis* for the Pyrales, *ana* for the Tortrices, and *ella* for the Tineæ), merely as a kind of *memoria technica*, the last of which names, for the tiny moths, as an ordinary diminutive, they have suggested. *W. H. F.*—*W. H. F.* On the leaf of your Australian tree (could you not send us its name?) is a minute scale like that of the Oleander; careful washing of the leaves with hot water is one of the best remedies. If you could entirely plunge the tree in water for 24 hours it would be even still better. *J. O. W.*

NAMES OF PLANTS: *J. T. P. H., Kent*. A species of Calliopera, of which we will give you the specific name next week. It is a deciduous shrub, native of Japan.—*R. C.* We cannot undertake to name plants from fragments of leaves. *W. M.* Oneidium uniformis, term. Rebh, f. (Lindl. Fl. Orchid. 64, Oneidium).—*K. & S.* 1, Adiantum Cunninghamian; 2, a cut-leaved form of Adiantum Capillus Veneris.—*A Constant Subscriber*. Phajus maculatus.

PLANT CULTURE ON SLATY SOIL: *W. Tanner*. A full reply to your questions will be given in our next.

RATES: *Cheltenham* writes—"I have a nursery garden, which I rent; there is a cottage, which I erected on it myself, rated at £11 per annum. The ground and cottage together are rated at £11 10s., and which I have been paying all the same. I am about to let the cottage and land were a dwelling-house. I find my neighbours have made a move in the matter. I thought, however, I should like to have your opinion as to my rate of paying the full amount. I have spoken to the tax collector, and he also thinks for land there is no deduction made, and the cottage would be in full payment of rates." On the same subject *A Constant Subscriber* writes—"I have been anxiously looking for an answer to 'J. G.'s inquiry in *Gardeners' Chronicle* of Dec. 17, 1870, respecting the taxation and local rating of glass structures used by nurserymen and market-gardeners, as at this time, being interested in the rating of such structures, any legal decisions on the above subject, from any of your numerous correspondents, would be thankfully received."

RESPONSE TO CORRESPONDENT: *Correspondent* who has been unsuccessful in this matter requests that those more experienced than himself would favour him through our columns with their method of procedure. VINEY BUILDING, &c.: *An Old Subscriber*. No.

CATALOGUES RECEIVED: Little & Ballantyne, Descriptive Catalogue of Garden, Flower, and Farm Seeds, and Garden Implements.—J. Backhouse & Son, Catalogue of Hymenophyllus and Trichomanes.—E. G. Henderson & Son, Catalogue of Flower Seeds for the Garden, Greenhouse and Stove.—Hogg & Wood, Spring Catalogue of Vegetable and Flower Seeds.—S. Dixon & Co., Select List of Vegetable and Flower Seeds.

COMMUNICATIONS RECEIVED: W. S.—T. B.—V. R.—C. Adam—J. W. (write to the Publisher)—A. H. P.—T. W. G. F. M.—H. K.—W. I.—A. Subscriber.—B. B.—W. W. I. L. P. the address is Wellington Place, Carlisle.—G. P.—J. A.—H. G. Rebb.

Markets.

POTATOS.—*Southwark*, Jan. 30.

During the last week the arrivals of potatoes and by rail have been large and still greater than the demand. The trade sold at the following quotations.—Yorkshire Flukes, 90s. to 100s.; Yorkshire Regents, 70s. to 80s.; Lincolnshire do., 70s. to 75s.; Dunbar and East Lothian do., 75s. to 85s.; Perth, Forfar, and Fishershire do., 65s. to 70s.; Kent and Essex do., 60s. to 65s.; do. Rocks, 55s. to 60s.

COVENT GARDEN.—Feb. 3.

The market for Vegetables is becoming very thin, and good vegetables are comparatively scarce, especially all sorts of saladings. Abundance of common Apples are still offered, and we have had considerable importations. Amongst flowers we have Orchids, Heaths, Cyclamens, Primulas, Hyacinths, Tulips, Camellias, Lily of the Valley, Pelargoniums, and *Cyrtus racemosa*.

FRUIT.

	s. d.	s. d.		s. d.	s. d.
Apples, p. 3½	1	0	to 2	0	0
Grapes, per lb.	1	0	to 10	0	0
Lemons, per 100	1	0	to 10	0	0
Melons, each	1	0	to 3	0	0

VEGETABLES.

	s. d.	s. d.		s. d.	s. d.
Artichokes, Jerus.	1	0	to 2	0	0
Asparagus, p. bundle	4	0	to 10	0	0
Beet, per doz.	1	0	to 10	0	0
Brussels, 4½ doz.	1	0	to 10	0	0
Cabbages, p. doz.	1	0	to 10	0	0
Carrots, p. bunch	4	0	to 10	0	0
Cauliflowers, p. doz.	1	0	to 10	0	0
Celery, rough, p. fan	6	0	to 10	0	0
—white, do.	1	0	to 10	0	0
Combers, each	2	0	to 3	0	0
French Beans, p. bush	1	0	to 10	0	0
Potatoes, Regents, per ton	70	0	to 80	0	0
—Rocks, 100 to 600.					

PARTNER WANTED, in an old-established Nursery, where there is a quantity of Glass. A good opening for a steady practical Man, with a small capital.—*N. F.* Post Office, Cumberland Green, London, S.E.

WANTED, as PARTNER, an active GARDENER, in a small Nursery, Florist, and Jobbing Business in Islington. Long Moss, Essex, cash consideration. *R. B.* 39, Rathfield Street, Islington, N.

WANTED IMMEDIATELY, an active Young Man, as FOREMAN in a large Forcing establishment, near London. He must thoroughly understand the forcing department in all its branches, and able to Manage Men. Wages 4s. per week, with fire and board. Apply to *W. H. F.* MILLER and MONRO, Fruit Salesmen, Covent Garden, London, W.C.

Head Man Wanted for Cows and Pigs. WANTED, a HEAD MAN or WORKING FOREMAN, on a small Stock Farm, near London. Must have been accustomed to the management of Cattle and a few head of Stock. There is a good four roomed cottage, and garden, and further advantages. As this is a good place, it is requested that but good Men will apply. By letter only. *GARDENER*, care of Everett & Sons, Royal Exchange, London, E.C.

WANTED, an educated GARDENER.—The Advertiser is looking for his GARDENER, after 12 years' service, on seeking a vacant GARDEN. The GARDENER required must have had experience in Growing Fruits and Flowers, Superintending the Cultivation of the Garden, and the Management of the Accounts.—Address, stating age, last occupation, and how long it was, to the Advertiser, 10, Abchurch Lane, London, E.C. and wages expected, to *Z.*, Calder & Co., 1, Bathurst Street, Hyde Park Gate, London, W.

WANTED, a practical WORKING GARDENER, thoroughly skilled in the Culture of Camellias, to bring forward Six Large Houses of these Plants and train them in the best manner. Must be a good Propagator of Ferns, and will be required to assist in the management of the Garden. Applicants must have had experience under, and refer to, well known Gardeners. Must have required to state length of service, age, and wages expected. Without further delay, please send your letters will not receive attention.—*Major Walter*, Wallasey, Cheshire.

WANTED, an active MAN, as SOFT-WOODED PROPAGATOR, and to take charge of young Stock. Progressive work will be given. The Manager to apply by letter, in the first instance, to *E. S. WILLIAMS*, Victoria and Paradise Nurseries, Upper Holloway, London, N.

WANTED for the Houses where Plants are grown for Market, an active YOUNG MAN, 18 to 20 years of age, some experience in Growing Stove Plants, Ferns, &c. Progressive work will be given to a suitable person.—*GEO. CLARK*, Rochester, London, S.E.

WANTED, a steady, energetic YOUNG MAN, to Assist in the Houses.—One accustomed to Plants, and a good Soft-wooded Propagator, and that has been in a Market Nursery preferred.—*RANSLEY TANTON*, The Nurseries, Epsom.

WANTED IMMEDIATELY, a young MAN as ASSISTANT, possessing a general knowledge of the Seed Trade, and willing to sell, and to be engaged in the general work of Shop or Warehouse. None need apply whose character will not bear the strictest investigation. Apply in own handwriting, stating particular experience, to *JOHN WATKINS*, Nurseryman and Seedsmen, Boston.

WANT PLACES. Letters to be Post Paid.

To Gardeners and Bailiffs (Head, Foremen, or Under). *JAMES CARTER* and CO. having many applications for the above, request that those WANTING SITUATIONS will send NAME, ADDRESS, and COPIES of TESTIMONIALS, to the Advertiser, 10, Abchurch Lane, London, E.C. and send unquestionable references need apply. Any Lady or Gentleman requiring more particulars, or BAILIFFS may rely upon *J. CARTER & CO.* supplying the most stringent regulations in reference to testimonials as to ability, honesty, &c.

Gardeners. *B. S.* has his own GARDEN, and REGISTERED MAN. Men of the strictest integrity, thoroughly qualified to undertake the duties of GARDENER, Ladies or Gentlemen requiring such may rely upon *B. S.* recommending only those whose conduct and abilities are worthy of their trust. Victoria and Paradise Nurseries, Upper Holloway, London, N.W.

EXPERIENCED GARDENERS (or as GARDENER and BAILIFF), of various qualifications, recommended to *HENDERSON AND SON*, Wellington Nursery, St. John's Wood, N.W.

To Nomenclators and Gentlemen. *GARDENER* (HEAD).—Age 31, single; of strict integrity and ability, and is a frequent and experienced cultivator of a thorough practical knowledge of Forcing Fruits, Flowers, and Vegetables, and the Management of extensive Flower and Kitchen Gardens, and is strongly recommended by many of the most respectable employers.—Apply in first instance, to *Mr. MOORE*, Head Gardener to the Right Hon. Earl Brownlow, Belton House, Grantham.

GARDENER (HEAD).—Age 35, married; considerable experience in all the requirements of a good place. Very highly recommended.—*HYV.* Victoria Nursery, Upper Holloway, N.W.

GARDENER (HEAD).—Age 30, married; a fine family; thoroughly understands the profession. No single-handed place accepted. Good character.—*E. D.* Bell's, New Agents, Hurmeston & Son, Highgate Nurseries, London, N.

GARDENER (HEAD).—Age 40, married; requires a comfortable situation. Thoroughly practical in every department. An excellent character from the family he has served six years. No single-handed place accepted. First-class references.—*C. E. J.* Messrs. James Dickson & Sons, 102, Eastgate Street, Chester.

To the Nobility and Gentry. *GARDENER (HEAD).*—Age 34, single; possesses an extensive and thoroughly practical knowledge of modern and the most approved system of Gardening in all its branches, Landscape included. A Garden of some scope, and where the same is cherished, and good references. The Obvious. *W. H. F.*

GARDENER (HEAD).—An energetic, thoroughly competent, practical Man, of many years' experience, is open to engage with any Nobleman or Gentleman requiring the services of a well-qualified Gardener. Excellent character. First-class references.—*C. E. J.* Messrs. James Dickson & Sons, 102, Eastgate Street, Chester.

GARDENER (HEAD).—Age 35, married; first-class Cultivator of Stove and Greenhouse Plants, Orchids, Ferns, &c.; successful in Growing and Forcing Grapes, Pines, Peaches, Melons, and Cucumbers, &c. Good references.—*H. BARNARD*, The Gardens, Warden Hall, Huntingdon, Cambs.

GARDENER (HEAD).—*WM. MILFORD* is now open to engage with any Nobleman or Gentleman requiring a thorough practical Orchid Grower, also Stove and Greenhouse plants, and Kitchen and Flower Garden. Has been successful in the leading Prizes at the London exhibitions.—*WM. MILFORD*, Albert Place, Haverlee, Essex.

GARDENER (HEAD).—Age 38, married; has had a considerable experience amongst Orchids, and is a good Cultivator of Plants and Fruits of every description. Over twenty years' character.—*W. H. F.* Messrs. James Dickson & Sons, 102, Eastgate Street, Chester.

GARDENER (HEAD).—To any Nobleman or Gentleman requiring a thoroughly practical Gardener, in every branch of the profession, including Early and Late Forcing. A good Plantsman. Can be highly recommended. Good references.—*W. H. F.* Messrs. James Dickson & Sons, 102, Eastgate Street, Chester.

GARDENER (HEAD).—*J. H. S.* is desirous of engaging himself to any Lady or Gentleman requiring the services of a thoroughly practical Gardener, in every branch of the profession, including Early and Late Forcing of all kinds of Fruits, Flowers, and Vegetables, and general management of the Garden. Highest testimonials as to character and ability.—*J. H. S.*, 31, Bishop's Road, Brighton.

GARDENER (HEAD), or GARDENER and BAILIFF.—Age 34, married, two children; has a thorough practical knowledge of the profession in all its various branches. Upwards of 20 years' character.—*W. H. F.* Messrs. James Dickson & Sons, 102, Eastgate Street, Chester.

GARDENER (HEAD, WORKING).—Age 40, married; a first-class Grower of all kinds of Forced Fruits, Flowers, and Vegetables, and general management of the Garden. Has had extensive experience in the cultivation of Stove and Greenhouse Plants, and the general Management of a well-conducted Garden Establishment.—*W. H. F.* Messrs. James Dickson & Sons, 102, Eastgate Street, Chester.

GARDENER, or COACHMAN and GARDENER.—Age 34, married, two children; has a thorough practical knowledge of the profession in all its various branches. Upwards of 20 years' character.—*W. H. F.* Messrs. James Dickson & Sons, 102, Eastgate Street, Chester.

GARDENER (UNDER, or SINGLE-HANDED).—The RECTOR of CHESTER is anxious to procure a place as above for a respectable young Man.

GARDENER (UNDER), in the Houses preferred.—Has been three and a half years' good character.—*H. B.* Mr. Notte, Stationer, 10, Abchurch Lane, London, E.C.

NURSERY FOREMAN and PROPAGATOR.—Is a first-class Salesman, and thoroughly qualified in every respect. No objection to travel. Good references.—*A. B. C.*, *Gardener's Chronicle*, W.C.

FOREMAN.—Age 26; 10 years' experience in Early and Late Forcing of Fruits, Flowers, and Vegetables; also the management of the Garden. Good references.—*W. H. F.* Messrs. James Dickson & Sons, 102, Eastgate Street, Chester.

FOREMAN, or UNDER GARDENER.—Age 23; used to Forcing Early and Late Vineries, Cucumbers and Melons, and Stove and Greenhouse Plants. Two and a half years' experience in the management of the Garden. Good references.—*W. H. F.* Messrs. James Dickson & Sons, 102, Eastgate Street, Chester.

PROPAGATOR (GENERAL), or FOREMAN and GARDENER.—Age 27, single; well up in Budding and Grafting. Twelve years in the Trade.—*W. L.*, 13, Frederick Street, Wandsworth, Road, S.W.

To Nurserymen. **PROPAGATOR, or GROWER** (Stove and Soft-wooded, &c.).—Age 31; good reference.—*G. FIELD*, Grove, Sandringham, Norfolk.

STEWARD, or BAILIFF and GARDENER.—Age 43; thoroughly practical. Understands all modern methods of Farming, also the Management of Woods and Plantations, and is a first-class Gardener and Good Cultivator of the Dairy and Toultry.—*C. A. B.*, 50, Bevington Road, Notting Hill, W.

To Nomenclators and Gentlemen. **STEWART, or BAILIFF and GARDENER.**—Accompanied to Estate Business also. Very first-class Cook. Highest testimonials and references.—Messrs. FRANCIS & SONS, DICKSON and SONS, Seedsmen, 102, Eastgate Street, Chester.

BAILIFF, on a Light Land or Mixed Soil Farm.—Age 36, married; has been accustomed to Marketing, and Buying and Selling Stock. Good references.—*W. H. F.* Messrs. James Dickson & Sons, 102, Eastgate Street, Chester.

BAILIFF, age 40, married.—A Gentleman would be glad to find a situation for his late Bailiff (now, or at Lady Day), whom he has appreciated for his services for 12 years, and whom he has as a thoroughly practical Manager, possessed of first-class Land and Light Land, and a good knowledge of the Dairy and Toultry, Buying, Selling, &c.—*B. G.* Post Office, Redhill, Surrey.

FARM BAILIFF (WORKING).—Age 36, married, respectable; has a thorough practical knowledge of Cattle and all the general Management of a Farm. Has been 15 years' experience character from present employer, also from several of the most respectable Farmers in this neighbourhood, of which he is a native.—*W. H. F.* Messrs. James Dickson & Sons, 102, Eastgate Street, Chester.

IMPROVER, age 19.—A Provincial Nurseryman is desirous of placing his son in a good establishment, where he may have the opportunity of learning the Nursery and Seed Business. Has been 12 months in the Nursery and Seed Business, and has given his services gratuitously for a year.—Address particulars to *HURST and SONS*, Seedsmen, 6, Leadenhall Street, London, E.

To Seedsmen. **SHOPMAN,** or otherwise.—Immediate engagement wanted. Ten years' experience, principally in England.—*A. B.*, Mr. Lovelock's, 8, Nicolson Street, Edinburgh.

Suttons' Selected Prize Stocks of Farm Seeds.

CARRIAGE FREE.

NOTICE TO LARGE PURCHASERS.

MESSRS. SUTTON have now completed their stocks of FARM SEEDS, and their usual price CATALOGUE will be published in February. Meanwhile Messrs. SUTTON will be glad to answer to large quantities of seed, on application, stating sorts and quantities required.

Wholesale and Retail, 10, Abchurch Lane, London, E.C.4.

CARTER'S PRIZES FOR THE ROYAL SEEDSMEN.

VEGETABLES to be awarded at the MEETINGS of the ROYAL HORTICULTURAL SOCIETY, on the 15th, 16th, and 17th inst.

All Vegetables to be grown by *bona fide* Gentlemen's Gardeners, or Gardeners in the service of the Nobility or Gentry.

May 17—*£1* 10s for the best Dish of Carter's First Crop Pea (a peck); 1st, *£1* 10s; 2nd, *£1* 5s; 3rd, *£1* 2s; 4th, *£1* 1s.

June 7—*1st*, *£2* 10s; 2nd, *£1* 10s; 3rd, *£1* 5s; 4th, *£1* 2s; 5th, *£1* 1s.

June 14—*1st*, *£2* 10s; 2nd, *£1* 10s; 3rd, *£1* 5s; 4th, *£1* 2s; 5th, *£1* 1s.

June 21—*1st*, *£2* 10s; 2nd, *£1* 10s; 3rd, *£1* 5s; 4th, *£1* 2s; 5th, *£1* 1s.

June 28—*1st*, *£2* 10s; 2nd, *£1* 10s; 3rd, *£1* 5s; 4th, *£1* 2s; 5th, *£1* 1s.

July 5—*1st*, *£2* 10s; 2nd, *£1* 10s; 3rd, *£1* 5s; 4th, *£1* 2s; 5th, *£1* 1s.

July 12—*1st*, *£2* 10s; 2nd, *£1* 10s; 3rd, *£1* 5s; 4th, *£1* 2s; 5th, *£1* 1s.

July 19—*1st*, *£2* 10s; 2nd, *£1* 10s; 3rd, *£1* 5s; 4th, *£1* 2s; 5th, *£1* 1s.

August 2—*1st*, *£2* 10s; 2nd, *£1* 10s; 3rd, *£1* 5s; 4th, *£1* 2s; 5th, *£1* 1s.

August 9—*1st*, *£2* 10s; 2nd, *£1* 10s; 3rd, *£1* 5s; 4th, *£1* 2s; 5th, *£1* 1s.

August 16—*1st*, *£2* 10s; 2nd, *£1* 10s; 3rd, *£1* 5s; 4th, *£1* 2s; 5th, *£1* 1s.

August 23—*1st*, *£2* 10s; 2nd, *£1* 10s; 3rd, *£1* 5s; 4th, *£1* 2s; 5th, *£1* 1s.

August 30—*1st*, *£2* 10s; 2nd, *£1* 10s; 3rd, *£1* 5s; 4th, *£1* 2s; 5th, *£1* 1s.

September 6—*1st*, *£2* 10s; 2nd, *£1* 10s; 3rd, *£1* 5s; 4th, *£1* 2s; 5th, *£1* 1s.

September 13—*1st*, *£2* 10s; 2nd, *£1* 10s; 3rd, *£1* 5s; 4th, *£1* 2s; 5th, *£1* 1s.

September 20—*1st*, *£2* 10s; 2nd, *£1* 10s; 3rd, *£1* 5s; 4th, *£1* 2s; 5th, *£1* 1s.

September 27—*1st*, *£2* 10s; 2nd, *£1* 10s; 3rd, *£1* 5s; 4th, *£1* 2s; 5th, *£1* 1s.

October 4—*1st*, *£2* 10s; 2nd, *£1* 10s; 3rd, *£1* 5s; 4th, *£1* 2s; 5th, *£1* 1s.

October 11—*1st*, *£2* 10s; 2nd, *£1* 10s; 3rd, *£1* 5s; 4th, *£1* 2s; 5th, *£1* 1s.

October 18—*1st*, *£2* 10s; 2nd, *£1* 10s; 3rd, *£1* 5s; 4th, *£1* 2s; 5th, *£1* 1s.

October 25—*1st*, *£2* 10s; 2nd, *£1* 10s; 3rd, *£1* 5s; 4th, *£1* 2s; 5th, *£1* 1s.

November 1—*1st*, *£2* 10s; 2nd, *£1* 10s; 3rd, *£1* 5s; 4th, *£1* 2s; 5th, *£1* 1s.

November 8—*1st*, *£2* 10s; 2nd, *£1* 10s; 3rd, *£1* 5s; 4th, *£1* 2s; 5th, *£1* 1s.

November 15—*1st*, *£2* 10s; 2nd, *£1* 10s; 3rd, *£1* 5s; 4th, *£1* 2s; 5th, *£1* 1s.

November 22—*1st*, *£2* 10s; 2nd, *£1* 10s; 3rd, *£1* 5s; 4th, *£1* 2s; 5th, *£1* 1s.

November 29—*1st*, *£2* 10s; 2nd, *£1* 10s; 3rd, *£1* 5s; 4th, *£1* 2s; 5th, *£1* 1s.

December 6—*1st*, *£2* 10s; 2nd, *£1* 10s; 3rd, *£1* 5s; 4th, *£1* 2s; 5th, *£1* 1s.

December 13—*1st*, *£2* 10s; 2nd, *£1* 10s; 3rd, *£1* 5s; 4th, *£1* 2s; 5th, *£1* 1s.

December 20—*1st*, *£2* 10s; 2nd, *£1* 10s; 3rd, *£1* 5s; 4th, *£1* 2s; 5th, *£1* 1s.

December 27—*1st*, *£2* 10s; 2nd, *£1* 10s; 3rd, *£1* 5s; 4th, *£1* 2s; 5th, *£1* 1s.

January 3—*1st*, *£2* 10s; 2nd, *£1* 10s; 3rd, *£1* 5s; 4th, *£1* 2s; 5th, *£1* 1s.

January 10—*1st*, *£2* 10s; 2nd, *£1* 10s; 3rd, *£1* 5s; 4th, *£1* 2s; 5th, *£1* 1s.

January 17—*1st*, *£2* 10s; 2nd, *£1* 10s; 3rd, *£1* 5s; 4th, *£1* 2s; 5th, *£1* 1s.

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more liberal class of contributions than the latter can, unassisted, give.

The Royal Agricultural College may be considered, in some sense, as if not a cradle, yet a very effective nursery of the progress of scientific and practical agriculture. This, indeed, it has actually been. Though it is ignored by the Royal Agricultural Society, of which it is in some sort an offshoot, and the very first of whose steps might reasonably have been towards the foundation of such a school; yet when that Society felt at length the necessity of attaching to their staff a Professor of Agricultural Chemistry, they were obliged to resort to their neglected offspring, the College, from which they carried off Professor WAY, the most eminent man of that day in his department. Mr. WAY's reputation in the course of a few years brought him occupation which led to his resignation of his appointment to the Society; and again the Society was obliged to resort to the College, and they carried off Dr. VOELCKER, a man to whom the science of agriculture, that Society, and their Journal, have all been more indebted than to any other person living.

The College however, not now only as a school of the sciences with which agriculture is connected, but as a school of agriculture proper, will claim the goodwill of the agriculturists of England. Many thousands of acres in this country are now farmed by students of the College; and many hundreds of thousands are under the control of former students who now hold land agencies.

A reference to some points in the history of this institution is necessary, in order that Mr. HOLLAND's relationship to it may be understood. The managers, on its first establishment, considered that thoroughly competent professors were necessary to the command of public confidence; but it seems they were in advance of the agricultural mind, and students were not forthcoming in sufficient number to bear the cost of such an establishment. The cost of the College, and of its necessary farm and other buildings, thus so exceeded the estimates of its founders, that a serious debt was incurred; and it soon became necessary to call a meeting of the original subscribers to take into consideration the condition of the undertaking. At that meeting the debt was found to amount to £10,000; and as there seemed no other prospect, at that time, than that it should increase from year to year, the meeting saw no alternative but to close the College. Rather, however, than allow the adoption of that resolution, Mr. HOLLAND, who was present, gave his personal guarantee for the amount of the existing claim upon the institution!

The next step in our history brings in the name of another liberal and energetic patron of agriculture. The late Lord DUCIE, having heard of Mr. HOLLAND's offer, attended the adjourned meeting,—observed that it must not be permitted for an individual to take on himself such a burden—that the payment of the existing debt would leave no provision for the future; and declared that a further sum of the same amount should be accessible in order to carrying on the College with advantage. The ultimate result was, that on the joint guarantee of the late Lord DUCIE, his friend the late Mr. LANGSTON, the late Lord BATHURST, Mr. SOTHERON ESTCOURT, and Mr. HOLLAND, £20,000 were raised; and it was resolved to carry on the College, in the hope of its becoming self-supporting sooner or later.

The apparently hopeless and ever-sanguine views of Mr. HOLLAND, under the zealous superintendence of the Principal of the College, the Rev. Mr. CONSTABLE, have been at length realised—the College has been filled, and for the last three or four years the net income, after providing for the annual expenditure and the interest of the debt, has yielded a sinking fund sufficient to extinguish it in the course of a few years.

So far as our present appeal has a personal object, it is, we believe, sufficiently justified by this personal history, which, however, is a very imperfect sketch of great public services. But it is principally on the same public grounds which actuated Mr. HOLLAND, that we call the attention of our great landowners to the importance of the step which the College Club are taking.

The College sends forth annually many young men better qualified than in former times as stewards and land agents of large estates, of which landowners have in many cases availed themselves; and students from the College are,

as we have said, now placed in those capacities over many thousands acres in this country. We quote the concluding paragraph of an address, signed by the Duke of MARLBOROUGH on behalf of the Council of the Institution, which has been recently published to make known the claims of the College on the goodwill of English landowners:—

"There are attached to the College a chapel, a well-furnished agricultural museum and spacious laboratories, a botanic garden, and a veterinary hospital. The students have, by special arrangement, ample opportunities of learning practical agriculture on a farm of 300 acres contiguous to the College. The farm, the property of Earl BATHURST, is occupied by a former student and graduate of the College. Instruction is given by the principal, and a staff of professors, in practical agriculture, and in chemistry and chemical analysis, geology, entomology, botany, veterinary medicine and surgery, surveying, and in architectural and mechanical drawing."

The Council are satisfied that the work contemplated in the establishment of the College is thus being accomplished, and that the young men disciplined, trained, and instructed within its walls, are qualified either to fill high positions as tenant-farmers, or to undertake the agency and management of landed estates.* Every year adds to the number of collegians filling situations of importance and of trust, and the College diploma has long borne a high value as a test of knowledge, ability, and character.

We earnestly hope that sufficient interest in the College exists among the landowners of this country to ensure the success of this attempt to promote the interests of the only great educational institution to which English agriculturists have access in this country. A HOLLAND Scholarship would hand down the memory of one of its greatest benefactors, and at the same time promote the improvement of agricultural education in all time coming.

—On Monday, in Mark Lane, prices rose 1s. to 3s. a quarter, in consequence, chiefly, of the demand for France, and the probable cessation of the war. The price of flour rose 3s. a sack.—At the Metropolitan Cattle Market sales were difficult, and prices, especially for beef, were lower.

—At a meeting, on Monday last, of the general committee, in connection with the FRENCH PEASANT FARMERS' RELIEF FUND, a report from the executive committee, which showed that more applications to the amount of £2076 5s. 11d. had been received, of which sum about £900 has already been promised. The report also stated that three courses are open to the decision of the general committee:—1st. To commence distributing as soon as the necessary arrangements can be completed; or 2d, to have a partial and experimental distribution, which might relieve some of the most urgent needs, and be the means of obtaining valuable data on which to found future operations; or 3d, to be in readiness for, but to postpone, the distribution entirely until the termination of the war. Lord VERNON, who was in the chair, trusted that the report would prove to them that the committee had not been negligent in its duties. The first step the committee had taken was to address itself to the various organisations in operation for alleviating the distress existing in France. The War Victims' Fund Committee had offered to place their organisation at their disposal, and being represented that day by Mr. BELLEVILLE, lately returned from the Metz district, he no doubt would give them information in reference to the great difficulties they had now to face. One of their past difficulties had been the risk of military requisition; no guarantee could be given that the corn, if sent, would not be eaten up by Uhlans horses, or that the men that sowed would actually reap. That difficulty is now removed, and it remained for consideration whether to adopt the recommendations in the report, and whether, in whom they should place satisfaction, and employ an agent or keep the control in the hands of the executive.—The Earl of AIRLIE moved the adoption of the report, pointing out that it informed them that associations with similar objects have been formed in Scotland and Ireland, and that it was resolved to communicate with these the progress that had been made by the English committee, and so to arrange their proceedings that the funds may not overlap.—Captain TALBOT, M.P., seconded the adoption of the report, which was afterwards carried. The question of appointing a distribution agent was next considered. Mr. CAIRD was of opinion that the work would be better done by some department of the French Government, the French Ministry of Agriculture.—Mr. ROBINSON, having had some experience in the distribution of several thousands of pounds, was of opinion it would be much better to send some compe-

tent person over to go about and obtain the information that might be necessary.—Mr. AVELING was of opinion that it would be impossible for one person to do it.—Mr. JENKINS, one of the hon. secretaries, thought it would be better to have half-a-dozen if needed, so as to see it properly distributed. It would be very difficult to get the French Government to do so at the present time, inasmuch as the Minister of Agriculture.—Mr. BELLEVILLE, lately returned from Paris, said that if they sent it over to the French Minister of Agriculture, as suggested now, they would only have the money wasted, for the mayors have so many demands upon them that they really cannot make inquiries into all the cases, and they now put anybody's name down that applies.—After some further discussion, Mr. CAIRD moved the following resolution:—

"That, considering the armistice which has just been made, and the prospect of an early peace, the committee recognises the advantage of making an early beginning, and entrusts to the executive all the arrangements they may deem expedient for the distribution of the seed, trusting that the instrumentality of the French Ministry of Agriculture may be utilised in so far as may be found possible."

The resolution was seconded and carried.

—An important paper was read on Thursday evening, by Dr. E. FRANKLAND, F.R.S., before the Chemical Society, on the DEVELOPMENT OF FUNGICID GROWTHS IN DRINKING WATERS. Mr. HEISCHE, lecturer on chemistry at Middlesex Hospital, had last year announced that he had obtained a small quantity of sugar to water which had received the smallest addition of sewage as such, there was invariably a development of Fungus, which then became, as he believed, a test of the fitness of the water for domestic use. Dr. FRANKLAND's experiments lead to the conclusion, not that sewage, but that phosphoric acid in any form, is the *sine qua non* of fungoid growth. Any water which contains not merely sewage or albumen, but which has been even filtered through animal charcoal, or has in any way acquired the fitness of phosphoric acid, will, on the addition of sugar, and on exposure to the air, in the course of two or three days develop fungoid growth. This development cannot take place without the presence of phosphoric acid, and if that be present, in however harmless a form, exposure to the air will at once set the process of development afoot. The drain water of a sewage farm which has contained no phosphoric acid failed to develop Fungus; while the purest distilled water, to which pure phosphates of soda were added, has exhibited the finest growth of Fungus after a few days' exposure. The test, therefore, if unserviceable for the detection of sewage water, may, no doubt, be used for the examination of the air; and to possible uses of it in this way, during times of epidemic attack, Dr. FRANKLAND directed attention.

—At Maidstone, during the past eight years, a COTTAGE IMPROVEMENT COMPANY has been at work with great advantage to their tenantry, and satisfactory returns to themselves. The eighth report, read at the annual meeting on Friday last, contains the following:—

"The share capital now amounts to £6725.
"The company possesses 9 cottages, six of which have been recently purchased."

"The net result of the year, by the balance-sheet, amounts to £515 12s. 3d., which, together with £14 11s., received too late, and £15 divided on the reserve fund, brings the receipts for 1870 up to £541 3s. 1d."

"A dividend at the rate of 4s. per annum will take £220 10s. 6d. in repairs, insurances, and other expenses, amount to £94 8s. 11d., leaving £105 14s. 8d. profit to be added to the reserve fund, and £14 11s. to be carried on to the next account. With this addition the reserve fund will amount to £409 7s. 9d. Latter's buildings, Waterbury, purchased at the end of 1869 are now being put into thorough repair, and when finished will present a striking contrast to their former very wretched condition, and will return a fair percentage to the company."

"There are still a large number of cottages in Maidstone, and in villages, which urgently require improvement; and, as the past experience of this company shows that this object may be effected, so as to yield a good return upon the capital invested, the directors hope that additional shares will be subscribed for, so that as opportunities present themselves fresh purchases may be made. Surely there is here an example which might well be followed in other towns and villages."

—A correspondent of *Ball's Messenger* suggests that we might benefit ourselves at the same time as the French, if we should obtain seed for them, by sowing half only or two-thirds what we usually sow:—

"Many thousands of bushels of seed, and hundreds of bushels of straw, or the money value of it, might be spared from this country for the necessities of France, and we not a bit the worse, simply by our reducing the quantity of our own seed to the acre by a little, and contributing the difference. Some of my own neighbours sow 5, and even 6 bushels of Oats, and 4 of Barley to the acre. I have reduced my own quantum to half that, and get more straw and a better yield than I did before. I don't press upon any one to make such a reduction as this all at once, but I do ask every one of my fellow farmers to strike off a little, say a bushel, half a bushel, or even a single peck, and send it over; and I am as sure of it, as that I have this pen in my hand, that not one in a thousand will ever think of returning to the old quantity again. Now, if by once sparing this handful to our neighbours we should come to save it and more on it for the single year, that would indeed be sowing seed on good ground, to be

* In proof of this it may be stated that on the occasion of the Royal Agricultural Society having, in the year 1869, offered certain exhibitions and other honours to any young man in the country who should pass satisfactory examinations in the subjects of agriculture and its allied sciences, out of the twelve successful candidates eleven of them either were or had been students at this College.

returned to us a hundredfold; let alone the far higher satisfaction of having done a good deed."

At Diss, the other day, Mr. C. S. READ, M.P., thus referred to the present state of the FOREIGN CATTLE TRADE in the THAMES:—"There was now a cordon drawn round the Metropolitan area within which all cattle had to be slaughtered. They were all aware that the Corporation of London had, by the Contagious Diseases (Animals) Act, the privilege of building the New Foreign Cattle Market, and that if they did not build it within the present year the market would remain as now. The Corporation had the use of Deptford Dockyard, and he thought they had been singularly tardy about the work. Mr. FORSTER had told him that he thought it would be completed during the present year. As soon as that definite market for foreign stock was completed the cordon that now surrounds the Metropolis would be withdrawn, and the market again opened. The Chairman asked if all foreign stock would have to go to the foreign market. Mr. READ said he was afraid that rested with the Privy Council. It was their desire that all foreign stock should go to the foreign market, but the Privy Council was a very shifting, and he might almost say "chiffy," body. He knew not what their desire would be. They were at present constantly changing the regulations about foreign cattle, by Orders in Council; and that sort of uncertainty, if continued, would produce great annoyance and inconvenience to the cattle trade. He himself did not think there was the slightest chance of the market being opened during the present year, as it was not yet begun.

— A whimsical instance of AGRICULTURAL CUSTOM was described the other day at a meeting in Monmouthshire, held for the discussion of a paper on the Tenant's Right to a Valuation of Unexhausted Improvements. Mr. DONALD MACINTOSH thus referred to a custom which possessed in his neighbourhood the force of law:—"There was a custom in his neighbourhood giving an outgoing tenant the right to have one-third of his land under Wheat. A man worked his farm four years in succession, and had no notice to quit. Well, the two last years he had one-third of his land under Wheat. He might leave to occupy another farm, and be there only one year, and he would again have one-third of his land under Wheat before leaving.—Can any one give us information as to the extent over which this custom prevails, and as to the practical effect of it in its neighbourhood?"

— On Saturday last, at Guildford, a non-resident farmer, holding land in that neighbourhood, was fined £5—receiving at the same time the severest rebuke—by the county magistrates, being charged, at the instance of the Royal Society for the Prevention of Cruelty to Animals, with IL-TREATING ten Cows and four HEIFERS, by neglecting to supply them with food. From the evidence of HENRY TAYLOR, an inspector of the Society, it appeared that on January 2 he visited the defendant's farm, and found the cattle all in a starving condition. They were in an open yard, without the slightest shelter. There was no straw, nor any sign to be seen of food provision for the cattle. A man named KETCHER was in charge of the farm, and in reply to a question stated that the master lived at Southsea. He never came to the farm; and although he had been written to, he had only on one or two occasions sent any food, and that in small quantities. Mr. JAMES BROAD and Mr. ARTHUR CHERRY, veterinary sur-

geons, deposed to the emaciated state in which they found the cattle. They were little better than skeletons covered with skin. In some cases the bones were nearly protruding. The frost was intense, and yet there was no straw in the yard.

NOTEWORTHY AGRICULTURISTS.

MR. HEWITT DAVIS.

WE have not seen the name of Mr. Hewitt Davis at agricultural meetings or in agricultural journals for several years. He has been disabled by increasing weakness for the last year or two, and though taking as much interest as ever in agricultural progress and prosperity, he has not been able for that share in the promotion of them which has, during many previous years of a long and useful life, fallen to his lot.

Active occupation, both as farmer and as land-agent, gave him unusual opportunities of observing defects and recommending remedies in English agriculture;

short, all the elements of good cultivation, he soon became known as an enterprising and successful agriculturist.

He first appeared as a public writer in 1830, when, by letters in the *Times* on "The Repeal of the Corn Laws," he pointed out how little farmers have to fear from the effects of free trade. Shortly after this he began to direct attention to the injury and waste of corn attendant on the practice of sowing so thickly as was then customary. The usual allowance of seed corn at that time was three bushels and upwards of Wheat, four or five of Barley, and six of Oats per acre, sown broadcast. While, however, his neighbours were sowing in the above-named large proportions, he was using but one-third of these quantities, drilled in rows at wide intervals, and inviting the public to visit his farms that they might see the result of this thin seeding. Mr. Hewitt Davis is also well-known for his advocacy of deep tillage, and the removal of hedge-rows and all other obstacles to the freest cultivation. He early saw the advantage of large open fields, compact buildings, good drainage, and all that tends to the economical working of the farm. His practice and writings soon brought him into notice, and he became largely employed as a land-agent, where he had the opportunity of introducing the improvements he so strenuously advocated. He was nominated by the Inclosure Commissioners one of their earliest inspectors of works executed under the various Lands Improvement Acts; and in this position not only has he assisted in introducing the system of deep drainage, since generally adopted—which at first met with strong opposition—but the various improvements thus superintended by him in many different localities have been made the means of spreading far and wide the latest and most trustworthy agricultural truths. It is not in those improvements only which have been directed by the Inclosure Commissioners, that Mr. Davis has rendered such material service to the interests of agriculture. In the general prosecution of his business as a land-agent he has done much to develop the resources of neglected and badly-farmed estates. In several instances known to us where landowners, ignorant of the true principles of estate management, and tenantry possessing neither skill nor capital, have been on the brink of ruin, Mr. Hewitt Davis, on being called in, has by his judgment in rearranging, and revaluing estates, and carrying out the necessary land improvements, in a short time enabled both the landlords and the tenants to attain a degree of prosperity before unknown, at the same time conferring a great boon on the parishes and the country at large, by the increased employment of capital, and the increased produce of food.

As a professional land-agent and surveyor Mr. Davis is worthy of all praise for his unselfishness of character; we have frequently known him, when called in officially as a Government inspector or drainage engineer, to have given the greatest assistance gratuitously where the usual charges would have been onerous—in some cases even surveying and re-valuing farms without charge.

He has been always ready to stretch out a helping hand to those who were struggling to make their way in his profession; and many now look back with gratitude for the kindness and attention they have experienced from him. Among them is a friend of our own—a land-agent having the management of estates in nine counties, who says:—"I have had the



HEWITT DAVIS.

and a clear and lucid style as writer has enabled him to make them known to English agricultural readers, with unquestionable influence on the farm practice of the country. There has been no one since the days of Cobbett and of Arthur Young whose short and pithy essays have conveyed to the tenant-farmer class truthful criticism and sound advice in better English.

Mr. Davis, as a young man, occupied, we understand, a place as clerk in a London merchant's office; and his agricultural career originated in his having been selected by one of the principals of his firm to go down to his country place to sort and balance the confused accounts of the farm bailiff. This having happened more than once, he was at length (nearly 40 years ago) induced to reside permanently on the estate, and take the direction of the home farms into his own hands; and ever since, until within the last three years, he has occupied a foremost place in the ranks of English agricultural improvers. Subsequently to the farm management of this large estate (2000 acres) for another, he took Spring Park, near Croydon, for himself,—500 acres of poor, gravelly, boggy soil,—where, by draining, deep tillage, thin seeding, and, in

honour and the great happiness of Mr. Hewitt Davis's acquaintance for 20 years, and shall ever retain a grateful remembrance of his kindness to my clients, their tenants, and myself, during that period, and of the many pleasant and instructive evenings we have spent together after toiling work on heavy undrained lands in different parts of the kingdom."

The following is a list of Mr. Hewitt Davis's chief works:—"The Effects of Importation of Wheat on the Profits of Farming;" "The Farmers' Resources for Meeting the Reduced Prices of their Produce;" "The Injury and Waste of Corn from the present Practice of too thickly Sowing;" "Farming Essays" (two series), &c.

Besides the authorship of these publications, Mr. Hewitt Davis has been a frequent contributor to agricultural and other journals, and, among others, to the columns of the *Agricultural Gazette*.

By voice, also, as well as pen he has done much to make known the best lessons of well-earned agricultural experience. As a speaker—invariably conveying the impression that he was considerate and thoughtful, as well as confident—he had many opportunities, in the course of his profession, of urging his opinions on the tenant-farmers of the country; and in this way, as well as through the press, he has materially contributed to the agricultural progress which has been witnessed by the present generation.

Let us add that Mr. Hewitt Davis never lost an opportunity of promoting the interests of those whom he employed; and there are many in situations of trust on farms and estates scattered up and down the country who will rejoice to see in this notice of his useful agricultural career that their old friend, though no longer able to take part with his former fellow workers, is not likely to be forgotten by those with whom he has been for so many years associated.

OUR LIVE STOCK.

CATTLE.

A CATALOGUE has just been issued of Lord Bolton's Shorthorn herd at Bolton Hall, Bedale, Yorkshire. The herd is of old standing, in the midst of a district long celebrated for its cattle. The present stock is bred from Mr. Robson's herd and that of Mr. Craddock. Several have short pedigrees of entirely Booth blood, and MARMION (26,821), bred by Mr. Booth, is the sire of a large number in the herd.

The third exhibition and sale of pure-bred Shorthorn cattle, under the auspices of the Midland Counties Agricultural Society, will be held on March 2, and all entries must be made on or before February 11. Prizes of £50, £15, and £5 are offered for yearling bulls, £20, £10, and £5 for bull calves; and £5 for older classes. The entrance fee is £2 if for only one entry, and £1 for a second entry as a yearling bull; £1 for all entries in the younger classes, and 10s. for all other entries. The whole will be offered for sale by auction at noon on the day of show at Bingley Hall, Birmingham. Only animals eligible for the Herd Book are received, and the following are among the regulations:—

"All animals must be *bona fide* the property of the exhibitor at the time of entry.
"The whole of the animals entered will be offered for sale by auction, without any further reserve than entering them at 20s. each, one of the main objects of this exhibition being to afford an opportunity to intending purchasers to improve their stock at a time when they are best qualified to make a correct estimate of the value of the respective strains of blood exhibited.

"Pure-bred Shorthorn cattle of all descriptions will also be received as extra stock, for sale by auction, without reserve. No entrance fee will be charged on these.

"Cattle duly entered must be at the hall at 10 o'clock on Thursday morning, March 2, and the yard will be open during the whole of Wednesday, March 1, on which day exhibitors who can do so are recommended to send their stock.

"Every exhibitor must send at least one servant in charge of the stock exhibited by him, which will be in his sole care, subject to the orders and regulations of the stewards.

"Hay and straw of the best quality will be provided free of expense. Troughs will also be provided.

"Prizes will be awarded on Thursday morning, at ten o'clock. Admission to the public, from ten o'clock until four, 1s.

"The judges selected will be gentlemen well qualified for the office, and their attention will be particularly directed to the symmetry, early maturity, size, purity of blood, and general good character of the several animals; due allowance being made for age. They will be requested not to award prizes for overfed animals; the object of the Society being to encourage superior animals for breeding purposes."

Another example of useful interchange between English and American breeders occurs in the case of a young Duchess bull, DUKE OF HILLHURST, bred by Mr. Cochrane, of Compton, Canada, from *Duchess 97th*, the sister which he purchased from Captain Carter in 1868 for 1000 gu. She was put, on her arrival in America, to 14TH DUKE OF THORNDALE, a great-grandson of *Duchess 66th*, who was bought at Lord Ducie's sale. This bull, one of the purest and best bred Duchess bulls in the States, is the property of Mr. George Bedford, of Paris, Kentucky, an old and eminent American Shorthorn breeder. The calf is bought for Colonel Kingscote, returning thus to the

neighbourhood whence the Duchess blood was first exported to America. Mr. Thornton declares him to be one of the best and most promising young bulls he saw on the other side of the Atlantic.

We understand that the Shorthorn herd and Southdown flock of the late Lord Walsingham will be disposed of during the coming season. The herd will be sold by auction on May 18, and the flock towards the end of June or beginning of July. The Shorthorns are about sixty in number, and they have been on the farm for about 25 years; the flock has been there for a much longer time. Of course, the reputation of the flock is unrivalled, and their success as prize-takers has never been exceeded. The Shorthorns have been bred largely from Mr. Fawkes' stock; and latterly, Mr. Booth's LORD BLITHE has been used, and is still in service. Lord Walsingham was an exhibitor of cattle at the local and county shows, but his sheep only were sent to the great county and London exhibitions.

On Wednesday, March 1, Mr. Thornton will dispose by auction of the pure-bred Shorthorn herd of Mr. Robinson, of Burton-on-Trent. The catalogue comprises 31 animals, several of them descended from Mr. W. W. Wain, of Wain, and Mr. Lakin, of Bowkley. Many prizes have been awarded at the Staffordshire and local shows to animals exhibited from this herd, and several of the cows are prize winners; the stock will be found in fine healthy condition, many of them, especially those of shorter descent, being excellent dairy animals.

We may just announce here that a large portion of Col. Kingscote's herd will be sold by Mr. Stratford in March. We hope soon to give full particulars.

FRENCH PEASANT FARMERS.

We have been requested to publish the following Address to the Tenant-Farmers of England:—

Gentlemen,—I believe you are aware that a movement in aid of the French farming peasantry has been commenced by an influential body of gentlemen, who in this country take a leading and active part in everything connected with the interest of agriculturists. I have been requested to give any aid in my power to this most charitable cause; I trust then I may be pardoned when venturing to make this appeal to a body of men, most of whom, on more than one occasion, I have received great marks of confidence.

You, it is said, can picture to yourselves the depth of the misery the war has entailed on all who live by "tillage" in France; I believe you can do no such thing. I am satisfied no hand that ever held pen could point in print the state of utter desolation and misery of the French agriculturists—the peasant-farmers of that war-blasted land.

England, by the Almighty's favour, has never tasted the horrors of a war such as that which at present one has proved itself. Ask you to think, as you now regard your own homes and homesteads, of what has come on these, the agriculturists who, like yourselves, are dependent on their skill and industry to preserve the home life. There are gaps at the hearth-side hewn by the unrelenting hand of war violence; the mourning for sons and fathers slain, which leave the widows and the fatherless to look for the means of existence where all power to produce it is destroyed. The savings of all past thrift are for ever lost, the very hope of the renewal of a life whose utmost toil gave only the necessities of a humble life; on what can it now be founded?

The roof that sheltered contentment, domestic peace, the united happiness of families, one and all workers on the farm, with one common interest in the life of every the smallest creature of the little scene of their industry, in the growth of every crop the smallest patch of land would yield to hard persevering toil—that roof itself is wont to stand, being now the rack on the last six months of agony, the future without one gleam of hope. Farmers are they, with all the local attachment common to their race, and yet they have no one atom of plant, living or dead, wherewith to again work their fields, which, all blood-stained as many are, must be barren, even when, rising again from the blow which has struck at the heart of their livelihood, they would seek to turn to the plough that they may eat and live.

I like the form of the appeal made to you. You are asked to meet and confer together, to discuss with one another, what you, the tenant-farmers of England—the well-burned, well-homed; to the people of all lands, the chief of those whose skill, industry, and enterprise have made England the great bread garden it is—can do to hold out the hand of a generous sympathy to these poor, afflicted, despoiled French members of your own order.

This is not a matter into which any Christian can import the question of right or wrong of the war. It were shame to any one to think one living English tenant-farmer could, in meeting this appeal, look on his own fields, his home, his flocks and herds—within doors, on his own fireside-living furniture—and in answer to this cry, if only for "a sack or two of seed" for these thousands of warred-out fellow-cultivators of the soil, begin to argue down the voice of Charity by any question as to the grounds which led to its being so sorely needed. No, in a long life I have studied closely, and learnt to

respect highly, the weight ever given by your whole body to any appeal for help to its suffering members. This, the suffering you are now asked to aid, I know will come home to you; if you see your way to give that practical aid of which you are the best judges, I am sure you will do so.

Of all men engaged in any one pursuit, I know none who have greater facility to act as a body to further any object you take in hand. I well know what in any locality tenant-farmer power can do to help or oppose any cause in which you are interested. In every locality you have your leading men,—men who have by their special ability and zeal justly won your confidence. To many of these the committee in London have appealed for help; they have been furnished with all information necessary to harmonise their work with that of the said committee. They have only, now, each in his own sphere, to learn of you individually what aid, in the form of seed, you will permit them to report as ready to be sent; they will be furnished with proper labels, and receive clear directions as to forwarding your contributions.

Public meetings are all very well in their way, but they often cost much to feed a spirit which ought not, as a rule, to need any such stimulus. You know what the condition of these small farmers must inevitably be if they are not aided; home-maimed they are—home-famished you may forbid them to be. A committee of working, practical men would soon learn at "market" all they need to know. Teams, I am sure, would be willingly lent; no load ever brought home will ever have given you more real joy than these your sacked benevolences will afford; no abundance of future harvest will be the less appreciated, as God's return to your own industry, when it comes home to these homes from which you may now have to look to those to whom any abundance for years to come cannot wipe out the bitter memory of this hour. Your own harvest home will be sweetened by the sense that you have cheered homes which otherwise can only look to fields at harvest barren, their food denied them, but not because their industry had failed them. S. Godolphin Osborne, Wells, Jan. 26.

BEEF PULP AND BEET SUGAR.

A VERY careful series of experiments has been made in England upon the feeding value of the pulp with reference to different kinds of animals in different places and of different developments, as to its nutritive and fattening qualities. The pulp, prepared by different processes, will, if fitted and kept for some time, undergo a kind of fermentation. The general conclusion to be arrived at, is that a ton of pulp is about equal to 1½ tons of the original roots. Now this may seem at first sight an extraordinary statement, when we remember that in the roots there is a great deal of water, and there is also a large quantity of water. But by the process of the manufacture we diminish the quantity of water in the pulp, so that some samples contain only 60 parts in 100, but generally about 70. If we take an average of good-sized roots, not grown specially for the purpose of getting a high percentage of sugar, but as good as you can get growing on a large scale, with ordinary Sugar-Beet seed, you will find that the amount of water is about 84 per cent. There is a great deal of difference between 84 and 70 per cent. of water, rather later is the average. The sugar is reduced in quantity, and so far the feeding value is diminished; the water is diminished, so far the feeding value is increased. If you diminish the water and the sugar, it stands to reason the other ingredients are increased. Some of these ingredients are useful as food, others are useless. One has thus increased the albuminoid matter in such a marked manner as to render the pulp more valuable as a feeding food. Comparing the two samples which have been put in my hands, I am come to the conclusion that Beetroot pulp contains rather more than 2 per cent., or about 2½, of the flesh-forming material. I examined the pulp from a distillery at Chelsea, which was used for the purpose last year, and found only two-tenths of sugar left; but I think we may say that 1½ or 2 per cent. is the usual amount. I think, anyhow, we may calculate on 1½ of sugar, and that its presence gives a peculiar value to the food, rendering it more palatable.

With reference to the pulp that has been kept some time, we have to note that it is very sour, and has a tendency, no doubt, especially if exposed to the air, to produce scum in the animals to which it is given as the exclusive food. As it is rather deficient in albuminoid matters, it will be desirable, therefore, to mix Beetroot pulp with a small amount of flesh-forming substances, such as bean meal, pea meal, or barley. These are excellent additions. They supply it with what it lacks, it is deficient in, and prevent the injurious consequences which would be caused by the sour pulp. The value of pulp, calculated according to chemical data, comparing it with other foods, as I have said before, is that 1 ton of pulp is equal to a ton and a half of roots from which it is made, and equal to 2 tons of ordinary roots. Ordinary roots, such as Mangels, do not contain more than 11 per cent. of solid matter, while Beet pulp contains about 30, and if we take many better kinds of roots we shall find not more than 12 or 14 per cent., if we do that. So that if we take

the best sort of roots we shall find not more than half the solid food contained in the Beetroot pulp. It is generally asserted that 2 tons of roots are equal to 1 ton of pulp; and if the pulp be sold at 12s. or 13s., or at the outside 14s. per ton, it would then be an economical food for the purposes I have mentioned, and it might be used as a good substitute for roots.

This point brings me to the question, how much pulp do you bring back from the sugar manufactory or distillery? It is generally calculated at 20 per cent., that is to say, if you have 100 tons of Sugar-Beet roots, with the highest percentage of water, you have 20 tons, or one-fifth; and while you sell the roots at 15s. per ton you have to buy back 20 tons at 12s. or 14s. per ton. The high estimates given last meeting were rather more than I should put upon them myself. I think the limit should be placed at about 15s., but I am not prepared to state this positively. In the dairies of London, where experiments have been made, it is said the cow-keepers objected to this food at first, and yet they bought it with eagerness. They said it was bad, but asked for more, so there was evidently something worth their attention.

The next point is the quantity of sugar we may fairly expect to acquire. I have said before about 11 and 100 parts of the quantity of solid matter contained in ordinary roots, such as Swedes. Turnips do not contain more than 9 or 10, and Mangels from about 11 to 14. We have, therefore, three sorts of roots of varied values, as far as solid foods are concerned. If you get a root like the Sugar-Beet, which contains not less than 13½ parts of sugar alone in the 100; then we are obtaining a large quantity of additional food without the loss of any substance that it is necessary, as manure, to replace. When I last

analysed Sugar-Beet, I found there were 12 parts in 100; a fortnight after that I found 13.2 per cent., then I waited another fortnight, of almost incessant rain, and during that period it increased only three or four tenths per cent.; so that the highest amount of sugar contained in our Sugar-Beets at the College was 13.5. But that is more solid matter than a Swede contains. I expect we shall not surpass that amount this season; it is a fair one, and larger than the estimates which give very favourable returns in various books published on the Sugar-Beet manufacture. They take 9½, 8, and other amounts, but I have given 13½. The next point is the question—what is the amount of roots per acre we may expect to get? If we get these roots rich in sugar, do we get them of such a size as to yield a fair crop? My experiment has been on too small a scale, and I am not in a position to give a decided opinion of Sugar-Beet on particularly thin land, such as that on which my roots have been grown, but I pulled up a root nearly a fortnight ago which weighed 4 lb., and contained 12½ per cent. of sugar. My roots are at a distance from each of 9 inches by 12, and calculating, not from that exceptionally large root, but from the average of all the smaller roots, I think I may say if an acre of land yielded as well, as my unmanured plot, it would be 26 tons, which is not a bad produce, and this on soil which was not at all favourable to their growth, and in which my big root had gone 6 inches into the clay below. *Professor Church, at Cirencester.*

BURGESS & KEY'S NEW CONICAL SELF-RAKER REAPER.

BURGESS & KEY'S new reaping machine, of which Fig. 34 is an illustration, is the simplest and most complete of the class of self-rakers which has yet appeared in the harvest field. The driver's seat on the pole in front of the rakes, and the lever for throwing in and out of gear are not shown, but their position and mechanism will readily be understood, the latter (the lever) from the portion of the lever-rod shown working in a pendant guide from the pole, and connected at the opposite end to a short vertical lever-stud rising from the hub or boss of the eccentric axis of the main wheel. The illustration gives a general outline of the conical self-raker and platform. The cutter-bar and knife working on the direct thrust principle, with their patent lubricating apparatus, are similar to those which Burgess & Key and Hornsby & Sons, by licence, have had in successful use for some time past, and with which most readers are now familiar. The novelties of this

new machine which require special notice are, therefore, first, the conical self-raker; second, the simplicity of the carriage frame and eccentric action of the main wheel; third, the attachment of the cutter-bar, crank-shaft, and connecting-rod; and fourth, the adaptation of parts to the requirements of field practice and general working of the reaper.

1. It will readily be seen from the oblique position of the rakes and reels that each, in performing one revolution describes the frustum of a cone, the axis of which produced is the standard to which the four arms are fixed. Simple as this will appear to those acquainted with mathematics, it is all the more interesting in the march of improvement to notice that this is the first self-raker where the true conical principle has been successfully reduced to practice. In the United States of America the solution of the conical problem, although repeatedly tried, made but slow progress, and when Owen Dorsey appeared in the harvest field in 1856 he required an undulating cam to direct his rakes from the conical path before he could clear his platform and lay his sheaf out of the horses' track: Dorsey's machine was introduced by Samuelson. The Messrs. R. Hornsby & Sons, by bending the standard of their "Governor Self-raker," obviate the cam, but the revolution of a bent axis is nearly as objectionable as the undulating cam movement. Their "Manchester Reaper," however, has a conical movement, but by complicated mechanism, which Burgess & Key avoid. True, the platform requires to be curved, in correspondence with the conical path of the rake, so as to enable it to discharge the sheaf at the side, and as this raises the platform behind, it throws more work upon the rake in raising the sheaf than when it swept over a level surface—a result which proves that the

an ordinary gate from field to field, and for narrow gates an arm can be folded up or removed.

2. The carriage frame is simply the forked termination of the pole, with two bearings for the axis on which the main wheel rotates. The standard framing with stay is seen outside, and the pendant bracket for carrying the finger-bar and knife gear inside. The lever stud, already noticed, rises upwards also inside. The axle on which the main wheel rotates is eccentric. It is fixed as regards the main wheel, but rotates on its own bearings, and the difference between the two centres is sufficient, by one movement of the hand lever at the driver's seat, to throw the knife gear and rake gear both out of or into action. This alteration of the position of the main wheel with the fixed bearings of the frame forms the second peculiar novelty of the machine. Advantage is also taken of it for regulating the height of the cut at the inner end of the finger-bar, the outer end being regulated by a small lever-wheel, seen outside on the standing corn side of the platform.

3. Motion is given to the knife from the large spur-wheel inside the main wheel. The crank-shaft and small gearing are covered from sight by the front inner shield of the platform, but they are similar to those of Burgess & Key's machines in use. The large spur-wheel shown drives a small one, on the opposite end of the axle of which is a bevel-wheel. This latter drives a lesser bevel-wheel on the end of the crank-shaft, and the crank-shaft extends back so as to bring the connecting-rod and knife on a line with the axis of the main wheel, or where the main wheel rests on the ground, as seen in the engraving, and sufficiently near the ground to effect the direct thrust, or, more correctly speaking, the equal velocity and cutting power of the knife throughout its to-and-fro movements.

4. With regard to the last head—the adaptation of parts and working of the whole—little requires to be said. It will be seen from the above, that the design and connection of the three parts noticed are highly satisfactory. Exceptions have been taken to the curvature of the platform but this is greatly compensated by its shortness, so that when a fair balance is struck, the odds are in its favour as compared with other reapers. Judging from the trials made last year in the harvest field, no doubt the other reapers are now being improved in this respect, so that the trials of the ensuing harvest must be left to speak for themselves. The economy of the second or eccentric movement of the main wheel may also be called in question; but as there is more than one way

of carrying out this principle, time must be given to ascertain which is the best. The principles upon which the reaper is constructed are sound, and, therefore, cannot be improved upon; it is otherwise with shortcomings in carrying them out, so as to bring up details to meet the diversified requirements of practice: and from the favourable opinion already expressed on the merits of this new reaper, it cannot fail to give rise to improved ideas in the construction of conical self-rakers generally. This is the natural course, and the stimulus which Burgess & Key's reaper is likely to give to the improvement of other merits special notice on public grounds. In this way, since the Great Exhibition of 1851, they have done much to advance the harvesting of hay and corn crops by machinery, and it is creditable to them as the vanguard of progress, pioneering onwards with every promise of success. *W. B.*

THE GAME LAWS.

At a meeting last Thursday of the Scottish Chamber of Agriculture, Mr. George Hope, of Fenton Barns, moved the adoption of the following resolutions:—

"1. That the legislative reform now to be sought should be confined to hares and rabbits, 2. That hares and rabbits should be dealt with by removing them from the game list, and giving the occupier of the land, or any one resident on the farm having his authority, the inalienable right to kill the hares and rabbits on the land occupied by him."

The following is Mr. Hope's address, as reported in full in the *Daily Review*:—

In bringing before you the resolutions proposed by your directors as a solution of the game question, so far as the interests of tenant-farmers are concerned, I have no intention of dilating on the general evils produced by Game Laws and the strict preservation of

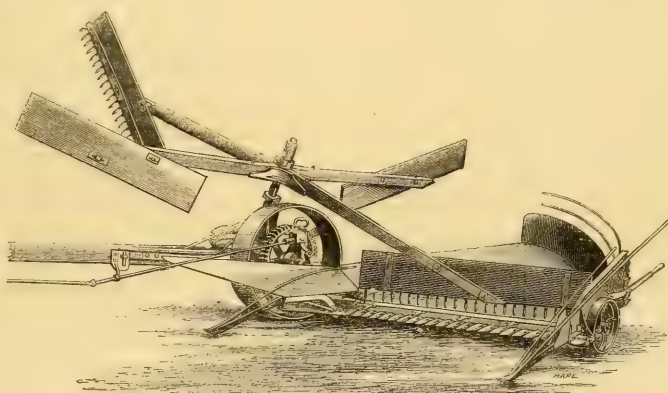


FIG. 34.—NEW CONICAL SELF-RAKER REAPER.

conical path of the rake does not effectually meet the requirements of the harvest field. The objection is doubtless sound, but reduced to a minimum by the shortness of Burgess & Key's platform, and its comparative levelness at the main wheel side, the corn from the opposite side being brought round from a higher to a lower level. We shall return to this under the fourth head—the working of the reaper in the field; just now we confine our remarks to the special mechanism of the rakes and reels. It has been shown that the standard represents the axis of the cone, and as one side of the frustum (the line of the points of the teeth of the rake) is parallel to the cutter-bar, it follows that the standard leans towards the platform side, and in a line with the axis of the main wheel, so as to suit the conical movement of the bevel gear by which it is rotated. In other words, the standard, instead of rising perpendicularly, or at right angles from the cutter-bar or frame, is placed obliquely, so as to bisect the angle formed by the opposite sides of the cone, being thus in the centre. The standard also forms the axis of the large bevel wheel cone, of which the wheel itself, seen outside, is a frustum. The small bevel-wheel on the hub of the main wheel, which rotates on a fixed axis, and gives motion to the large one, forms the frustum of a third cone, whose apex with the apex of the larger bevel cone both centre in the axis or centre of the rake standard. The axis of the main wheel or central line of the axle on which it rotates is thus in a line with the axis of the lesser cone. There are thus three frustums of three cones, and the manner they centre constitutes the first of the peculiar characteristics of this new reaper, one that requires very great mechanical skill in its reduction to practice. The upper portion of the standard is threaded spirally, forming a male screw, so that by undoing the key seen at the top, and turning round the arms, the standard can be elongated or shortened, as the crop requires. The reaper can easily pass through

employing them differs, more or less, according to circumstances. They purpose to impart condition and fertility to soils, and there is no doubt that, under proper management, the investments become highly beneficial and valuable. We are accustomed to speak of them as acts of husbandry, cultivations, manuring with lime, chalk, bones, rapeseed cake, &c., or guano, superphosphate of lime, &c., and the spending of cake and corn in yards and upon the land. He believed those were generally practised in modern farming. Well, that being also accepted by them they must ascertain their value. He did not mean by that that they must go into the thing arithmetically and calculate it; but having accepted the principle they must admit that there was a certain value which a farmer put in his land, and it was not clear at the present time that he had power to get proper remuneration.

Referring to some of the acts of cultivation and acts of husbandry, he had stated that it was as essential to the outgoing tenant to perform them properly as it was important to his successors to have them valued to him. They assumed almost the same form throughout the country, now that the implements were so similar, so that he thought it probable that prices might be put down which would be convenient for all localities. He did not say precisely the same scale would do, because any man who knew England would say such a thing was impossible; but there might be in localities a scale of prices with which occupiers themselves might have become familiar, and that would be a guide to them in transferring their holdings; they would know what was the value of their operations, and they would feel, if the tenant was recognised, that they would be paid the value for them. He could not think there would be any difficulty in having this point settled, because they knew their operations, and that no man in his senses would object to pay a fair proportion. They then came to other operations, such as chalking and liming, the application of bones, &c., which were used to a considerable extent in Monmouthshire. To discourage the use of things which really were perhaps the chief benefit of manure in many soils, was absolutely to cut agriculture—to limit it for one operation, or for many. It was a matter which he thought the nation should take up. Operations which, they could prove, conferred a lasting benefit on the soil for successive years, a man had as great a right to demand payment for when he left the farm as there was a right to demand from him payment of imperial or local rates. Passing from what he called permanent improvements, to these other operations which he found recognised in some parts of England, as the use of artificial manures—such as guano, superphosphate, and all patent manures, which had, he believed, less lasting benefit. He was not at all disposed to recommend very much recognition of these operations. The use of these chemicals, these artificial manures, though the operation was most valuable, yet their effect was so passing that beyond promoting the growth of the crop to which it was directly applied, he himself did not feel that it conferred a lasting benefit on the soil, and he was encouraged by farmers. If the application of 3 cwt. of superphosphate to an acre, or 2 cwt. of guano, resulted in a much larger bulk of crop, whether he consumed or sold it, the farmer got his money back in the excess of produce. It was not like chalk or lime, of which he had spoken, which was possibly many years in acting upon the soil to which it was applied. He daresay many gentlemen would differ from his idea, but he did not think that the farmer would vary much. Now, if they came to the consumption of oilcake and corn on land. He knew how valuable that application was, and he thought they should take a more liberal view of the case. He has seen the effect of consuming Swedes on land with a considerable consumption of oilcake, and also the use of the same material on grass land where sheep were penned. He had seen meadows improved to a large extent, and he was not quite sure that their best farmers did not think that if they wanted good pastures they should consume oilcake. If farmers could prove that he had consumed a large amount of oilcake, either on his pasture or in feeding off green crops, he was entitled to compensation—certainly for more than the next year—for two years, if not more in some cases. These were points which should form ingredients in any measure they adopted. He had at first stated, and he repeated, it was a decided advantage to a landlord to have his farm, or his house or corn so cultivated, and he was quite sure to find without any difficulty a successor. He did not know any mode of doing this except by encouraging the outgoing tenant to do his duty to the farm during his last year or two. This encouragement should come from the landlord, and it should come also from the community. The landlords must march with the tenants, and that was why he first of all endeavoured to prove it was the landlords' interest to let this matter be properly agreed upon. That the tenant should be able to do his duty to the tenant-riht, or rather the absence of the classic prices for operations—that farms were neglected, occupations for the last year were allowed almost to run to waste, the hoe was laid aside, no artificial food or manure was purchased, the land ran dry, and the incomer saw that he had to do three years of toil before he could hope to get any return for his money. He referred to the national importance of this

measure—thereby hoping to incite other Chambers to take up the question. It was only by general action that they could do anything in the direction they were pursuing. It must be of national importance; because the population of the kingdom was so vast, and they were so dependent on foreign supplies, that if 1 acre of land in England was allowed to run to waste, it was a crime to the nation. It must be so, when they were actually importing one-half or two-thirds as much as they grew. He was speaking of the staple of life—Wheat. It must be of national importance to encourage the most complete system of agriculture—to give those who occupied the land, and who farmed well, a claim upon their successors for what was ultimately due to them. For that reason he dwelt upon it as being of national importance. It was common to them all, in their own neighbourhoods—when farms were changing hands, they passed the localities which they had hitherto viewed with pleasure, seeing the busy husbandman doing his duty, and the face of the country as it should be in a well-cultivated district—they had seen this going to waste; the labourer was absent from the fields, and the district absolutely yielding no more than one-third what it should yield. This was a common picture every day, and while they admitted that, they must, he believed, come to the conclusion that it arose from there being no plan of remuneration for the man doing his duty.

ECONOMY OF CATTLE FOOD.

[An unusually severe and protracted winter has followed on short crops of hay, straw, and other cattle feed—no wonder that the members of the Society for the Improvement of the Education of Farmers Clubs and Agricultural Societies. We give below one of many papers which have been lately read upon the subject. It is taken from the *Proceedings of the Swindon Chamber of Agriculture*, by Mr. Piniger.]

THE unprecedented dry season of 1870 will not be soon forgotten. The fall of rain for the 12 months has been barely 20 inches, the annual average for the 12 years past being nearly 28 inches. The total rainfall of April, May, and June was only 1.89 inch. I am indebted to Mr. Arkell, of Penhill, for the following figures:—

Rainfall (in inches) at Penhill.

	1858.	1861.	1863.	1864.	1868.	1870.
January .. ..	.73	.87	2.96	.94	4.16	9.01
February	1.41	2.36	.62	1.25	2.07	1.62
March .. ..	.85	.44	.74	2.62	1.95	1.81
April	2.61	5.51	1.27	1.41	1.44	1.44
May	2.35	1.87	1.48	1.70	1.05	.98
June .. ..	.71	3.68	3.85	1.44	.59	.32
July	2.50	3.60	3.38	7.00	4.35	2.69
August	2.42	.80	.31	.73	1.67	2.71
September ..	2.17	2.16	.71	.27	3.79	.82
October	2.21	1.31	4.00	1.80	2.78	3.03
November ..	2.17	1.96	2.00	2.10	1.89	1.63
December ..	2.30	1.19	.94	1.50	.50	2.03
	30.76	24.88	24.80	19.27	30.66	19.99

Average of 12 years 27.89 inches.
From March 17 to June 30, 1865 days, only 2.03 inches rain.

The drought, which partially set in as early as the middle of March, has continued with but little intermission up to the present time throughout the year. The natural consequence has been to absorb all the farmer's profits, and very great deal of his own food. One informs me that he is 9 tons of cheese short of his usual make, which reckoned at £70 per ton, amounts to £630. The pastures in these and adjacent valleys, usually so rich and fertile, were suddenly brought to a standstill, and vegetation at the time when the hope of the husbandman is on the alert for the return of summer was cut short by cold, cutting easterly winds, with the certain result of the loss of our hay crop. I have myself five stackyards where I usually put a hayrick, but which now have none at all, but for the little left of the previous year's growth. There is one consolation. It is generally, I believe, admitted that our crop of straw is nearly, if not quite, an average one. More particularly is this the case with wheat-straw, the quality of which is first-rate—so much so we scarcely ever knew it so good; and here in a great measure must be our dependence for the saving of the lives of thousands of our cattle, and sheep, and swine, and poultry, how best to consume so as to make the best use of this very valuable material is the question each one appears to be asking the other, and on which each one is desirous of being better informed.

How to use our straw.—That there is a mode of rearing straw really not critical there is but little doubt; at all events, we can so supplement it with other matter that it can be made an exceedingly valuable adjunct to our usual resources. But it is not by putting out your cows for 12 weeks on board wages in other persons' yards at 1s. 6d. per head that you will succeed. Some gentleman informed me that the farmers in the neighbouring county, diluted or moistened their wheat-straw cut into chaff for the cattle used with chaff having been in another county for some season. Another informant told me that some farmers cut up their wheat and other straw and mix it with a quantity of salt and lay up in store for winter, when it comes out a really fattening substance. This may, to a certain extent, be a palatable, but I imagine not very nutritious food. Another informs me he cuts his straw into three-quarters of an inch in length and sweetens it with treacle and water at the rate of 1 lb. of

the former to each animal per day, and this with satisfactory results. I am fearful that in instances like this, the palate of the animal is better pleased than the system is fed, and that the belly is made to grow big while the back grows very thin. Another assures me his cattle do exceedingly well on cut straw and 4 lb. of palm-nut meal each per day, at £8 per ton, spread over the chaff, the straw cut the same lengths as in former cases. Now this must be a very cheap mode, and will well compare with any I have met; I am not quite sure if he informed me whether his cattle were in-calf cows or barren stock. Much, however, is involved in this. With our dairy cows within four, six, or eight weeks of their calving time, the same dry husky food they did on three months ago they can barely subsist on now. Now if this mode of 4 lb. of nut meal be effectual, it must be economical, because at £8 per ton it will cost only 4d. per day or about 2s. 3d. per week, in addition to 2 cwt. of cut straw at 3s., which makes it up to 5s. 3d. each per head per week. Supposing that 10 cows will eat 24 bush. of chaff or 1 cwt. of straw cut with a very little hay each, in addition to 4 lb. of cake, this gentleman would get his cattle kept on palm-nut meal and cut straw at the price of 5s. 3d. each per week, which would be very cheap. Another, whom I consider a first-rate manager of dairy cows in winter, assures me he cannot in any season do it at a lower price than 10s. 8d. per head, or your cow justice during the time of her rest, eight or ten weeks, she should have 2 cwt. of good useful sweet hay, which at the spending price, £2 10s. per ton, comes to the money. If you give half cut straw cut with it, you must make it up to her in cake, meal, or some other nutritious matter. Now, if instead of 2 cwt. of hay, I give 1½ cwt. of straw at 3s., ½ cwt. of hay at 2s. 3d. (spending price, £2 10s.), and ½ cwt. of cake per week, I cost her 8s. 4½d. per week. This looks a startling sum for 70 or 80 cows, but it amounts for 80 cows to £34 per week, or very near it.

My friend, whom I will call A. I., informs me he has put off all his older cows to his arable farm at straw with 1 bush. of roots and 2 lb. of cake per day, and this costs him, to receive anything for his straw, 6s. 6d. per head. Then he informs me he keeps his 45 grazers cows at home on cut straw and hay, half of each, moistened with porridge made of 1 bush. of linseed to 60 gall. of water, and he keeps his 100 lb. of pea and barley meal mixed and strained over the mass sufficient for two days, or at the rate of a trifle more than 6 lb. of meal per day to each cow. Now this, without hay and straw, costs 2s. 3d. per cow, or the cost of hay at 4s. 6d. spending price, and some of straw at 1s. 6d., comes to just 8s. 3d. each cow. These, he says, are just his youngest cows; for the ones that are older will be scarcely enough. One thing must be borne in mind. For this mode of feeding he has capital premises and arrangements for doing it in this way. He considers 2 lb. of cake per day would be equal in nutriment to his gruel, &c., at a little more cost and a great deal less trouble, or very nearly 9s. per head each. I find our cows in the London dairy, kept well on hay, grains, roots, and cake, cost 12s. each per week. Another on a farm of first-rate land, number of cattle much as usual, cows, poor, and dry, and a few calves, kept by Michaelmas, and desirous of getting them up, using his straw cut fine, mixed with linseed gruel, treacle allowed to lie and get into a kind of porridge before being used. The cows eat it with the greatest avidity, and appear improving. He is pretty well off for old hay, yet he seems desirous of economising that, and his new too, by supplementing his straw with cake, Linseed, treacle, roots, and other matters. My method has been to cut my straw and a very little hay by steam power into chaff, moistened with a little treacle, and served indiscriminately to all the stock. Two bushels of Barley were boiled and thrown in with each day's mass for a time, but this we have now discontinued for other matters to make it up. I endeavour to watch my cattle, and by so changing and moving them about where necessary I endeavour to see all going on as well as under the circumstances we have, but we feed indiscriminately on this chaff; the calves grow stout, stock, and young are indulged in extra cake, &c., as a make-up, with a few Mangels, and they appear to do exceedingly well. I am not a sufficiently painstaking man to go into minute details. I have made a few experiments in boiled Linseed and treacle, and the Linseed, I believe, acts as an incentive, sweetened with treacle, to lead the animal to crave for it; though I do not see any very beneficial results beyond that. It helps (and this I consider is the essential part) in assisting in pushing through husky and clogging matters through the intricacies of the cow's stomach, which, to me, does not appear formed by Nature to feed on the dry materials given to other of our domestic animals. I have also tried Messrs. Foster's compound, 6 lb. of it against 4 lb. of linseed and cotton cake mixed, on 10 cows in calf. I prefer the cake, though I do not notice any marked difference; they appear exceedingly well, and I have ordered a ton more. These and various other experiments have been tried, in all of which I have been anxiously watching for a more marked improvement than I have yet seen, prostrated as they are with this very rigorous season and the effects of the terrible infection of the foot-and-mouth disease, from which we are barely

recovered, and from which I do not expect to be fully rid for a very long time to come. Other friends of mine with a large stock of Mangels pulp those and mix with their chaff or cut straw, but we all know this food wants the addition of a few pounds of cake or meal to do the animal justice, especially our cows forward in calf. Many will defend the system of giving wheat-straw whole and not cut. With this I cannot possibly agree, when cattle have to get their entire sustenance from it. Of the different qualities of straw I am not prepared to speak very learnedly, though I think that the best or cut straw, of a light crop of say 3 qrs. per acre, on stone brash or gravelly soils, is as good, if not better, than any other variety, either of which is, no doubt, very preferable to wheat-straw. I think, however, from my own experience, there is a great deal of nutritive matter in bean or pea straw, or what we call "poultz," where the haulm of Pea runs up the stalk of Bean, which holding it off the ground, avoids that dirt and filth Peas in a wet season are liable to form, being so much on the ground. But all these reasons are additions to something of a more nutritious nature, if you intend doing justice to your cattle in the winter, or fitting your dairy cow to again resume her milk-producing process with strengthened vigour. One more word I wish to have. It is this: do not think too much of, or put too much dependence in, your stock of wheat-straw. You have a few good-sized ricks in your stackyard, and you fancy them almost inexhaustible. You have a great abundance there now, but nothing is more fleeting or deceptive. One stack of hay of 30 tons, will yield more fodder than the straw of 40 acres of Wheat, and if you are very short of hay I would advise you to purchase a little to cut up with your straw, and also spend a little on Linseed, palm-nut meal, barley, or pea meal, so as to make the most of it, or you will find your wheat-straw gone before you are aware.

Mr. E. W. MOORE said: Some few years ago he had gone into this matter with some friends, and the result of their deliberation was the conclusion that it was very difficult to do without straw, and that he had better have a little each year. He remembered at the London Farmers' Club one gentleman said the best way to manage stock was to have very good animals, good fellows to look after them, and give them plenty of good food. No doubt this was good advice, and it might be fairly presumed that the farmer had good animals and good men, but at present they had to debate the important question of getting good food. He believed the result of the present state of things would be to lead farmers to make experiments with the view of discovering that they were not so dependent upon hay as they had hitherto thought they were. The fact was, they had all thought too much of that most expensive of foods for cattle—hay. They had thought too much about it, and had mown too much while they grazed too little. The present season, however, had compelled them to learn a lesson which they had not learned before, and perhaps, to do without it at all. What was more, he believed this lesson was being learned already, and he quoted as a confirmation of his idea the fact that hay was not increasing in price so much as they thought it would, and as much as it would have done and been sold generally for some time. This state of things was only to be attributed to practical men setting their wits to work, and by the use of artificials, as well as improved modes of preparing cattle food, rely less upon hay.

MR. T. HEWER: He was one of those in the happy position of having a large stock of hay through the winter, and he was not, at least, only a very small quantity. He did not, however, despair, for he had plenty of wheat and bean straw, which, with a proper quantity of Mangels, say half a bushel a day, also three or four pounds of palm-nut meal, and two or three pounds of cake, make up the ration for each animal per day. Very extravagant as it was, it was too, as to cost, though it was not excessive in quantity. But the question was, how to get on when the cows had calved, and there were no more hayricks. Last July his pastures were little better than a down, and he at that time gave his cows Mangels and straw, and he had to feed them on that until the very much liked by the stock, and did them good; and he was fortunate enough to make 5 cwt. of cheese per cow.

MR. JAMES HORTON said: Where he lived the straw crop was not an average, the Wheat being thin, and the barley corn very few. He and his brother had cut the straw into chaff and then mixed it with linseed gruel and meal. The quantity for each cow per day was 2 lb. of Linseed ground and soaked in two gallons of water for 24 hours, then thrown over the chaff with 2 lb. of meal, well mixed the before using. The cost of each cow per week is 3s. 6d., estimating Linseed at 8s. 6d. per bushel, and meal at 16s. per ten score. They gave the same to sheep, and kept them in a healthy state at 4d. per head per week. To horses, for the night, after baiting, they gave more Linseed, and not any meal, and they very often heard of horses having the gripes, which was very often the case when they are dry provender. He could not see why farmers should pay to have the oil—which was so beneficial to the health of the stock—extracted from the Linseed, especially as many of the times it was very injurious to feed cattle with adulterated cake; even if the cake was good, they had to break it before the cattle could eat it. He hoped to hear from more practical farmers the length the chaff ought to be cut for cattle, as he felt that much was to be learned upon this.

MR. R. POOLE said: In this district they were better off than where he had lately been, where a great deficiency of straw prevailed. He was near one farm last week where the farmer had lost ten beasts and three horses from want of keep. Speaking of his own practice, Mr. Poole said he had spent a great deal in meal and cake. Linseed, &c.; he had used 20 sacks of Linseed, and had to buy 20 sacks more, and a quantity

of cake. This he mixed together, with rice meal. He used for each cow per day about half a peck of meal, 2 lb. of Linseed, and 2 lb. of cake. He had the food prepared with care, and employed the best man he could to look after the cattle. There was just one point arising out of this state of affairs which ought not to be neglected. In spending all this money, tenants ought to feel they were doing so upon a satisfactory basis. Many farmers would be spending thousands this year in artificial food, which must improve the land, yet with some of this might be a complete loss for as any future benefit was concerned, they might get six months' notice to quit. Coming back to the question in hand, he might observe that he was a great advocate at one time for cutting chaff; he had, however, come to the conclusion that if a man had plenty of straw, it was cheaper to give the cattle 4 lb. or 5 lb. of cake per day, and not permit the straw over, as they preferred this to eating a quantity of chaff.

MR. W. F. PARSONS noticed the advance that had been made since the great drought in 1844. In the winter of that year most calamitous consequences resulted in the deficiency of food for wintering stock. The aspect of affairs at the present moment was a very serious, and of something the work of doing could not go into. With straw and other things they might, perhaps, get on. With a stomachfull of inferior food was better than half the quantity of superior, it being an admitted fact that the work of digestion would not go on unless the animals had their fill.

MR. T. ARKELL proposed a vote of thanks to Mr. Pininger for his paper. Alluding to the use of straw, Mr. Arkell thought it better to use the straw whole, and let the cattle pick it out, spending the cost of cutting it into chaff in some useful artificial food. He further thought it was preferable to chaff for the staple sacrifice, or at least, to cut the cud were not able to eat dry, short food like horses. There might be a little waste, but they would have manure, while the cattle would do better on whole straw than on so much chaff, and the labour of cutting it would be saved.

Home Correspondence.

Co-operative Societies.—Mr. Spooner, in his letter to you, insinuates that the objects of these societies are "to destroy" the trades of the manure and cake dealers. This is not so. What the effect will be is quite another thing, and the sooner such trades as have been recently exposed by Dr. Voelcker in his reports to the Royal Agricultural Society are "destroyed" the better. The objects of the co-operative association are to check adulterations in seeds, manures, and feeding-stuffs, and to reduce the cost of them. And in these objects I know they have been successful. It is the farmer's duty to sacrifice, or to remain indifferent to such advantages for the sake of the "trade of Romey," or any other town, and in order that the Government taxes may be paid? Let us hope those stores will soon be empty of, and closed to, such rubbish as that which has been alluded to by Dr. Voelcker. The Government, I think, may be left to itself to look after the "ways and means," and I have no doubt the farmer will be at least in a better position to pay the Queen's taxes after receiving money's worth for his money. He will be saving his money in cattle with cakes, and paying fabulous prices for stuff called "manure" not worth the carriage. If the farmer can be supplied with his requisites without the use of a large floating capital ("£100,000") so much the better for him, for that simply means he can be so supplied without paying interest on that capital of from 10 to 80 per cent. To save this I purchase all my manures and feeding-stuffs of the Agricultural and Horticultural Co-operative Association, of which I am a Member. P. S. If Mr. Spooner will offer me better terms and sureties I will purchase of him!

Pea Roots.—In your leading article of January 28, you discuss the cause of the excrescences on the roots of Peas. It strikes me that they are analogous to those which constitute the disease of fingers-and-toes in Turnips. I have laboured with the aid of a microscope to trace the source and progress of that disease which has in many farms only been found on the roots of the mixture of sand, clay, and pebbles, which has also been subject to wireworm; but, though I have continually found grubs in the knots, they never appeared to have grown there from germs, but rather to have embedded themselves therein when decay had invited or facilitated their inroad. It was clear that the fault was not in the seed, because large portions of the field were healthy. G. H. V.

Quarter-Evil.—Will you allow me to inform Mr. Radcliffe that it is useless giving calves sulphur to prevent or cure an attack of this malady. I have tried it for years on two estates where I lost annually 40 to six calves, yearlings or 2-year-olds, but to no purpose. I then discontinued the use of Turnips of all kinds, and lost about half the above number, having

fed them on Mangels. After two or three years I adopted the plan of rearing my young stock during the autumn, winter, and spring months—from October to May—on pure linseed cake, in the place of any description of roots, till they turned the age of two years; and on this system, in three years, I have only lost one. My own experience is, that fat, lean, cross, and pure bred animals are equally liable to the attacks of this disease. In Devonshire the quarter-evil is very prevalent, and yet I know a farm, and have been told of others, where Devons have been bred for more than 60 years, on which case of quarter-evil has never been known. Is Mr. Radcliffe sure his cake is pure? A Devon Breeder.

Foreign Correspondence.

NERVI, RIVIERA DI LAVANTE, ITALY: *Devons and Shorthorns.* My attention has been called to two inaccuracies in your estimated live weight of the Devons. You put it, of the young steers, at "10 cwt. 0 qr. 20 lb."—ought it not to be "11 cwt. 0 qr. 20 lb." And of the heifers at "13 cwt. 3 qr. 14 lb."—should not this be "14 cwt. 0 qr. 14 lb." I would further ask if it is on your published figures you have come to the conclusion that "after two and a-half years feeding the Devon does not come within one-half the weight of a well-fed Shorthorn?" I have been puzzling myself in trying to reconcile your figures with your remarks, but for the life of me I cannot accomplish it; and have come to the conclusion it is a riddle, so "I'll give it up." A Devon Breeder. [We shall next week have some remarks to make on our correspondent's letter. Meanwhile we have to acknowledge with thanks his correction of our figures. The average weight of the young Devon oxen was 11 cwt. 0 qr. 20 lb., and of the heifers 14 cwt. 0 qr. 14 lb. And the statement regarding the carcass weights of the Devon and Shorthorn breeds is also a blunder,—made evidently when the writer was puzzled almost as completely as his critic.]

Societies.

ROYAL AGRICULTURAL OF ENGLAND.

MONTHLY COUNCIL: Wednesday, February 1, 1871.—Present: Lord Vernon, President, in the chair; Viscount Bridport, Lord Kesteven, Lord Tredegar, Sir Watkin W. Wynn, Bart., M.P.; Dr. Barnett, Mr. Booth, Mr. Bowley, Mr. Cantrell, Colonel Chatterloner, Mr. Davies, Mr. Dent, M.P.; Mr. Brandreth Gibbs, Mr. Hornsby, Colonel Kingscote, M.P.; Mr. Leeds, Mr. Milward, Mr. Pain, Mr. Randell, Mr. Ransome, Mr. Shuttleworth, Mr. Torr, Mr. Whitehead, Colonel Wilson, Mr. Jacob Wilson, and Dr. Voelcker.

The following members were elected:—Averil, George Hanson, Wood End, Lichfield. Blackwell, G. Jun., Hazlecoote, Kingscote, Wootton-under-Edge. Brown, Nathan, jun., Wood House, North Dalph, Downham. Brown, Henry, Preston, Wellington, Salop. Calshaw, Joseph, Towneley, Burnley. Cunliffe, Major Ellis, J.P., Queen Street, Lytham. Dowsley, W. J., Hall Street, Holmcoote, Carnforth. Drew, Edward, Calcot Farm, Kingscote, Wootton-under-Edge. Duncan, James, Benmore, N.B. Evans, Warren, Llandowlaids, Usk. Evans, William, The Fields, Newport, Monmouthshire. Gaites, Jacob, Hall Street, Holmcoote, Carnforth. Godwin, J. S. S., Court Lodge, West Peckham, Maidstone. Hancox, E. O., Evesham. Harrison, John, Warmingham, Sandbach. Harrison, William, Samsbury Hall, Preston. Hawkins, Rev. Canon S., Woolas Vinceray, Newport, Monmouthshire. Henson, William, Burton Fields, Hincley. Hibbert, Henry, Broughton Grove, Grange. Holbrow, D. Charles, Bagpath Court, Wootton-under-Edge. Horton, S. Lewis, Park House, Shifnal. James, John, Laus-our, Caerleon. Keeling, G. B., Hampton House, Penkridge. Linnett, James, jun., Kimbolton. Little, William, Littlecote, Ely, Cambs. Lockwood, A. C., Chester. Lowe, Thomas, The Old Hall, Eddisbury, Northwich. Morris, Thomas, Henfaes, Welshpool. Morris, J. T., Darenth, Dartford. Mosley, Captain W. H., Heaton Hall, Stourbridge. Neville, John, Hasclour Hall, Tamworth. Nunnerley, John, Buerion Hall, Nantwich. Phillips, Guy Taylor, Brockton Leasowes, Newport, Salop. Phillips, Thomas, S. Princess Square, Plymouth. Pratt, C. A., Sharncliffe, Nuneaton. Rider, T., Edgeobrough, Shawbury, Salop. Rider, W., Crudgington, Wellington, Salop. Shakespeare, John, Copstan Magna, Hincley. Shepherd, W., Eaton, Chester. Shotton, Henry, Wotton, Wrexham. Silcock, Richard, Thornton Hall, Poulton le Fylde. Smith, Ralph, Lenwich, Evesham. Spurr, George, Boston. Taylor, Harry, Elmbridge Green, Droithwich. Torr, John, Carlett Park, Eastham, Chester.

Tyler, Captain George Griffin, The Callow Hill, Monmouth.
Tyser, G. Dorman, Hollands Park, Tonbridge.
Wale, Henry, Woodlands, Woburn.
Webb, E. jun., Worsley, Stourbridge.
Wilkes, Sam., Popy Norton, Shifnal.
Wilkinson, J. Rennie, Great Addington, Thrapston.
Wrottesley, Lord, Wrottesley, Wolverhampton.
Wood, James, Oaklands, Breeze Hill, Walton, Liverpool.
Wright, James, Cophouse Farm, Salney, Flint.

FINANCES.—Viscount Bridport presented the report, from which it appeared that the Secretary's receipts during the past two months had been examined by the committee, and by Messrs. Quiller, Ball & Co., the Society's accountants, and were found correct. The balance in the hands of the bankers on January 31 was £2070 6s. 4d. The committee reported that £2000 had been received from Wolverhampton and placed on deposit. The balance-sheet for the quarter ended December 31, 1870, and the statement of subscriptions and arrears, were laid upon the table; the amount of arrears then due being £894. The committee recommended that 12s. be taken in arrears, the subscription be taken off the books. One hundred and twenty members have given notice during the past year of their withdrawal from the Society. The committee recommended that the Secretary apply for a summons in the County Court against Richard S. Cook, Thurstaston, Rugby, for the arrears of his subscription. The committee have to report to the Council that they have invited Mr. J. Henry Johnson, solicitor, of 47, Lincoln's Inn Fields, to represent the case of the Society in the action taken by Messrs. Bradburn & Co. against the Society, and that he has accepted service of the summons on behalf of the Society.—This report was adopted.

JOURNAL.—Mr. J. D. Dent, M.P., reported that the Editor had conferred with the principal land-agents and tenant-farmers of Shropshire and Staffordshire, at a meeting held at Wolverhampton; and that the committee, after considering the opinions expressed at that meeting, had resolved to recommend the following conditions of the farm-prize competitions of 1871:—

1. That the size of competing arable farms be not less than 20 acres.
2. That the dairy farms be those on which not less than 20 cows are kept, and which are chiefly devoted to dairy purposes, including the sale of milk either to towns or cheese factories.
3. That the entrance-fee be £2 for members and £3 for non-members of the Society.
4. That every competitor must enter all the land in his occupation within the competing area.
5. That the last day of entry be March 25.
6. That a tenant-farmer, in order to be eligible to compete for the prizes offered, must pay a *bona fide* rent for at least three-fourths of the land he occupies.

It was also reported that the subscribers to the farm prizes had placed an additional sum of £50 at the disposal of the Society, to be awarded by the judges for any special feature of excellence in management in any of the competing farms; that the attention of the judges of dairy farms be specially directed to cleanliness in the dairy, and the good management of dairy produce; and that the judges be instructed to withhold any of the prizes in case of want of sufficient merit in the competing farms.—This report was adopted.

GENERAL, WOLVERHAMPTON.—Lord Kesteven presented the report of the committee, in which it was recommended that local prizes presented be adopted by the Council, and inserted in the prize-sheet; also that the printing of the prize-sheet be delayed for one week, to enable the names of donors of special prizes to be inserted. It was further recommended that members of the Staffordshire Agricultural Society, not being members of the Royal Agricultural Society, should be allowed to compete for the prizes offered for dairy cattle, wool, butter, and cheese by paying the same amount as that paid by members of the Royal Agricultural Society, the fees to be the same as heretofore.—This report was adopted, after the expulsion, by 12 votes against 5, of a paragraph stipulating that carriage-horses should be exhibited in harness.

SELECTION.—Mr. J. D. Dent, M.P., presented the report of the committee, the paragraphs of which were considered *seriatim*.—1. The recommendation that Mr. R. H. Masfen, of Pendeford, Wolverhampton, as a member of Council, in the room of Mr. H. Hall, resigned, was moved for adoption by Mr. Dent, M.P., seconded by Mr. Randall, and carried unanimously.

2. In reference to the paragraph that "The committee, having considered in what manner the Council can best recognise the long services of Mr. Amos as Consulting Engineer to the Society; and having reason to believe that Mr. Amos would be gratified by continuing his connection with the Society, and by still assisting the Council with his advice, recommended that he be appointed Honorary Consulting Engineer to the Society."—Mr. Russell referred to the great services which Mr. Amos had rendered to the Society, and to the progress of agricultural engineering, and suggested that Mr. Amos should be made an honorary member of the Society, and should receive the thanks of the Council engrossed on vellum, and accompanied by the Society's Gold Medal. Mr. Shuttleworth having seconded the proposition, a conversation ensued, in which it was stated

that by making Mr. Amos an honorary member of the Society he would be practically deprived of his seat on the Council. Ultimately, on the motion of Mr. J. Dent Dent, M.P., seconded by Colonel Challoner, the recommendation of the committee was adopted, with the addition of the latter part of Mr. Russell's suggestion. The recommendation that Mr. Jublin-Dannell, Superintendent of the Experimental Farm and Agricultural College at Stockholm, be elected an honorary member of the Society, was adopted unanimously.

SHOWARD CONTRACTS.—Mr. Randall (chairman) having presented the report of this committee, it was referred back to them for further consideration.

COUNTRY MEETING REQUIREMENTS.—Mr. Jacob Wilson reported that the committee moved for by Lord Lichfield recommended the postponement of the consideration of the general question of making a change in the present mode of inviting competition, but suggested certain alterations in the questions forwarded to the towns selected to compete this year.—This report was adopted, and the alterations in the questions were agreed to.

The death of Lord Walsingham, a Vice-President of the Society, was reported, and the President expressed the deep regret felt by himself and the members of the Council at the loss of their valued colleague. The vocal services of Mr. Consulting Engineer was referred to the Implement Committee for consideration and report.

On the motion of Mr. Jacob Wilson, seconded by Mr. D. R. Davies, on behalf of Sir W. W. Wynne, Mr. R. Milward was elected a Steward of Live Stock.

The Secretary was instructed to send letters stating the requirements of the Society for the country meeting in 1872 to the mayors of Cardiff, Newport, and Hereford, and to the High Bailiff of Cheltenham.

The committee were instructed to grant the loan of the Society's plough dynamometer, from the Bramham More and Knutsford Agricultural Societies.

A letter was read from Messrs. Carter and Co., requesting trial of a blue-flowered Clover, and the Secretary was instructed to inform them that Lord Tredegar and Mr. Randall were willing to try the plant in their individual capacities.

CLOUCESTER.

Capital in Agriculture.—At a recent meeting of the Gloucestershire Chamber of Agriculture, Mr. D. LONG read a paper on this subject, in which he said the causes calculated to prevent the investment of capital in agriculture are these:—1st, the law of preference, or the prior right of the landlord to seize for rent; 2d, the constant increase of local rates and taxes; 3d, the Game Laws, and over-preservation of game; and 4th, insecurity of tenure.

And, first, as to the law of preference. It is manifest that when, as the law stands at present, the landlord has priority over other creditors for rent, a tenant with insufficient capital to develop fully the productive power of his farm is, in the eyes of many landlords, an equal eligible to a man of more means, and more, especially if, as is generally the case, he be willing to pay a higher rent than a better class of tenant; provided only that the value of the tenant's farming stock be sufficient, in case of an emergency, to secure the full payment of the rent to the landlord. This unsatisfactory state of the law unfairly increases the competition for the occupation of land, and is often productive of great mischief in decreasing the fertility of the soil, and thus diminishing the productive power of the soil and the think that if landlords were obliged to share the assets of insolvent tenants equally with other creditors, they would naturally become more anxious to find tenants of good standing and with sufficient capital, the speedy consequence of which would be a fuller development of the productive capabilities of the soil, owing to the introduction of the larger capital of the improved class of tenants.

Secondly, as to the increase of local taxes. The great and continual increase of local taxes discourages the application of capital to agriculture so long as that capital, if otherwise employed, is not subjected to them. And, moreover, we are further threatened with an additional increase and discouragement for the purposes of education, which, like many other burdens to which personal property does not contribute, certainly must be a national obligation, and the cost of it should not be borne by real property alone.

I now come to the third part of my subject—the Game Laws, and over-preservation of game. I am of opinion that the Game Laws, as they at present exist, tend more than anything else to excite feelings of jealousy and distrust between landlord and tenant, and to diminish those feelings of friendship and cordiality which ought to exist between all classes, and more especially between the owners and cultivators of the soil; and I think that these special laws with regard to the preservation of game are an anomaly which requires the immediate attention of the Legislature, with a view to their entire repeal and the substitution of an effective law of trespass. With regard to the over-preservation of game, I would ask why should a landlord take a tenant as occupier and receive the absolute value of the land annually in the shape of rent, and then, through the medium of his gamekeeper, stock the same land and consume the produce grown on it, and at the expense of, the

tenant with game reserved for his own exclusive use and enjoyment? This is the case in the neighbourhood of Gloucester to some extent, and in many places in this county, and I say it is high time that such an unsatisfactory state of things should cease, and that all game should be made the property of the occupier of the land on which it is kept. Landlords who preserve game and reserve the right of shooting, and more especially those who let this right, ought to be compelled to contribute to the rates and taxes in respect of the annual value of such right of shooting. The custom of letting the shooting of estates to strangers, who, having paid for the right, naturally think themselves entitled to exercise and enjoy it to the utmost, and who have no inducement to conciliate and obtain the goodwill of the tenants is, I think, one of the causes of careless and ineffective cultivation of the soil. This custom often has a kind of demoralising effect on the tenantry, and, though landlords may have a legal right to do this, they ought to feel themselves under a strong moral obligation not to give power to strangers thus to damage, discourage, and annoy their tenants. If landlords are desirous of preserving their game, why do they not keep and in their own occupation for that purpose? They might then honestly and fairly preserve as much as they wished, since the benefit and enjoyment they would derive from the game would be counterbalanced by a corresponding diminution of income or deficiency in their own crops, instead of, as at present, in the crops of their unfortunate tenants.

I now come to the fourth and last division of my subject—insecurity of tenure. And this is a very difficult subject to deal with. A lease is undoubtedly the most desirable and best safeguard to the tenant, and offers the greatest inducement to increased exertion and more liberal employment of capital. But, setting aside the question of leasing, I am of opinion that if all tenants, whether holding from year to year or otherwise, were provided by our law with as ample powers and facilities for recovering the value of their investment and exhaustless improvement, and making their farms as landlords now have for recovering damages in cases of breach of covenant and dilapidation, this would go far to obviate the difficulty, inasmuch as it would induce occupiers without leases to develop the capabilities of their land by the introduction of the greater capital, and would prevent unscrupulous landlords from robbing their tenants of the capital thus introduced.

The CHAIRMAN (Captain de Winton) said it would be a very happy result when a good feeling between the landlords and tenants of this country should be able to exist, and the members should discuss the matter with temper and discretion. He did not put himself forward as a practical farmer, but he yielded to no one in interest in agriculture, and desired, in order to avoid needlessness, to look at the matter from the point of view of the tenant's point of view. He quite agreed with Mr. Long in his first proposition that if we could always have tenants on the farms of England with sufficient capital to work well it would be better alike for the tenant, the landlord, and the country, and much better for the community at large; for if the judicious employment of capital upon a farm does not make that farm pay enough else will. The only difficulty in thinking of the proposition is that its general adoption would to a great extent put aside the men of small capital. And we should have further to consider the question of the tenant's point of view. A landlord having a farm in a certain condition would naturally say to an incoming tenant, "I've put my land in a very good state at considerable cost to myself, and I desire that you shall prove to me your capital is sufficient to enable you to do better than I, so that after a certain time it may not be returned into my hands deteriorated." The tenant would answer that truly the land was in a certain condition, but that there was room for the application of the tenant's capital, and that the question of the matter would be discussed between them, and the result be an agreement mutually fair. But you would find great difficulty in securing the landlord in case his tenant became bankrupt or shouldn't leave sufficient on the farm to make up the land and the tenant are equally interested in preventing a greater burden than they should bear falling upon land and real property. The fundholder has an equal interest with the man with real property in the maintenance of the poor and of roads—which will shortly be thrown upon real property—and in matters of local taxation. Landlords are not, however, so ready to question to discuss here. If a landlord is not himself an occupier, the tenants would wish that he should have some amusement in the neighbourhood in which he lives; and there might be and should be such a cordial feeling between him and the tenant, that the tenant should be able to agree with a tenant somewhat in this way: "I'm very fond of shooting; there's a certain amount of game upon the farm you are about to take; you or your sons enjoy sport, let us come to some equitable arrangement by which we can both share the sport, and the game on your farm shall not amuse me to your injury—that you shall not, in fact, raise crops upon which my game feed at your cost." The tenant, in most cases, would say, "I and my sons are as fond of shooting as you are, and if you will only show me what amount of shooting you would like, I'll take care that you have it. I only ask that when you shoot I or some of those connected with me may be allowed to go with you or alone." I believe if this plan were followed, the landlord would have as much game as he wished for, and the tenant would have the interest in its preservation. He protested against the letting of the game on an estate, for as a tenant he should certainly say to a landlord whose farm he thought of taking,—

each. And here I will describe my notions of how a flock of ewes should be kept. They shall cost 35s. a head, and be purchased in August. They both shall run stubbles, and be kept in a similar way, only that one lot shall have a piece of Rape or Mustard for a month previous to a shearing, so that the one lot shall be in good state, and the other a little below par at that particular time; then they run the seeds and pastures, or clean up behind the lambs; they are still on much the same keep, but one lot is frequently changed from field to field, the other kept a bit too long in one place, the shepherd has the lambs to attend to in the morning, and keeps our devoted ewes too long in a bare fold, where they had finished up the bits left by the lambs by 6 o'clock on the previous morning; they continue to run the pastures when November comes with its usual rains; the one lot is immediately removed to the drier grounds, where a bite has been kept in anticipation of this period; the other lot remains a few days, perhaps weeks, too long on wet comfortless ground, the bit of grass there is dirty and loathsome from the constant wanderings of the dissatisfied ewes. December comes, but without frost; the good manager keeps his flock on the dry ground, and the sheep walk to the field and fetch them themselves; the bad manager begins to think his ewes look dunced rough, is frightened, takes them away from the grass, and plunges them into a piece of Turnips, gives them as many Turnips as they can gorge, and hay, which they don't care about, having plenty of Turnips, keeps them between the hurdles often in mud up to their bellies. This goes on till January comes, with its frosts, when the sheep, with their roots decreasing apace, and the hayricks diminished visibly; gets frightened again, curtails the Turnips, and cuts straw with hay into chaff; the consequence is that the ewes are always looking for the Turnips, rush at them when the time comes, take in a considerable amount of wind, and consequently feel uncomfortable. Then may be expected a pretty good crop of dead lambs, so the game goes on to lambing time, when the good manager finds himself in a very satisfactory state as regards his too long, and the bad manager has lost four or five. He has few twins, and even the singles have not sufficient milk. He finds when weaning and shearing time comes that he has lost 10 ewes, and has only 80 lambs, and those are a bad lot.

Now, what does our good manager do? We left him in December, it will be remembered, with his stock in a very healthy state. In January, or as soon as they require it, he gives a little cake, and perhaps a bit of chaff, or a picking of mangel, cut, barley, or pea straw, and so on; they are continued or kept up till lambing time, always in comfort, always in health. Observe, I have not mentioned hay as part of their diet. I very seldom use hay myself for sheep, and I am quite satisfied that it is quite unnecessary; and at anything like average market price, it is one of the dearest articles you can consume, and not to be compared to cake or corn as an economical feeding-stuff. I have known a flock of ewes in the middle of the season, and the shepherd says were worth. Can that be right? and what is the reason? Why, some absurd restriction about selling hay, probably. Fancy being compelled to consume hay worth £7 per ton, when you can use cake so much more economically; and will any one say that cake-feeding is not better for the land? Moreover, I object to giving ewes an excessive quantity of roots before lambing. I believe a large amount of ill-luck to be accounted for in this way. Now, the owner of the flock, and the shepherd will be well satisfied, at the probability, at weaning time, with about 80 ewes and 130 lambs. The ewes will keep the lambs well and give them a good start, which is everything with a lamb. Once get a young lamb "dry" in its skin, as we call it—I mean pinched,—and with its back up, and you may move him if you can: he is injured for life.

The parallel I have been drawing in a very rough way, I believe to be by no means an unusual one in real life, and I leave you to draw your own inference of the difference between profit and loss in these two cases. Why, one lot would be worth almost double as much as the other, and yet probably have cost no more to keep. No wonder that some men like sheep while others hate them, that some are "lucky," others unlucky. I believe the great principle of sheep farming is to keep them moving—I mean, increasing in weight, and not recommending "dogging," mind. If sheep once sustain a check, it takes them a month to start him again, and all the food he eats during that period is simply wasted. What does M'Combie say of cattle? "If you want them to pay, they should never lose their calf-sheep, depend upon it." It is quite equally true of sheep, they should never lose their lamb-flesh. I expect we are all pretty well agreed that in sheep business nothing pays better than selling fat lambs, and no doubt, as a rule, it is quite enough, but if it were possible to keep them on for another six months, always doing as well as when with their dams, and with good keeping, it is quite possible, I believe, the latter part of their lives would be as profitable as their beginning. Take, for instance, the prize lot of lambs at Winchester Fair, in October last. The 300 made over—£3 a-head, and you may reckon up the cost of keeping them as you like; you can come to only one conclusion, namely, that they paid right well.

Now, you may depend upon it, they were kept "doing" the whole time. I will here say that the dams of the 1st prize lot have tasted no hay for two or three years, and the principal food of the lambs was Vetches, sainfoin, and Cabbage. I will not pursue the daily life of a lamb from its birth to its death, for that would be asking too much endurance from you. I will simply say that I believe it is very essential to give young lambs a succession of fresh keep if hurdling be the system adopted; let them at least have one fresh piece every day; and if the system of grazing the whole field be adopted, on no account let the keep get too big before stocking, and when stocked don't keep them there too long, remembering that for every day they are kept on the same keep, it is stale they will take two days of good keep to make what they have lost. Rely upon it, for sheep to do well upon seeds or grass, they should be pastured in moderate numbers with other stock, and frequently shifted from one field to another, always having the opportunity of obtaining good water. There's an old saying, "If you want more milk, sell a cow." The same may be applied to sheep—"Do not over-stock!" A few sheep well done will pay a lot more than a large number done badly. Over-stock your sheep and you spoil your sheep, and spoil your land. Here let me say that I think wherever possible there's nothing like keeping sheep between hurdles. They are not only spared a lot of injurious exercise—I speak of grazing sheep—but you get the full benefit of the manure, which, when sheep are allowed to run over the field, is, to a great extent, wasted under hedges and trees, or where it is not required. I am of opinion that it is unwise, as a rule, to keep more sheep on pasture too late in the autumn; or rather, I should say, get them on to roots as soon as you can. I believe a ton of Swedes in October will produce as much mutton as 2 tons after Christmas, unless very carefully secured, and even then they are not nearly so good, or, at all events, they do not make mutton so fast, but that perhaps may be on account of the difference in the state of the land and the atmosphere; but whatever the cause, the result is the same. I like to get on to Swedes, Mangels by October 1st. My own plan is to give them as many roots as they will eat. I speak of fattening sheep with about 1 lb. of cake or corn per day; no hay. I find the sheep, as a rule, do very well, and pay me a fair price for my roots. I find 1 lb. of cake per day and 20 lb. of roots to be about the average quantity a fair-sized teg will consume; and reckoning in this way, I have been always able to calculate the time my roots would last me, and this is sometimes useful to know. There is a prevailing notion that Mangels are unfit to feed with sheep on the land in autumn. This is, I venture to say, a great mistake. I would quite as soon have Mangels as Swedes in October, November, or December; and as they are a much more certain crop, I shall go in for a large proportion of Mangels. I have fattened a lot of sheep on Mangels this last autumn, and never had sheep do better.

And now, in conclusion, let me say that to be successful in the breeding and management of sheep—I mean successful in a pecuniary way—like all other branches of business, it must be thoroughly understood and well carried out. We must think over our blunders and profit by them, and not go and commit the same blunders again. We must look our mistakes fairly in the face, and not slur over them and call it all ill-luck. I know it is generally thought that any fool can be a farmer, and so he can in name; but I am sure that you will find it out for yourself, and not make money at farming. I believe a prevailing error among farmers is a fear of expense. We too often spoil the ship for the sake of a half-penny worth of tar, or the sheep, &c. The most profitable lot of sheep I ever remember were kept the most expensively; after paying for their corn, which they had *ad libitum*, they paid 30s. a ton for their roots.

or temper in breeding and in cattle feeding, disappear when a sufficient number or extent is the subject of observation for time long enough; and till of late years the trustworthiness of agricultural results as a guide to anything like general conclusions has been supposed to depend upon the length of time and quantity of surface which they covered. It was Dr. Anderson, the Professor of Chemistry to the Highland and Agricultural Society, who first systematically advocated field experiments in agriculture on a small scale. Plots, a few perches in extent, took the place in his hands of many-acred fields; and by special care in the selection of soil, and seed, and manure, and special exactness in the observations, and, finally, it was claimed, for these miniature experiments that they were equally significant and trustworthy with the large-scale experiments to which we had been accustomed. It has, however, been reserved for the Royal Horticultural Society to insist upon the safety of reliance upon experiments on a flower-pot scale for agricultural conclusions as to the influence, for example, of manure upon plants; and to the report of one of the first botanists and one of the first agricultural chemists of our time upon a series of agricultural experiments, and very smart set of notes known we have now to direct the attention of our readers.

The following is the description of the experiment:—

"Instead of growing together a number of plants such as are common in pastures, it was deemed desirable to study the influence of various manures on particular species grown separately, in wooden boxes, 2 feet square and 18 inches deep, filled with poor soil, such as is found in unmanured and rather exhausted soils of our fields, and with good drainage at the bottom."

After due deliberation the sub-committee selected the following plants for experiments:—1, *Dactylis glomerata*; 2, *Anthoxanthum odoratum*; 3, *Lolium perenne*; 4, *Poa pratensis*; 5, *Poa trivialis*; 6, *Bromus mollis*; 7, *Trifolium pratense* (perenne), red Clover; 8, *Lotus corniculatus* (perenne); 9, *Lotus uliginosus* (annual); 10, *Plantago lanceolata*; 11, *Achillea Millefolium*; 12, *Carum Carui*. It will be seen that, of the dozen plants experimented on, six are true grasses, three Clovers, and three common weeds in pastures.

"For each of the preceding plants six boxes, each 2 feet wide and 18 inches deep, were sunk in the land, level with its surface, in order to protect the soil in them from excessive evaporation:—1, one box was left unmanured; 2, manured with a pure mineral mixture; 3, with ammoniacal manure; 4, with nitrate of soda, with ammonia and mineral manures; 5, with nitrate of soda and mineral manures."

"The following manures and quantities were supplied:—

Oz.	Peracre.
1.47 sulphate of potash, or at the rate of 1000	1000
1.47 carbonate of lime	1000
15 sulphate of magnesia	100
15 chloride of sodium	100
1.47 bone ash	1000
treated with 1.10 sulphuric acid	750
For box 3, .50 sulphate of ammonia	400
1.47 chloride of ammonia	1000
For box 4, 1.62 nitrate of soda	1100
For box 5, The manures used for 2 and 3.	

"The amount of nitrogen in the preceding quantity of nitrate of soda recommended for box 4, it may be observed, is the same as that in the sulphate of ammonia and chloride of ammonium employed in box 3."

"Dr. Gilbert kindly furnished the preceding manures, which were introduced into the soil by the whole of the soil in the several boxes, the soil itself being procured from Ealing, that in the Society's grounds being deemed too rich for the purpose."

The report describes the observations recorded on the appearance of the several boxes during the germination of the seed, during the progress of the plants from May 3 to July 1; with notes on the comparative effects of the several manures on the various species of plants, and notes on the conditions of the plants on October 13; and, lastly, notes on the relative effects of the different manures on the root development of the 12 plants, and on the contrasts observable between the growth of the root and that of the herbage.

In Dr. Gilbert's report at the close of the pamphlet, on the quantity of dry vegetable matter produced by the several plants under this varying management, we have the conclusion, which will be of great interest to the farmer. The whole of the results are given in elaborate tables and diagrams, and we must be satisfied therefore with one or two short extracts from the description given of the effect in one or two only of the cases experimented on:—

1. "*Dactylis glomerata*."—It will be observed that this very free-growing grass increases but little under the influence of purely mineral manures, but augments by about one-half under the influence of each of the other manures, all of which supply a large and equal amount of nitrogen, but in different states of combination or of association with other constituents. And here it may be well to observe that, pre-eminently so far as the grasses are concerned, the recognised characteristic effect of mineral manures is to favour elation or maturation rather than luxuriance; whilst the characteristic effect of nitrogenous manures is to give luxuriance rather than maturing tendency. The fact, therefore, of any increase by mineral manures alone is some indication of the over-ripeness of the unmanured plants in available nitrogen; and that, at the time of cutting, there was not more produce where the ammonia salts or the nitrate was employed in admixture with mineral manures (the conditions of both luxuriance and maturation being thus supplied) than

Notices of Books.

Influence of Manures on Plants.—"Reports of Experiments made in the Gardens of the Royal Horticultural Society, during the year 1869, on the Influence of Various Manures on Different Species of Plants." By Dr. M. T. Masters, F.R.S., F.L.S., and Dr. J. H. Gilbert, F.R.S., F.C.S. (From the Proceedings of the Royal Horticultural Society.) Taylor & Francis, Red Lion Court, Fleet Street. 1870.

Agricultural opinion is generally an impression—the result of so many years' experience which have come and gone, exerting what influence it might upon a mind of not above the average power of observation; and most people, we believe, would rather trust the judgment of an old farmer upon matters agricultural than in this country than the most elaborate inferences from the figures of the analytical chemist declared to the third place of decimals. But agricultural opinion is sometimes the result of an accurate observation of the reply of Nature to a careful question; and the experiments on which it is then based have been carried on over whole fields or whole flocks and herds for years. It can hardly fail of being trustworthy under such circumstances. The variations of soil or of seed in plant culture, of individual character

where they were used alone, is probably accounted for by the facts that where they were used alone there was, owing to the richness of the soil, a sufficiency of mineral matter within the increased root-range for as full an amount of produce over the area as the limitation of season would admit of; whilst, where both the nitrogeous and the mineral manures were employed, the limitation of season again prevented any increased effect from the increased supplies by manure.

2. "*Trifolium pratense*."—The plants in all six boxes were luxuriant and more or less crowded. Still the mineral manures gave a marked increase; and, excepting in the case of No. 5 (minerals and ammonia, from which it would seem the plants suffered), the nitrogeous manures gave a further increment of increase, and the nitrate somewhat more than the ammonia-salts. In fact, the effects of nitrogeous manures were, upon the whole, greater than could be expected from the small quantity of the family to which this belongs, when they are grown on soils less rich in the mineral constituents required. The variation in the proportion of mineral matter is not great; but the percentage is higher under the more manured conditions than under the unmanured; and from the greatly increased development of underground feeders under the manured conditions, we have additional reason for supposing that the late-sown, crowded, and luxuriant plants had not attained to the maximum growth at the time of the final cutting of the season.

3. "*Plantago lanceolata*."—Of all the 12 species, the *Plantago* gave the most growth aboveground. Even without manure the dry substance produced was equivalent to about 8 tons per acre, representing an assimilation of more than a ton of mineral carbon. These results were even less produced by mineral manures than without manure. The nitrogeous manures, however, gave increase, and more when combined with mineral manures, though, from the very large produce over the limited area without manure, there was not room for much increase under any circumstances. The percentage of mineral matter in the dry substance was throughout comparatively low; and, consistently, whilst many of the plants were unripe, many were freely seeding.

The pamphlet from which we have given these extracts well deserves the study of the farmer. He will find in it a detailed confirmation of most of the conclusions, regarding the influence of various manures, to which Mr. Lawes had been led by many years' observation at Rothamsted.

Farm Memoranda.

EAST BARN, EAST LOTHIAN.—Among the many farms in East Lothian which present examples of high cultivation pursued in a profitable manner, there is one to which we propose briefly to direct the attention of our readers, having at different times had opportunities of becoming personally acquainted with the system of management pursued upon it. Some years ago we gave an account of it in a contemporary journal, but since that time we have been put in possession of additional facts relating to it.

The farm to which we allude is that of East Barns, situated about 3 miles south from Dunbar. It is part of the estate of Mr. Mitchell James, and is in possession of Mr. James Murray, who has been on the land for 19 years; a second lease for that term of years being now drawing near its termination. The farm consists of 500 statute or imperial acres, or 308½ Irish; and the yearly rent is £2400, or £4 16s. per statute acre, which is equal to about £7 15s. per Irish acre. The farm is bounded on the east side by the sea, it lies on a gentle slope, the highest point being 150 feet above sea level. The soil is generally of a strong nature, and belongs to what is locally known as the "red soils," a name which is descriptive of land, and is celebrated for the superior quality of the crops of Potatoes produced on them. For the most part the fields range about 70 statute acres in extent, and have all been thoroughly drained. The only permanent pasture on the farm consists of an outside field of 18 statute acres, through which a small river runs, affording a constant supply of wholesome water for stock.

The rotation followed by Mr. Murray is (1), Turnips—partly consumed by sheep folded on the crop; 2, Barley; (3), grass, mown and used as hay, part pastured; (4), grass, pastured, chiefly by sheep; (5), half in Oats and half in Potatoes; (6), half in Potatoes (after the Oats), half in Beans, Peas, Cabbages, and Carrots; (7), Wheat.

The Turnip crops grown at East Barns are usually very fine; even last year, when the plants in many Turnip fields in East Lothian never came properly away. Mr. Murray had no reason for complaint on that ground. The manure used is farmyard dung and dissolved bones, and the manure is applied at 55 to 60 bush. per statute acre, the bushel weighing from 57½ lb. to 59½ lb.; or say from 28½ cwt. to 31½ cwt. per statute acre, equal to from 45 cwt. to 61 cwt. per Irish acre.

The Oat crop, it will be observed, does not occupy the same extent of land at East Barns as that which is allotted to Barley and Wheat. The chief use to which the produce of this crop is applied is the feeding of the farm horses and a small quantity of meal for the use of the farm labourers, who are paid, as is usual in Scotland, partly in kind. The Potato and Tartary are the kinds of Oats grown on the farm, and any surplus is usually sold for seed. The Potato Oat produces at East Barns from 50 to 60 bush. per statute acre; weight, 45 lb. per bush. This is equal to from 20½

cwt. to 24 cwt. per statute acre, or from 33 to 39 cwt. per Irish acre. The Tartary produces from 90 to 100 bush. per statute acre; weight, 40 to 41 lb. per bush.; or from 27½ cwt. to about 36½ cwt. per statute acre, equal to from 34 cwt. to 58 cwt. per Irish acre.

The rough-chaffed Wheat is the variety which has been grown by Mr. Murray for several years past. He gets a change of seed every year from Essex, sufficient to produce enough seed to sow the bulk of the break in the following year. The average yield of Wheat on Mr. Murray's farm is from 48 to 50 bush. per statute acre; weight, 65 lb. per bush. We have known the yield at East Barns to be as much as 60 bush. per acre, or nearly 35 cwt. per statute acre. The average yield, however, is from 27½ cwt. to 29 cwt. per statute acre, or from 44 cwt. to 47 cwt. per Irish acre.

The stock on the pastures consists chiefly of sheep in various stages of preparation for the butcher. Mr. Murray's system is to buy in from 700 to 800 half-bred and "three-part bred" lambs in July and early in August, at the great fairs of St. Boswell's and Melrose. The choice of the produce of one or two crosses of Border Leicester rams with Cheviot ewes, or once-crossed ewes. They are put on the pastures, and at the proper season on Turnips. They grow well, are rapid feeders, and produce a superior description of mutton. Neither cake nor corn is given, as a rule, to the fattening sheep, the grass produced on East Barns, as well as some other farms in the neighbourhood, being of a very fattening nature. Besides the sheep mentioned, Mr. Murray has been in the habit of keeping a small half-fat sheep at different periods of the year, and of finishing the rest of the stock. The only stock of cattle kept during the summer are the cows belonging to the ploughmen, and two or three for the use of the house; but in October, or early in November, about 80 Shorthorn bullocks, two and three years old, are bought in to be fattened during winter on Turnips and straw, with about 3 lb. of cake per head daily, the allowance being gradually increased up to 6 lb. per head.

It is to be observed that half of the sea, when broken up, is put under Potatoes to which crop, however, neither farmyard dung nor artificial manure is applied as Mr. Murray finds he can get a sufficiently good crop without the aid of manures. The yield is about 7 tons of marketable Potatoes per statute acre, or from 11 to 12 tons per Irish acre, besides small Potatoes not suitable for market. The variety grown is the Regent, and the crop is bought up for the London market. Growing Potatoes on lea, in rotation, is a common practice in East Lothian, but in the generality of cases little or no artificial manure is used, and the crops of the previous year are largely supplied with cake, which tends greatly to enrich the land. Mr. Murray employs seaweed chiefly in growing Carrots. The best roots are purchased for the Edinburgh and Glasgow markets, the small or otherwise inferior roots being consumed by the farm-horses.

There is one point which any one visiting East Barns will scarcely fail to notice—viz., the close "sole" in both the winter and summer grass. On remarking this, Mr. Murray attributed it to the heavy use of Clover he gives, amounting to fully 20 lb. per statute acre of the different kinds of Clover; that is, fully 32 lb. per Irish acre. The quantities given in Lawson's Tables for one year's hay and one year's pasture amount altogether to 12 lb. per statute acre. In connection with this point we may mention that when red Clover was first brought to East Lothian from Holland, a little over 100 years ago, by the then Earl of Haddington, a little was known of the quantity of seed required, that "they sowed a boll to the acre"; that is, 6 bush. to the Scotch acre, or, in round numbers, nearly 24 cwt. to the statute acre. The effects of that enormous seeding were visible for many years afterwards in the extraordinary luxuriance of the pasture. In general, farmers in East Lothian use fully more Clover seed than the quantities set down in Lawson's Tables. This was brought out in a discussion which took place some years ago at a meeting of the East Lothian Agricultural Society, a report of which appeared at the time in this journal; and we may remark, that to seed fully in case of Clover, and also of Turnips, is a very safe practice.

As the condition of agricultural labourers, and the best means of improving it, has lately excited a degree of attention on this side of the Channel, the following particulars will probably be regarded with some interest. From 18 to 20 men, about 20 women, and six boys and girls are regularly employed at East Barns, the latter being trained to all kinds of farm work suitable for them. There are extra hands engaged for harvest, Potato raising, &c. The regular hands have for the most part been all their lives on the farm, and it very seldom happens that there is any change among them. The wages of the ploughmen and other male workers on the farm are made up of a number of different items, such as an excellent dwelling-house and garden, a quantity of Potatoes planted in the field, victuals in harvest, a considerable quantity of Oats, Barley, and meal. Each cow kept for each family has a small round, liberty to keep a pig or pigs, and part in money. The wages of the first-class male workers, made up in this way, are reckoned as equal, on the average of years, to 20s. a-week. The wages of the second-class, who have not a cow, but a larger proportion in money, are calculated

as equal to from 15s. to 16s. a week. The female workers, when these are not the daughters of the ploughmen, &c., have a free house and garden, Potatoes planted in the field, extra wages in harvest time, victuals, and 1s. a-day in money at ordinary work, which, altogether, is reckoned equivalent to 9s. 6d. weekly all the year round. Mr. Murray was in the habit of getting over each harvest from 50 to 60 Irishmen, as he preferred cutting with the hook; but last harvest the crops were well adapted for the reaping-machine, which was extensively used by him, so that he only required 12 extra hands at that season. We cannot refrain from mentioning a very pleasing fact in connection with Mr. Murray's band of Irish reapers. Most of these men have gone regularly to East Barns every harvest for many years; but there are two or three brothers among the number, and one of them completed his 43d harvest last season in Mr. Murray's employment; the other brother, after assisting to reap 40 harvests in the same employment at East Barns, and on the farm which Mr. Murray held previous to becoming tenant of East Barns, has not been able to cross the Channel for the last three years. Now this we consider a most creditable circumstance both for the employer and the men. The wages paid to reapers last harvest by Mr. Murray were 21s. a week, with lodging and food. The food or "victuals" given during harvest to all engaged consists of as much oatmeal porridge—"strabuit"—and new milk as each person can consume for breakfast; a large roll of freshly-baked wheaten bread and a bottle of beer for dinner; and a supper same as the breakfast. The meals are cooked for the workers, all of whom, with their families, are supplied during harvest, whether regular hands or those temporarily engaged. This is the general system in East Lothian.

It has been stated that the male workers on the farm have excellent dwelling-houses provided for them as part of their "gains" or wages; and when we say these cottages are excellent, we describe them as they really are. The cottages, as usual in Scotland, are built of stone, freestone, and slated. They form three sides of a square, having the out-offices and gardens behind; and the centre of the square is occupied by an ornamental and carefully-kept plot, filled with evergreens and flowering shrubs. The cottages originally provided for the farm having been found rather limited in point of accommodation, several new cottages were erected about four years ago, and we believe at Mr. Murray's expense. These cottages are even superior to those first erected, and contain four apartments, besides pantries and small dairy. The kitchen and pantries are paved with fire tiles, but the two sleeping apartments and best room are floored with deal. The walls are white washed, and each kitchen is furnished with a new cottage range and other conveniences. The furniture of these cottages is not merely substantial, but in many instances actually handsome and expensive, which we consider the best possible evidence of the comfortable condition of the owners. Mr. Murray takes a great interest, and we may say pride, in his workpeople, which is shown in many ways we do not consider ourselves at liberty to bring under public notice; but there is one thing we may mention, the farm provided an excellent library, containing between 500 and 600 volumes, for their instruction and amusement, and the manner in which the books have been used, especially during the winter evenings, shows how much they appreciate the boon.

We have heard a good deal of late of the Oxfordshire prize farms; but we feel convinced that East Barns will compare favourably with any of them. Several gentlemen from Ireland have visited it, and been highly pleased with all they saw; and should any other gentlemen feel inclined to do the same, we take it upon ourselves to say they will not leave East Barns either dry or fasting. *Irish Farmers' Gazette, January 7.*

Obituary.

WE regret to announce the death of Mr. PETER STEVENSON, of Rainton, near Thirsk, which took place suddenly on Sunday, January 29. Mr. Stevenson had been for many years a valued correspondent of the *Agricultural Gazette*. He was in the 74th year of his age.

Miscellaneous.

A TEST FOR WATER IN MILK.—It is, as is well known, a remarkably difficult matter to detect water in milk, so as to say for certain that it has been added. A test which appears likely has been devised by Dr. A. E. Davies, F.C.S. Such a test, he believes, we have in the specific gravity of the serum, or liquid portion of milk, from which the casein and fat have been removed by coagulating and straining. The gravity of this liquid he has found to be remarkably constant, ranging, in that obtained from genuine milk, from 1.026 to 1.028; and, by carefully ascertaining the specific gravity of the serum of genuine milk diluted with various quantities of water, we may obtain a standard of comparison which will enable us to say, within a few per cents., what quantity of water has been added to any sample of milk that may come under our notice. *Chemical News.*

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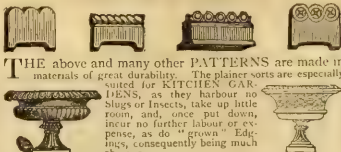
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THE GARDENERS' CHRONICLE AND AGRICULTURAL GAZETTE.

No. 6.—1871.]

SATURDAY, FEBRUARY 11.

{ Registered at the General Post Office as a Newspaper. } Price 6d. POST FREE, 5¹/₂d.

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CARRIAGE FREE.

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Wm. PALLERTY, Secretary.

The Gardeners' Chronicle
SATURDAY, FEBRUARY 11, 1871.

MEETINGS FOR THE ENSUING WEEK.

TUESDAY, Feb. 14 {Royal Horticultural (Anniversary), at S. Kensington .. 3 P.M.

{Royal Horticultural (Fruit and Florist Committees), at S. Kensington .. 11 A.M.

WEDNESDAY, .. 15 {Royal Horticultural (Fruit and Florist Committees), at S. Kensington .. 11 A.M.

{Ditto (General Meeting) .. 3 P.M.

THURSDAY, .. 16 {Linnæan .. 10 .. 8 P.M.

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make any way in the world against the odds that I have to contend with." To such we would say, recollect what GEORGE STEPHENSON made himself, what ELIHU BURRITT, who speaks nine languages, and many others, have done by perseverance. Let them get and read "Self Help" and "Men who have Risen," and if those works do not nerve them to industry and a determination to rise, nothing will. It has been said that a young man who has learnt the rudiments of the three R's, "reading, riting, and rithmetic," may make himself anything he pleases. Of this we have not the slightest doubt, if he has only the pluck, the indomitable courage, to will that it shall be so. Courage is the great thing, and without courage and industry no man ever became great in any walk of life.

The table of the hare and the tortoise is yet a household word, and we believe the progress of fast men and steady young ones will, in the world's history, be much the same as it always has been; and that patient endurance with industry will always beat the showy and light-footed competitor. We would wish particularly to impress this fact upon the young gardeners at this season, when the long evenings give them ample time for study. More particularly would we impress upon them the indispensable necessity of their becoming thoroughly good and expert workmen, not only in the mystery of potting and training plants, but also in the more necessary duties of digging, trenching, draining, &c. We now count our practical experience in the garden by near half a century. During that time we have worked with, or had the direction of hundreds of men, and of the whole number we can safely say we have never met with half a dozen who could be considered experts in their calling, or who, if a plan and datum line was given to them, could carry it out in a systematic manner. A large majority of young gardeners have no idea of lines and levels; the coolitude, the dumpy level, or even the use of the simple boning staffs are sealed books to them; and they know little more of making up an edging to lay Box to, than they do of Greek or Latin. The best architects are those who have had a practical initiation at the "bench," and they are the best because they make plans that are capable of practical execution. The best gardeners are those who know the practical use of every tool, and who can handle the spade, the pick, or the pruning knife, and give their reasons for using them in the best manner. Now, however, to know the right way of using tools, or at any rate to use them, is considered by the young gardener of the period *infra dig.* But a few days back the gardener of a nobleman in a northern county, where some 50 or 60 men are employed, receiving notice of an unexpected incursion of visitors the following day, gave directions to his foremen that certain young gardeners from the plant and forcing houses should go out and assist to put an extra clean face on the place. This they most positively refused to do, saying "it was labourers' work;" and giving them their choice to obey orders, or leave the place, several of them left rather than submit. How are we to characterize such ignorant obstinacy as this? Shall we attribute it to that species of management, prevailing in some gardens, which places youth in the houses and keeps them there, leading them to believe that the management of the kitchen garden, and the execution of new ground-work forms no part of a gardener's education? Fatal error! the rock upon which scores of gardeners have wrecked their fortune for life, is that which leads young men to believe they can become proficient in any art, without first learning the rudiments of it.

Again, a first-class gardener, holding a small, but noted place, wanted assistants. One made application dressed in the height of fashion—a light summer suit and blue tie, white felt hat, with scarlet band, drab sea-side boots, pale lavender kid-gloves, and a short fashionable walking-cape, with silver knob. The gardener, a plain, hard-working man, met him, and thinking he was some friend of the family, humbly raised his hat, when to his disgust he found the exquisite before him was a suckling gardener, "begging a brother of the earth to give him leave to toil."

A few questions sufficed to show that the creature sought a situation, but not work. "He would take a place in the house, but would not do outdoor work," he was a "scholar," and had learnt "architecturing" whatever that may mean.

Lastly, a retired gardener, who had built five or six small plant and forcing houses, and who

other ingredients mentioned after the same manner, and at the same season, omitting of course the water and the covering of the heaps with soil, as for the lime. These top-dressings, as I just now observed, are not advantageously administered when they can be procured, alternately annually, but when the soil is of a chalky nature the lime must be dispensed with. I have grown my Potato crops on the same ground consecutively for 23 years, and I adopt a third-course system as follows:—

If convenient, during the dry hot days of autumn a third of the ground is manured. We hear much about earth-closets and house-sewage now-a-days as being something new and difficult to deal with. The process is no difficult thing to myself, I may say, for a period of 35 years. One of our sewage-tanks and our earth-closets have been in use during 23 years; and my first liquid-manure tank was made 36 years since in Shropshire. We have two sewage tanks now (and I require another), the sediment from which is cleared out once a-year, and mixed with road-scrappings, along with the contents of the earth-closet pits, in a back yard, to which the produce has gone out of the mixen, an agglomeration consisting of the refuse of the garden, decayed hot-beds, chiefly of rotten leaves, and all the sweepings and refuse that are to be collected from about a house and grounds in the country, the goodness of which has been carefully preserved by constantly sifting over it dry earth or fine cinder ashes during the collection of the mass.

This "muck-pie" is then carted on to the ground by degrees, as the trenching proceeds, and no more of it at a time than can be worked into the soil during the next few hours; and when I mention trenching, and perform that operation in the autumn, I mean thorough trenching either with spade or fork, in contradistinction to bastard or half-trenching. The latter is best done in the spring months, because it is always better to avoid raising to the surface a full spit deep of subsoil which has not been disturbed for a generation, or probably never before; for then a poor crop, or scarcely any crop at all, must be expected for a year, or until it has been subjected to the ameliorating influences of the atmosphere. So we will now suppose ourselves at the beginning of November, with our ground thoroughly trenched, and the manure or compost well mixed throughout the whole body of the soil, and the bottom spit uppermost, to pulverise and brought to the surface by the treading and the eggs of the larvae of the deep dwelling creeping things made to undergo the deadly embraces of Jack Frost, whilst their more active progeny of the top soil are buried and being done for deeply out of harm's way.

This reversing of the natural order of things is a great provocation to insect life, and greater destruction is dealt out to them by trenching and thorough and deep disruption of the soil, and the power of the draining nostrums put together. Nevertheless, they do perform a part, and an acknowledged part in the economy of Nature, but chiefly in the mechanical action which they exert upon the soil, which brings me again in due course to consider this department, on which I prefer to apply the quicklime, to attack the stubborn slow decaying remnants of the refuse of the compost and the inorganic substances of the subsoil, which have been lying buried and unproductive for ages, which the potatoes would have no use so till Doomsday had they not been brought up to the light. Now, in contradistinction to your correspondent's soil, which is "dry and slaty," I must inform him that the soil which I have operated upon as above was a rich hazel loam with a stiff marl subsoil in Shropshire; here, in Oxfordshire, the soil is a stiff, dark stony loam with a clay subsoil, and of the very worst. Still I would "go at" his soil in the very same way, and if I could not get the depth, if the subsoil was too slaty to be brought up, I would plough it with the subsoiler, and rout it about somehow; and in regard to the soil and salt and the lime, I would curtail the quantities one-third per acre after the first application. The mortar rubbish, and even the wood-ash might be left optional, or not be applied at all should a difficulty be found in procuring them; about 5 cwt. of potash of fine quality would be allowed to chime in very advantageously as a change.

For light soils worked on this principle, I recommend the flat system of planting Potatoes, to be done as early as possible, say in the beginning of February, using a dibble, and planting 7 inches deep, afterwards slightly scarifying the ground between the rows, to keep down weeds and to let in the air. Potatoes which produce gross foliage are more suitable for light soils than those with meagre tops, and a tuber that will form deep eyes in a rich loam, will grow shallow-eyed upon a light land. The flavour, too, becomes strangely altered. I could grow the same variety in this ground, at Woodstock, partly on flat untrenched ground, and partly on the ridge-and-trench system, and the tubers produced on the latter plan would be reified as a first-class meally Potato when cooked, whilst those grown upon the flat untrenched part of the plot would be considered as quite unpalatable. In fact, upon the sullen soil we have here I could scarcely ever get a Potato fit to eat, until some 18 years ago I began to adopt the ridge system, which I will next explain, in order to reach more than one description of

soil, and the necessities of those readers, whose ground may lay damp or shaded.

Concluding that the land has been trenched as noted above, and that the top-dressing of lime, or soil and salt, has been given, then about the first or second week in April will be time enough to plant on heavy ground. For first early Potatoes allow 36 inches between the rows, and for store sorts quite 42 inches—do not be afraid of these distances. Measure out the widths by straining two lines where two rows of sets are to be, and then place the seed tubers upon the surface of the soil, close along by the lines, at 1 foot set from set for the early kinds, and at least 15 inches apart for the late sorts, which for this description of head and cultivation should be second early ripeners and late keepers, say, such as Daintree's Second Early Round, Paterson's Scotch Blue, Gryffe Castle Regent, Rintoul's New Early White Don, Rivers' Royal Ashleaf, Veitch's Improved Ashleaf, Wheeler's Gloucestershire Ashleaf (much alike), Wheeler's Milky White, Dean's Waterloo Kidney, Almond's Yorkshire Hero, and Haigh's Lapsone Kidney—all first-class sorts. Well, two lines for each description of head and cultivation should be the lines between the two rows of sets, if the eye and practice cannot be depended upon without—at an inch or two wider than a Parke's steel fork—never use the spade on a good holding soil—so as to afford a guide in casting out the soil, which eventually will form the trench between two ridges. When the soil is of a very tenacious nature, a spade may be used to make a cut in continuous, rather sloping inwards, should be an insubstantial line, as to reject the soil from the shoulder of the trench, and make appearances more even to the eye. I scarcely ever adopt the practice now, as I find the times of the fork perform this part of the work nearly equally efficiently as one proceeds, by allowing one's senses to work, and it saves time and tramping unnecessarily over the ground, which is a great point to have gained, in cases where a footprint left will afterwards become consolidated like a brick. Now, their force the fork about half the length of its tines into the ground, and cast the soil alternately right and left, not plump over the sets, as that would displace them, and possibly break off the young shoots with which they are, or should be, provided, but as far from them as the edges of the ridge will allow, and which practice soon enables one to know how to do, so that the seed Potatoes will appear as if lying in a hollow. The trenching, which is done, will displace the sets, and the shells out, must be made to take a central position upon the sets, and to cover them about 3 inches deep, without, as I just now cautioned, injury to the young shoots, in lieu of piling up and forming the ridges at once to their proper height (for a superincumbent weight of earth, in consequence of the ground remaining loose from having been trenched, might cause, during the first wet weather, a troublesome displacement of the ridges of the ridges down into the trenches); but in another fortnight or so, when the ground is more settled, or the young green tops of the sets are to be seen just peeping out, then will be the time to cover over with another half-depth of the tines of the fork with soil as before, and shovel out the final "crumbs," viz., the loose soil from the trenches, at any other period not long distant—say, over the young foliage when frosts at night are likely to prevail, eventually finishing off the ridges, and leaving the sets to be left to themselves. They may be so left, with the exception of pulling off a few weeds from them when found necessary, until the Potatoes are ready to take up, though the mind of the worker must not rest; but at once begin to consider how the trenches may be occupied most beneficially with the Cabbage tribe. I plant Brussels Sprouts by preference in the trenches, as they are always useful in household use, and always find the Cabbage tribe apt to be planted; but I find the tops of the Potatoes are apt to draw them up, and otherwise interfere more than is good for them. The soil in the trenches is well soaked occasionally as soon as the Potatoes are "lifted," with sewage from the tanks, and the Brussels Sprouts relish this treatment amazingly, so much so as to make it soon appear incredible to a great many how it was possible that I could have secured a first-class Potato from between them. The above is the ridge-and-trench plan.

Keeping your correspondent's questions strictly before my eyes, I will now advert to the second and third divisions of my courses, and drop the personal pronoun by supposing ourselves to be setting to work upon half-trenching the soil immediately, if it is of a light nature; otherwise, that we shall complete this operation before the middle of March, by degrees, as opportunity occurs; or, if it is garden ground, such as the Cabbage tribe or white ones are used from off. Never use green stable manure or raw dung in any shape when planting Potatoes in the spring time of the year, as it encourages all kinds of insects, gives a bad quality to the esculent, and favours skin diseases, and the Potato disease itself. Eschew it as you would the plague, and never, as I said before, cast a full spit of subsoil on to the surface in spring, or during the digging time of the year. The merest toy now-a-days knows that however large or small his allotment of land may be, it will never do him any good if it lies wet and sour, unless he wants it to grow withies or rushes. Let it be well drained

for growing Potatoes, and the next thing now to be considered is the thorough mouldiness of the soil. Draw a mark lengthwise over the ground, and step it 12 yards broad, and divide this breadth in half, and from one half at the beginning measure, and dig or fork out a trench one yard wide, and cast the top spit along with the shovellings opposite the end of the other half. Now with the fork break up the bottom spit. I was compelled to use a pick, and allow it to remain in the bottom. Before we dig any farther, supposing a heap of well-rotted manure or compost is at hand, then heap a part of it equally over so much ground as is likely to be half-trenched in one day, and spread it as the digging proceeds; or, that is, before another trench is measured, and then turn this top spit on to the bottom one previously broken up, and cast the shovellings on the top of it, fork up the bottom again, and so on, till we find ourselves opposite to where we began, or quite round, when we find the top spit of the first trench lying ready to fill up our last one. Step out another 12-yard breadth, divide it, and so on, as above; and, *appropos* to garden ground, do not trench or dig at all, with the drip of fruit trees; if the circumference of the branches guide us, or, say, up to 2 yards from the stems of espaliers cut or saw off what roots there are up to those distances, and smooth off with a knife; this will make them throw out fresh fibres near at home, and rather do good than harm. And here we have what is called bastard, or half-trenching, and upon which the salt and soot mixture would work as much good for with the drip of fruit trees as it could apply. Then, I would advise him to plant on his "light slaty" soil, Paterson's Victoria, Webb's Telegraph *alias* Daw's Matchless (kidneys), and Early Emperor (red), Rintoul's Early White Don, and Gryffe Castle Regent (as rounds), also, Sutton's Red-kissed Flourball would suit his soil, and give him heavy crops for field culture. The above are all of gross foliage. One-third of the division should be devoted to early Potatoes, such as Hogg's Early Goldstream, and Turner's Union (rounds), also, Montpelier, Fries's Prolific, Rivers' Royal and Veitch's Improved Ashleaf (kidneys), also the Early Rose and the Early Goodrich (Americans), and after the early Potatoes, flying crops of Grange's Broccoli, Lettuces, &c., when well watered with sewage, could be got from this compartment in time to allow it to undergo a thorough trenching in the autumn. Formerly, in Shropshire, where horses, cows, and pigs had to be considered, I allowed a third of the ground to remain unplanted, which was the case with the Red and Mangel Wurzel, and I preferred the thoroughly trenched compartment to sow them upon. I have thus grown the Belgian Carrot at the rate of 20 tons per acre.

But here the glebe land is situated in the midst of a strict game preserve,—most unfortunately so, and in consequence of the vermin to continue my practice was simply an impossibility; therefore, I have, since the game laws were made, been obliged to leave ground (minus horses, cows, and pigs), and that chiefly a garden; and although my primary object is still the cultivation and improvement of the Potato, I manage to "steal" such other vegetable crops as are required for the use of the household, from off the divisions between the Potato.

As your correspondent has not specified whether he means field culture especially, I have so given him advice in connection with the Potato, and for himself or others of your readers, who may also want to "grow Potatoes," and to furnish their differing soils with substances that will be required to produce them from generation to generation, without ransacking the world from "Indus to the Pole," for guano, or other foreign products, the like of which I have never purchased an ounce of.

Lastly, in answer to my friend Mr. Earley (p. 45) allow me to say, that I do not see Potatoes and seed Potatoes, and, so far as my practice and judgment have led me to observe, I find the "Potato murrain" is more encouraged by over-ripe than from unripe seed. When deciduous or other plants are raised by unripe cuttings, it does not hold that their species become deteriorated in consequence, and a Potato that has become sufficiently ripe to put forth its shoots is more likely, I should say, to be endowed with fuller powers to maintain its stamina, than a tuber which has become over-ripe; or in that case it has always struck me as being more fitted for food, and much more likely to become attacked by "fungoid growth" when cut and stacked up into sets, after having undergone the usual enervating processes of larger tubers, viz., several winter "sprutings." I confess, however, that Mr. Earley's theory is too searching for me, and I wish I was sufficient of a physiologist to satisfy myself, as I will, however, simply state what my practice is, and has been in regard to seed Potatoes, and give him a preliminary anecdote as my text in my next communication.

Robert Fenn, Rectory, Woodstock.
(To be Continued.)

THE EVERGREEN GARDEN.

It is only in seasons of severity, like the past, that we can fully appreciate the value and of really hardy evergreens for the furnishing and decoration of our gardens and pleasure-grounds. The utter wreck and ruin of all tender subjects, whatever their merit in other respects may be, which marks the pro-

gress of a winter with the thermometer verging upon zero of Fahrenheit, only proves the utter un wisdom of relying upon anything in the shape of an evergreen which has not been thoroughly tested. For want of this discrimination between safe and unsafe plants, many a shrubbery and many a pleasure-ground bears at this moment the ruthless marks of the destroyer.

Of course, sheltering plantations of the hardy evergreen trees, such as are found amongst the Firs and Pines, is a necessity round about a mansion, if only they are kept in their proper places; but we refer not further to these. The pleasure-ground, too, must be furnished with its sheltering shrubberies, composed in the main of the commoner hardier kinds of evergreen shrubs, as the Holly, Yew, Box, &c. But of all the uses to be made in the home grounds, of the multitude of handsome shrubs to be found in the nurseries, commend us to a Garden of the better class of really hardy evergreens for a choice setting of foliar and floral beauty, in the spring and summer months, and for a picture of cheerfulness and comfort in the days when old Winter has crumbled up all the summer and autumnal flowers, and has laid his icy hand on many of the so-called hardy subjects which come to us with the high-sounding recommendations of inexperienced enthusiasts.

Such an Evergreen Garden as we contemplate is, perhaps, a costly one, but, once provided, it is well worth its cost; and it may be pointed out that there is this obvious advantage in associating together the choice subjects we have now in view, namely, that they then give us a garden scene which is complete and enjoyable without drawback or alloy; while, if the very same things had been scattered promiscuously throughout a pleasure-ground, they would comparatively have yielded but little effect, and would indeed have but shown up the more plainly by contrast the havoc which a low winter temperature is sure to carry with it. We have been led to make these remarks, by way of introducing some figures of evergreens of the class alluded to, which we borrow from Mr. Anthony Waterer's excellent catalogue, to which reference was made at p. 1701, 1870; and we may add that such an evergreen garden as we are now contemplating may in fact be seen in the Knap Hill Nursery, and requires but to be seen to be appreciated.

The long drive which passes through this extensive nursery runs through a large circular garden or parterre of evergreens, which though in this case intended for the trade purpose of displaying choice articles for sale, is at once suggestive of the desirableness of introducing such a feature in every demesne. This evergreen garden is simply formed by judiciously arranging a select collection of beautiful specimen trees, of varied size, form, and colour. It is intersected by circular and



Head, 13 ft. 6 in. circ. FIG. 35.—RUSH SPECIMEN OF WATERER'S HOLLY. [From a photograph.]



Head, 24 ft. circ.]

FIG. 36.—STANDARD RHODODENDRON.

[From a photograph.]

radiating walks, dividing the surface into beds, these being filled with such dwarf evergreens as the numerous hardy Heaths, *Daphne Cneorum* major, *Andromeda floribunda*, and other things so hardy that they bid defiance to the severest cold, and margined by contrasting subjects. These plants, varying in hue amongst themselves, each too in its season furnishing its quota of flowers, serve in a general way as a surface furnishing to the ground, and are well adapted to set off the finer specimens displayed amongst them at regular intervals, such as standard and pyramid and conical Hollies, green, black, and variegated; columnar Cypresses, Yews, and Blots, golden-headed Yews, &c., while some of the dwarf Firs, as *Abies pumila*, are freely and effectively used to define the borders of the drive.

Looking up materials to furnish such a garden, the first place for thorough hardiness must be given to the gracefully pyramidal vivid-green *Cupressus Lawsoniana erecta viridis* (see *Gardeners' Chronicle*, 1870, p. 279), which is absolutely untouched by the cold, and is the greenest of all the green shrubs to be found throughout the immense extent of this nursery. Year after year, from the first, it has thus stood perfectly unharmed, proving it to be without question the best hardy evergreen in cultivation. How greatly is the value and importance of such a plant brought out and made evident by such a season as this!

The Hollies come next in merit and importance, and though not all equally hardy, there are yet several of them which are able to brave all weathers with impunity, while some of the others which occasionally suffer slightly through excess of variegation, when not quite recently moved, are yet practically un hurt. One of the finest of the variegated sorts is the Waterer's Holly (fig. 35), remarkable for its small leaves and dense growth, and forming conical specimens of the utmost symmetry. Other variegated sorts, both gold and silver, and amongst them that known as Golden Queen (of which a standard is represented at fig. 37), are invaluable subjects for the evergreen garden, since the bright marginal colours of their leaves serve, by contrast, to lighten up the whole group of which they form part; while several of the dark-leaved, almost black-green, Hollies are not only effective, but utterly regardless of frost, however intense. Amongst the more distinct and noteworthy of this latter group are *laurifolia*, *ovata*, *scotica*, *tortuosa*, and *donningtonensis*. The green and golden hedgehog-leaved Hollies, too, are perfectly hardy sorts. For parterre work all these Hollies may be used, either in the form of standard trees, pyramids, dwarf cones, or low bushes.

Amongst the choice subjects of pyramidal habit, in which category comes the Cypress above alluded to,

Taxus erecta may be commended for its remarkably neat habit and healthy green colour; and *Biota elegantissima*, for its strongly contrasting bright coppery-brown hue during winter, and its golden tint in summer. *Taxus hibernica* is a well known deep green evergreen of columnar habit, not liable soon to outgrow the positions it is required to occupy; and *Taxus japonica* is another fine columnar dark green shrub, perfectly hardy, and with rather a bolder character, though dwarfier than the Irish Yew. The Golden Yew, worked on the Irish Yew or on columnar plants of the common Yew, is a very telling plant, and indeed in any form, bush or cone or pillar, may well form part of such an assemblage as we have now under notice.

Passing on to shrubs of looser habit, we come to the well known *Cupressus Lawsoniana*, which is perfectly hardy and always elegant, though far surpassed in beauty by the more regular-growing feathery *C. Lawsoniana gracilis*, the colour of which is a rather pale shade of green. Then we have *Juniperus chinensis*, light green, and elegant; *Retinospora obtusa*, bright green; and *Thujaopsis dolabrata*, sap-green—all good. In dwarf compact bushes, we have the invaluable *Thuja aurea*, which puts on a golden-green hue with its young growth in spring, and acquires a warm brownish-red tint in winter; *Cupressus Lawsoniana pygmaea*, a low glaucous feathery-looking bush; *Abies pygmaea*, dwarf, dense, erect, conical, and full green; *Abies pumila*, dwarf, tufted, horizontal, and of a somewhat glaucous green; and *Picea Hudsonica*, also dwarf, tufted, and horizontal, but with dark green foliage, are other good dwarf subjects for masses or margins. Young plants of *Thuja variegata*, are remarkably effective for grouping, as they take on in winter a yellowish hue, flushed with a warm brown—a kind of light yellowish-bronzy tint, which is very effective. Those assuming a purplish tint in winter are *Cryptomeria elegans*, a fine bushy shrub, with horizontal branches, and *Retinospora ericoides*, which is dwarf, tufted, and columnar.

These are but indications of the materials to be had for planting the Evergreen Garden, which may be infinitely varied in arrangement. Those we have named have, however, all been noted since the late frost, in a locality where everything tender suffers severely,—where *Berberis Darwini*, for example, is killed to the ground, and many other supposed hardy subjects are more or less damaged; they may, therefore, be considered as thoroughly hardy, and as not likely to disappoint those who select them, except it may chance through some incompatibility of soil, or an exceptionally trying situation. We have as yet said nothing of the grand family of *Rhododendrons*, standards of which (fig. 36) are most effective, and dwarf masses of which, ultimately growing up into ample bushes, are gorgeous in the extreme during the blooming period. *Rhododendrons* for the purpose here indicated should, however, be selected for two special qualities—bold, good-looking foliage, and hardness of constitution, by which both leaves and flower-buds may escape such injury as the present inflicts upon less enduring kinds. These qualities are only to be found in the sorts bred from *R. catawbiense*, those even which contain the blood of the supposed hardy *ponticum* having in many cases had their flowers destroyed in the bud by the late severe frosts. T. M.

Home Correspondence.

Odontoglossum Alexandræ.—We have had in bloom during the winter what might be called a magnificent sample of *Odontoglossum Alexandræ*. It bore four spikes, bearing in the aggregate a few blooms over 120. One spike had 56 flowers, another one, 36, the other two smaller ones making up the number to that I have named above. We bought the plant at one of Stevens' sales, and it has grown from comparatively small dimensions to what, I doubt not, is the largest individual mass in Europe. There cannot be

a doubt of its identity with *Odontoglossum Alexandræ*, alias *Bluntii*, from the cordate-acuminate lip which distinguishes the species, separating it from *Odontoglossum Pescatorei*, which species has a very decidedly panduriform labellum. Indeed, if we were to condescend to a severe botanical diagnosis, the names of *O. Alexandræ* or *Bluntii* of modern nomenclature would be lost altogether, as the species lately introduced in quantities from Bogota is none other than *Odontoglossum crispum* of Lindley. A parley, however, on the question of nomenclature, which, in so far as Orchidaceæ are concerned, is every day becoming more weighty. Bogota I find to be fully 8000 feet above the sea level, the temperature comparatively low, with no great fluctuations between day and night temperatures during the colder days. Consequently I have grown the plant in a pit, just as any one would grow ordinary *Pelargoniums*. The minimum mean for October was 54°; 7;

competent readers will not think it too much trouble to supply the required information. I add a list of a few which occur to me—*Abies* (*Pseudo-Larix*) *Kämpferi*, *Abies Hookeriana*, *Cephalotaxus Fortunei*, *Fitzroya patagonica*, *Dacrydium Franklii*, *Larix Grifithii*, *Picea bracteata*, *Podocarpus andina*, *Prumnopitys elegans*, *Retinospora* (*varius* sp.), *Saxea Gothica conspicua*, *Sciadopitys verticillata*, *Torreya myristica*. Particulars as to locality, vigour, height, &c., are what are chiefly required. G., Bath.

Camellias.—Mr. George Westland, in his paper on Camellias, at p. 103, says—"I have failed to find in this country the rich black peat used in the culture of the Belgian Camellias." Now, I do not pretend to have the experience which Mr. Westland undoubtedly enjoys, yet I have had some experience in Belgium, and had the pleasure of visiting all, or very nearly all, the Gent nurseries, which every one knows to be so numerous as to have given to the town the name of the Belgian garden. Being fond of the culture of Camellias, and having seen a good deal written about it, I inquired particularly into the subject of the soil used for them in Belgium. This, as far as I could make out, was not peat; in fact, the only peat I ever saw in Belgium was used for certain Orchids, and was imported from either England or Prussia.

The soil used for Camellias in Belgium (or perhaps I had better say in Ghent, though with the exception of Brussels, few other towns can boast of horticultural establishments), was leaf-mould with sometimes a little sand. The preparation of this leaf-mould is quite an important industry in the less fertile country lying between Ghent and Antwerp. The leaves are collected in autumn by gangs of men, women, and children, and placed in large heaps, which, if the weather be dry, are watered to induce fermentation, the heaps being placed between small dykes, and the water being thrown on in the same way that you see men watering linen in the bleaching grounds. If, on the contrary, the weather be hot and wet, it is found necessary to reduce the size of the heaps to prevent them taking fire from over-heating; on the approach of winter the leaves are put into long, narrow heaps, so as to be subjected as much as possible to the action of frost, which has a great effect in reducing them. In the following spring the leaves are turned, and put into larger heaps; this process is gone through two or three years—in the latter case they are of course finer and more valuable. This soil is then sold to the nurseryman by measure, and used extensively in nearly all pot culture. As is the case with most things now-a-days, this leaf-mould is subject to adulteration, which is effected by mixing with it the cleanings from the dykes, &c., which the cultivators say is quite worthless. I hope Mr. Westland will excuse these remarks, which are made in no carping spirit; on the contrary, I quite agree with his excellent paper, but thought he might perhaps have mistaken the very fine leaf-mould I have seen used in the culture of both Camellias and Azaleas for peat. A. H. Pearson, Chiswell.

Improving an Ice-house.—A question on this subject, asked at p. 12, has been answered by two of your correspondents, in whose communications several good practical hints have been given, and among them is the recommendation to give air at the apex of the house. This is mentioned as being important for the preservation of ice. Any information as to the best mode of giving air would be gratefully received by a Constant Reader.

Fruit Trees and Rabbits, &c.—I have been at considerable trouble in fertilising some choice Apple blossoms, and raised young plants from the impregnated fruit pips. These I grafted and budded on *Paradise* stocks, and planted them in a bed to fruit. You may imagine my annoyance upon my first visit to them in the spring, to find that the rabbits had completely barked the young trees down to the graft on the stock. I find that the rabbits barked the trees, and the hares



Head, 15 ft. circ.)

FIG. 37.—STANDARD GOLDEN QUEEN HOLLY.

[From a photograph.]

for November, 50°; 4 for December, 48°; 6; and for January, 46°; 5. The exact mean for the four months which we have passed to-day is 49°; 19. Grown under that temperature, this, with hundreds of others, may, I say it fearlessly, be equalled in point of health but could not be excelled. James Anderson, Meadowbank, February 1.

Conifers Little Known, or of Recent Introduction.—To those who have not the opportunity of inspecting at leisure great public establishments or large private nurseries, it naturally becomes a matter of interest and curiosity to know what has been the fate in this country of many conifers that have been introduced as plants of high promise and value. It may be asked, how far they have realised the anticipations formed of them? How have they progressed? What is their present state and promise for the future? Above all, where can they be seen? The temperate house and the grounds at Kew no doubt contain most, or all of them; but perhaps some of your many

nibbled every branch within reach. I tried various experiments to protect them, and have succeeded in saving my trees this winter thus far from further injury. My remedy is to paint the bark and branches of the trees, as high as the game can reach, with human excrement in a liquid state, and if scattered round the trees all the better. To wire round the trees is the most effectual remedy, but it is too expensive in a large garden. *N.*

Two years ago I had to plant some Hollies, ranging from 34 to 44 feet in height, with clean stems, about 12 inches in height from the ground. The first enemy to guard against was, of course, the rabbits, and I had the stems painted with common unboiled gash, and also lightly touched the points of the shoots with the same material. I had a great deal of misgiving as to what effect the application would have upon the health of the trees (not having heard of such a remedy being tried before), but I am happy to state that they are as healthy, and have grown as well, as others which were not so treated. *R. Mervin.*

The American *Agriculturist* states that a gentleman in Georgetown, Ohio, "succeeds in keeping rabbits from injuring his trees by rubbing the trunks with hog's liver as high up as the rabbits can reach. It seems that animal matter is repulsive to the rabbit. Many Western orchardists sprinkle their trees with blood. Some shoot a rabbit, split it open, and rub the tree with the raw flesh." *W.*

The Golden Foxglove, *Gerardia quercifolia*.—In the August of 1857 I noticed on the Catskill Mountains, near New York, a magnificent plant, very different there, which had long spikes of golden-yellow flowers. This plant lays the part of our Foxgloves, and is consequently called, in the vernacular of the country, the American Golden Foxglove, but botanically the *Gerardia quercifolia*. It has much the look of the *Incarvillea sinensis*, but is larger in all its parts, more profuse in blossoms, and of course these are quite of a different colour. It would be quite hardy here, and to the best of my knowledge there is nothing to beat it amongst all the favourites of our flower beds, *dis*, I believe, a perennial plant, but at least certainly a biennial. It was too early in the season then to get ripe seeds, and for the last 13 years I have vainly endeavoured by every means to have it sent over. What I got for it several times was but our European Foxglove. You would very much oblige the flower-loving community at large, and the writer in particular, by inserting this in the *Gardeners' Chronicle*, in the hope that some kind American collector will enrich our gardens with one more of the native beauties of the country by sending us a few seeds. *Jean van Volxem, 1, Rue Zinner, Bruxelles.*

The Timber of the Silver Fir.—I am informed that the wood of the Silver Fir is more durable, when cut down in summer with the sap up, than when felled in winter, and that this was the practice in some parts of Scotland. If such is the case, the Silver Fir would not the Spruce and Larch Firs be equally improved by felling them in summer? I should like to know the opinion of some of your practical readers upon the above subject. *A. S. D.*

Crickets and Other Insects.—In answer to your correspondent, Mr. Edwards, allow me to state that, having been very much troubled with crickets, I have tried various remedies, such as arsenic and oatmeal, treacle, &c., but I have not found anything so effectual and convenient as Brown's paste; but this, like almost every other insect destroyer, must be persevered with in its application, which consists in putting a little on a small piece of glass behind the pipes or between the bricks, or in any other place where crickets are likely to lodge. I have no doubt but that it is some preparation of phosphorus, as recommended last week, but there seems something about it which insects like, and I have also found it very destructive to woodlice. Before using the paste we were overrun with the pests, but now we seldom see or hear one, and we take care to keep it out of the way of the "crickets on the hearth." *J. Willard, Holly Lodge Garden, Highgate, N.*

Improving a Lawn.—I have a lawn, of which the soil is very poor. By dint of constant sowing of Clover and watering, all through last season, I have got the bare patches in the turf all covered at last. Now that the lawn is covered, will it be advisable to plant soot the winter, as I did with Dutch Clover Fir, and grass seed, and at the same time sprinkle over the seeds some fine mould, and some superphosphate of lime, which I have by me? If so, when will the right time be to do it—now, or later in the season? My subsoil is gravel, and the ground under the lawn was levelled up with mortar rubbish, &c., to within about 4 inches or so, of the turf—still the soakage of water is not very rapid, owing, I fancy, to the mortar rubbish being so well rammed in. I have, as yet, with rain, rather think that my turf came originally from rather wetter and heavier land than my garden is. Would this fact at all account for the grass not doing kindly here? Any information from some of your correspondents will greatly oblige *An Old Subscriber*. [Dress with guano mixed in a compost of fine earth. Be cautious of Clover; it will smother the grasses. *Eds.*]

Sesamum Cake for Bees.—Your correspondent who makes an inquiry respecting this article, is prob-

ably not aware that there are several descriptions of Sesamum, two or three sorts being sent from the East Indies. That which is probably the most suitable is grown in Egypt, and the cake may occasionally be obtained by the ton from the seed crushers, who may be seen on the corn market any Monday at two o'clock. *H. B., Shorefield, Southend.*

Ivy.—Perhaps there is no evergreen more attractive during the winter months than the "Ivy green." What would the castle, church, or ruin be without its Ivy? Those who have pillars, arches, or a few old roots well covered with this creeper, cannot fail to consider them amongst the prettiest objects of the garden. But why do we so much frequently see it on the cottage? It has many properties to recommend it; its yearly clippings might be useful in the pig yard, or (if the cottager is so fortunate), given in moderate quantities, would be useful to his cow. But does Ivy make walls damp? is the frequent question, and upon this subject I wish to give my experience. Fifteen years ago I planted several walls, amongst which was an excessively damp wall of a cottage facing west. This wall was a base of a chimney, and the external showers the wall being built with very porous stones, secondly, from ground-damp. After having the wall pointed and the drainage examined, we planted the broad-leaved, or Irish Ivy, which soon covered the wall, forming a perfect weather-board, and, as far as external moisture is concerned, I believe it to be a perfect cure; but ground or foundation dampness it seems to make no difference to, as this still appears at every little change of weather. The situation is to some appearance a perfectly dry one. A wet about 9 feet from this wall is more than 30 feet deep, nor was there any appearance of water until we came upon the rock. I mention this to show how difficult it is to account for ground damp. As an advocate for Ivy planting, and particularly on damp walls, I may say that several loud complaints against Ivy have come under my notice, and I have invariably found that the Ivy had been allowed to fill the spouts or climb upon the roof, interfering with the proper course of the drainage, and dampness had arisen from this cause. *John Taylor, Rose Hill Lodge, Bokerley, Carlisle.*

Disease in Onions.—I should feel very thankful if any of your numerous correspondents could give me any information respecting the cause of, and the remedy for, what is called the "disease" in Onions. For the past 15 years our yearly crop of spring Onions has been seriously damaged by a disease which attacks the tops of the leaves when the bulbs are about half or three parts grown, descends the leaves, and stops all further growth of the plant. It is very singular that this disease has not been observed in any of our neighbours' gardens. Our soil is deep, tolerably well manured, and it contains a large proportion of peat, which was annually added previous to the last seven years. *N. T.* [See our Volume for 1854, p. 595. *Eds.*]

Tubercularia vulgaris.—In the interesting paper on this fungus, by "M. C. C." at p. 105, occurs the following passage:—"But wherefore call them 'conidia'?" This is a word compounded of two Greek words, 'gonos', a seed, and 'eidos', a likeness, or resemblance. It is sometimes written 'gonidia', but more usually 'conidia', and means, therefore, seed-like, or resembling seed." I venture to suggest to "M. C. C." that, in making "conidia", and "gonidia" synonymous terms, he has fallen into a mistake, which will puzzle students of Fungology as much as it has puzzled me, and to which I would like to call his attention to induce him to correct it. The term "conidia" was first used by Fries to denote a secondary form of fructification observed in Fungi, consisting of cells which are produced at the tips of the filaments of the mycelium, the exact office of which has not, I believe, up to the present time been determined. "Gonidia", on the other hand, is a term used in Lichenology to denote certain cells found in the sub-cortical layers of the thallus of Lichens, hence called the "gonic layer." The presence of these gonidia is held by many eminent botanists to be the only distinguishing mark between Lichens and certain allied Fungi. *W. Phillips, Shrewsbury.*

Late-keeping Grapes.—Allow me to confirm the opinion expressed by "P." on late-keeping Grapes, at p. 135. I should prefer to call them late varieties, for they are not all late that are late-keeping. I have long thought that to grow the thick-skinned late sorts of Grapes to perfection it was necessary to subject them to early forcing. Four years ago I planted six Vines in a narrow range of the three houses, each 60 feet long, used for storing bedding-plants in winter, and for growing Fuchsias, &c., in summer. Two Vines were planted together at the centre of each house, and were allowed to grow upright the first season; they were then cut back to a wire running horizontally the whole length of the house, where they were trained in 1869, making strong short-jointed shoots from 25 to 30 feet in length; in the autumn they were pruned back to within 4 feet of the previous year's wood. Last season I determined to grow the Vines in the open air, in doing so I made use of one of the above-mentioned houses, in which were growing Alicante (Kempsey), and Black Lady Downe's Seedling. They grew well, and were allowed to carry six bunches each, which were

brought to perfection, some of the Alicantes being cut and exhibited at a local flower show at the end of August. The Vines in the other houses were Royal Vineyard, Trebbiano, Syrian, and Tokay; they had the same attention paid to them as the other two, with the exception of the extra heat, they also grew strong, showing fine large bunches, and looked the pictures of health as long as the hot weather lasted. It was not convenient to give them fire-heat, and I wished to see that they would do well without it, and the result was that as the nights became cold the berries began to discolour and damp off, eventually becoming unfit for use, and in October they were cut unripe and thrown away. I believe if those Vines had had heat like the two first-named sorts, the result would have been some fine Grapes; the season was all in favour of such a trial, and it therefore proves the correctness of Mr. Pearson's statement that "late-keeping Grapes" are unfit to be grown in a "cold or cool house." There was much to be learned from the trial, and I have been describing, for they not only grew the whole length of the house, but were turned up the ends of the houses. When pruning them in the end of October, one of the canes was laid on the roof of a shed—it was 25 feet long; I now send it for your inspection, but from being exposed to all the frost we have had, it is only 20 feet in length now. *G. Thomson, Stansted Park.* [These are wonderfully vigorous examples of Vine rods, more like two year old than one year old wood. *Eds.*]

Hot-water Boilers.—I have no doubt that hundreds of gardeners, like myself, have had some extra trouble and anxiety this season in bidding "fare thee well" to their hot-water boilers, now see the evil of depending on one boiler. On December 24 last my thermometer showed nearly 28° of frost, and had even the small boilers in the cold houses given way at such a time, ten times the value of an extra boiler would have been destroyed. I am more and more convinced, particularly where two or three houses are heated by the same apparatus, that no collection of plants can be considered safe without a second boiler. I have heard of several "breakdowns" of this kind. Now, I would highly recommend to your advertisement columns I am quite bewildered which to choose; and I really must confess, although I have made heating and hot-water boilers one of my chief professional studies for the last 20 years, I am at a loss to understand how a single boiler can heat 4 miles of 4-inch piping satisfactorily, and yet the advertisements say that one-half of these boilers can be taken away, whilst the other half is at work,—which means also, I suppose, that a new half must be put in without letting the fire out, or at least not so as to cause any loss of time or inconvenience. I should be glad to hear if any of your correspondents have had any experience on that point; if so, I need have only one of these boilers to secure what I term perfect safety in such winters as we have just experienced. The makers also state that their boilers are indestructible; may not the fire-bars become defective, in consequence of the intense heat, and the hard stoking which must take place to get the boilers to work, and the consequent wear and tear of the tubulars, and greatly admired their workmanship and ingenious make, I have not yet worked, nor ever seen one of the new Duplex at work. I believe Mr. Eyles has one at work at Kensington, and if he would kindly give us a report of the working, with the cost of the same, &c., he would confer a great benefit on a number of gardeners, for I am certain that our coal bills will be unusually high this season, and the loss of bedding plants very great; so that any one who can save money in the way of heating horticultural buildings, will be thankfully received by many. *H. W. C.*

About Potatoes.—I am always deeply interested in the subject of Potato culture, and am, therefore, tempted to offer a few remarks on Mr. Dean's communication at p. 108. A good Potato is a valuable esculent in any establishment, but more especially is it so in a large one, such as that which I have to provide for (including the domestics, over 40 persons for eight months in the year). I have always been of opinion that well-ripened tubers were essentially necessary to produce good crops; but the question is, "how many?" The answer is the one which I am now most concerned about. I well remember having a fine lot of seed of the Ashleaf Kidney and the Early Handsom, in the early autumn of, I think, 1864. I had them all laid out to ripen in the compost ground during dry weather, but when I came to remove them at the approach of rain, I found that two-thirds of them were diseased, indeed, I had less than a bushel of sound ones to the sack. The same time a poor man, the parish clerk, who had just been lifted, and were quite sound. He put them in a bin in a store-room on the ground-floor, leaving the door open during the day. They were not covered up in any way, and very soon (before he could sell

them) the disease attacked them, and he had to part with them quickly. I am convinced that the disease comes in the atmosphere, and that, where Potatoes are not covered up, let them be in shed, barn, or any other building, when the blight or disease comes they will become infected. If I could do so conveniently, I would carry out the injunction given by your able correspondent, Mr. Radclyffe, in these pages last September, viz., "plant early ripeners that keep late;" but I have not the means at my command to lift two acres until after the harvest is got in. I intend in the coming season to plant a good quantity of Paterson's Victoria, for I find that out of 10 or 12 varieties which I have tried on our light, dry, sandy soil, this is the very best for winter use. I may also state that I have found Webb's Imperial Kidney the best second early for the same description of soil. They are both beautiful eaters, and fine croppers. T. Wynne, Holbrook, Suffolk.

Callicarpas.—The fickleness of the horticultural public as regards their favourites, is often the subject of comment. Truth to tell, however, there is generally some good and sufficient reason for the alternations of popular fancy. The change is not wholly due to caprice, and when, as happens in exceptional cases, the favourite retains her sway, we may be pretty sure that there are exceptionally good reasons why she should do so. We never hear of the Rose going out of fashion. That the plant whose generic name stands at the head of this notice should come and go is no matter for surprise. See them when in leaf and they are not worth house-room; see them when in flower, and their room is to be used a popular saying, "worth more than their company;" but see them when in fruit, and every one cries out how beautiful! The genus is rather a large one, its members being natives of Peninsular India, of the Eastern Himalaya, of Japan and China, and even North America. Two or three species have been from time to time introduced into our gardens, and some even were figured in botanical records, but generally with a sort of half-apology for occupying space with such mean-looking subjects. They were figured on botanical grounds—for scientific purposes—much in the same way that criminals are submitted to the faithful portraiture of the photographic camera, in order that they may be recognised in future, and their worthlessness made apparent. Such was the case up till 1859, when all on a sudden a *furor* was excited by the exhibition in St. James's Hall of a species of *Callicarpa* with purple berries, so beautiful that every spectator was loud in its praise. Dr. Lindley led the way in lavishing compliments on the plant, and as it would never do to let such a beauty go unnamed, he called it *Callicarpa purpurea*? Very sagaciously he put a "?" after the name, knowing by experience that it is no easy matter to determine the species of *Callicarpa*, and feeling doubtful whether the plant in question was really the *C. purpurea* of Jussieu. Indeed, it was very soon found that the plant was not the true *C. purpurea*. What it really was has not been determined to this day. Indeed, we are not sure that Lindley's plant is really in existence now in our nurseries. At any rate, what we have been furnished with from various sources, under the name, has had but slender resemblance to the plant figured by Lindley, a cut of which is here reproduced, fig. 38. Stranger still, let any one compare this illustration with the coloured figures given by M. Van Houtte in the "Flore des Serres," tab. 1359, or by M. Lemaire, in the "Illustration Horticole," vi., 202—both published shortly after Lindley's figure, and a doubt will assuredly arise as to whether the same species could have been intended. Lindley's figure, in fact, differs considerably in the form and pubescence of the leaves from the Belgian illustrations. But let that pass up to this time our search in herbaria and books has only enabled us to say with our predecessors, that Lindley's plant is not the true *C. purpurea*; "only this and nothing more." We were reminded of this beautiful plant by the receipt, a short time since, of a spray with panicles of small pink or violet-coloured berries, and which was sent to us with a request that we would supply the name. On comparison we have no doubt the plant in question is *C. rubella* of Lindley, in the "Botanical Register," t. 883,—one of those mean-looking plants which stand

but a poor chance of being retained in these colouring days. But the berries, which Lindley never saw, and of which we find no record, are quite beautiful enough to vindicate the generic name. That

so beautiful a berried shrub should not sink into oblivion we may just indicate its characteristics, and



FIG. 38.—*CALLICARPA PURPUREA*, Hort. nec Juss.



FIG. 39.—*CALLICARPA JAPONICA*.

advise those who possess the plant not to condemn it till they have seen the fruit. It comes from China. *C. rubella*, Lindl. Bot. Reg. t. 883; D. C. Prod. xi. 645.—An undershrub whose branches and young shoots

are densely covered with cream-coloured floccose down. Leaves 3–4 inches long, $\frac{1}{2}$ inch wide, on very short stalks, lanceolate, cordate at the base, acuminate, serrate pubescent above, thickly clad with hoary tomentum below. Cymes 1½–2 inches across, axillary, repeatedly forked, many-flowered. Calyx shortly 4-toothed, corolla pinkish, berries the size of Millet seeds, very numerous, at first rosy-pink, afterwards of a violet colour.

Another species, originally described by Thunberg as *Callicarpa japonica*, and figured in "Paxton's Flower Garden," ii. fig. 221, with a quasi apology as usual, we notice here because we have reason to believe it to be nearly or quite hardy in this country. At any rate we remember to have seen the plant two or three years back in the open air at Kew during the winter, without protection, though it has since been relegated to the temperate house. Our figure (fig. 39) was taken from the Kew plant, but we have not seen the berries. As this is a plant likely to be in some of the nurseries, and to be unceremoniously turned out if due caution be not given, we recommend that it be not discarded till the berries are ripened. If, then, it prove unworthy further care on the part of the horticulturist, we will submit without a murmur.

C. japonica, Thunb. Fl. Jap. 40; Miquel, Prolus Flor. Jap. 98.—An undershrub, the young branches and leaves of which are covered with stelliform downy hairs, which speedily fall off, leaving the adult plant nearly glabrous, though still provided with minute citron-yellow glandular scales. Leaf-stalks rarely half an inch in length; leaves variable in shape, prevailing form lanceolate, acuminate, crenate-dentate, 4–6 inches long, 1–2 inches wide. The inflorescence has the same characteristics as those of *C. rubella* before mentioned, but the individual flowers (shown in our illustration of the natural size) are larger, and of a pale rosy-pink colour.

One peculiarity of this plant is the position of the new buds or innovations on little stalks not immediately in the axils of the leaves, or a little above them. The true *C. purpurea* of Jussieu we do not think is in the country, but whether or no, our object in calling attention to these plants will be attained if we induce cultivators to wait and see their fruits before they consign them to the rubbish heap. M. T. M.

Foreign Correspondence.

FRANCE: The War; the Frost.—In order to get to Brussels from the South of France I was obliged to come to London, and in my journey I had the opportunity of seeing much of the ravages caused by this cruel war. Poor France, so hospitable to those who now overrun her so barbarously! You can have no idea of the devastation I have witnessed in my late journey. The majority of the French nurserymen, even in the uninvaded districts, have been well-nigh ruined from the drought of 1870, the severe frost, and the absence of trade. At Metz, MM. Simon have had their nurseries destroyed, either by the march of Prussian troops, or by the movements of the French soldiers encamped at Plantières. At Troyes, one of the brothers Ballet had to leave his business, in order to undertake the duties of officer in the Gardes Mobiles. His brother, who was a member of the Town Council, was sent into Germany as a hostage, and is confined in the casemate of Goerlitz, because the town, exhausted of its resources, could not meet the last requisition imposed by the Prussian prefect, Von der Stein. At Bordeaux M. Georges, professor of arboriculture, well known for his public services in the east and south of France, fell ill and died suddenly, as also did his young wife.

Many other horticulturists have died in the field of battle, or have lost their sons. The florists at Nancy, Rendatler, &c., are ruined; their plants are destroyed, their future rendered hopeless. Dr. Marjolain, of Paris, well known as a surgeon, and commemorated by the Rose and the Apple which bear his name, tells me that the establishment of MM. Thibaut & Keteleer, Sceaux, is utterly ruined. Similar disasters have befallen the Versailles nurseries, where MM. Bertin, Truffaut, Margot, and others, have suffered the cruellest losses. At Versailles a number of fine trees, planted by Le Nôtre, have been cut down.

Many of my botanical friends have still confidence in the future of France, and are working with renewed zeal, certain that a country like France will never perish, even though pillaged, sacked, and soaked in blood by hordes of savages. Such, at least, is the opinion of some of our botanists, who counsel courage

and hope in the future supremacy of right and justice over brute force and falsehood.

As to the frost in Limosin, as far as Auvergne, the winter has been more severe and prolonged than has been known to be the case since 1829-30. Near Limoges, and even in that town, the thermometer indicated -15° Cent. Frost began to fall on December 21, and covered the ground to a depth of 12 to 18 inches for more than six weeks.

At Montpelier the thermometer has been as low as -12° Cent. = 10° F. All the Bays were frozen. This has never been noticed in a district where the *Phytolacca dioica* is cultivated in the open air, as it is at Nice and at Saragossa. At Poitiers the frost was also severe. The Cherry and Portuguese Laurel, *Laurus nobilis*, the Bay, *Myrica carolinensis*, suffered slightly; and *Viburnum lucidum*, *Garrya macrophylla*, *Mahonia japonica*, *Osmanthus*, and *Ligustrum repens*, were killed to the roots. The losses at Limoges were much greater. Specimens from 20 to 25 years old of the following species were totally destroyed:—*Magnolia grandiflora*, *Ligustrum ovatifolium*, *L. japonicum*, *L. chinense*, *Eunonymus japonicus*, *Phillyrea*, *Ceanothus*, *Cotoneaster buxifolius*, *C. microphylla*, *C. thymifolia*, *Laurels* of all kinds, *Myrica carolinensis*, and *Juniperus*, at Niord the damage was less. At Angers nothing had suffered, the Camellias in the open air were full of buds, the large Magnolias of the famous avenue were as green as ever, as also the Japanese Azaleas, *A. liliiflora*, *pinnata*, *amena*, &c.; *Passion-flowers*, *Phormiums*, *Ceanothus divaricatus*, *Chamærops excelsa*, were scarcely hurt; *Fabiana imbricata*, on the other hand, was killed. The climate of this place has maintained its old reputation.

At Malo the losses in the Poitou and the "Deux Lèvres." In Jersey, (St. Helier) I found *Phormium*, *Tritoma*, *Muhlenbeckia*, *Quercus glabra*, *Escallonia floribunda*, *Hemanthus*, &c., destroyed. A plant of *Veronica Andersoni*, however, 15 years old, was unhurt. *Ed. André, Brussels.*

Societies.

THE MELBOURNE HORTICULTURAL SOCIETY'S SPRING SHOW.—[The following account, condensed from the *Illustrated Australian*, will give no bad idea of the condition and progress of horticulture in Australia. One thing we regret, the evident close imitation of our British shows. Surely in a country where there are so many fine native plants—New Holland plants—some greater effort should be made to utilize the indigenous flora, and to get away from Bentham's "Flora Australiensis" and Dr. Von Mueller's numerous publications as a guide, the colonists should do better than stick to the everlasting *Fuchsias* and *Pelargoniums*. EDS.]

At Malo, a lapse of a year the Melbourne Botanic Gardens were, on November 19, 1870, again the scene of a floral exhibition, under the auspices of the Horticultural Society of Victoria. The Society's programme embraced a "grand exhibition of Roses and other flowers, pot plants, fruits, and vegetables," exceeding in magnitude and scope what was done in 1869, and was well calculated to keep faith with the public. Owing to the fact of the show being held too late, neither the pot plants in bloom nor the cut flowers were up to the mark. From the gardens of Mr. R. B. Ronald, of Toorak, Mr. Stuart sent the only collection of eight plants in flower, and, except the *Fraxinus*, the lot was decidedly *passé*.

In collections of four, Mr. Stuart had a better exhibit, his *Begonia manicata*, *Rhynchospermum jasmintoides*, and *Franciscia confertiflora*, were well bloomed, *Allamanda nerifolia* still wanting a few days of display, his best specimen was killed, but he had, to no remark, Of Ferns and *Lycopods* the display was good. The 1stst honour fell to His Excellency's Mr. Watters, for a collection of 60, with which the public is familiar; Mr. Stuart being 2d with 21 plants, including good specimens of *Nephrolepis exaltata*, *Pteris incana*, *vespertilionis*, *Adiantum speciosum*, and *Onychium japonicum*. In collections of 10, Mr. Jeffrey, gr. to Mr. Greig, of Toorak, was 1st with some freely grown specimens, Mr. Watters coming a good 2d. Mr. N. Ronald's collection of 14 Tree Ferns formed a conspicuous feature in the rotunda: *Asplenium nidus*, *Polystichum*, *Polystichum*, *Polystichum*, the whole are in capital health and well established. From Mr. Scott, of Hawthorn Nursery, came a well-bloomed plant of *Rhododendron Oslowianum*, which had no competitor. The 1st prize for a new or rare plant was given to Mr. Ronald, for *Colera*, Queen Victoria. In the class for 4 Azaleas, Mr. Stuart was the only exhibitor, and, excepting *Duchesse Adelaide* de Nassau, his plants were nearly out of bloom, November 19 being vastly too late for these beautiful plants. The most effective part of the show, the species devoted to plants having ornamental foliage. Of these there were several nice collections, in good health and cleanly grown, besides other collections consisting wholly of *Caladiums*. Mr. Stuart was 1st with the following 12, viz.:—*Hibiscus Cooperi*, *Iresine Herbolita*, *Achyranthes aureo-reticulata*, *Durandea Guilfoylei*, *Calceolaria rebrina*, *Strelitzia reginae*, *Urtica*, *Thalictrum argenteum*, and *Duchesse de Brabant*—all belonging to the Rex section, and well grown. The remainder of Mr. Stuart's 12 consisted of variegated forms of *Sedum azeoidum*, *Phormium tenax*, and *Hydrangea hortensis*. Mr. Ronald, 2d, with *Calceolaria rebrina*, *Strelitzia reginae*, *Urtica*, *Thalictrum argenteum*, *Duchesse de Brabant*, *Argyrea nervosa* variegata, *Alternanthera spatulata*, *Yucca aloifolia*, *Dieffenbachia picta*, *Croton arboreum* (fine golden variegation), *Phormium tenax* variegata, and three *Caladiums*. He was also 2d in the following 5, viz.:—*Hoya coccinea*, *Calceolaria rebrina*, *Strelitzia reginae*, *Urtica*, and *Thalictrum argenteum*. Mr. Watters exhibited unsuccessfully in the class for 12 ornamental plants. Mr. Ronald appears to have made *Caladiums* his forte. He filled the

whole of the classes with well-grown healthy plants. His most noteworthy varieties were *Houlletii*, *marmoratum*, *Brongniartii*, *Colocasia odorata*, and *Alcascia macrorrhiza* variegata.

On a side stage in the rotunda was a collection of *Caladiums* grown in the gardens; the colours had been well brought out, but the plants were rather drawn. In *Fuchsias*, Mr. Stuart had the class to himself; his plants, which consisted of well-known varieties, were considerably past their best. Mr. Brunning, of St. Kilda Nursery, supplied the show and fancy *Pelargonium* classes. Owing, as he stated, to the inclemency of the winter, his plants were much smaller than those superbly grown ones he exhibited last year. Royal Visitor, *Auguste Seyverens*, *Negress*, and *Perfection* were the fancy varieties; the most attractive of the show kinds, as regards colouring, and leaving out of sight the show qualities of the flowers, were *High Admiral*, *Mrs. Greig*, *Mrs. Bindon*, *Royal Albert*, *Royal Perfection*, *Princess Beatrice*, *Princess and Ision*. From Mr. Watt, a florist at Richmond, came a numerous collection of *Calceolarias*. Mr. Brunning was the principal exhibitor of *Zonal*, *Bicolor*, and *Tricolor* *Geraniums*, *Messrs. Livesey & Stone*, of Brighton, being no less a contributor to these classes, and those for *amaranth*, which he yet to establish characters for themselves, no novelties were present. Mr. Brunning's double *Geraniums* comprised *Andrew* and *E. G. Henderson* (scarlet), *Madame Lemoine* and *Tom Pouce* (rose colour), and with these he showed of *Surpassé Beauté* des *Suresnes*, a good rose colour. The cut-flower classes were, with one exception, decidedly weak, neither the general collections nor the Roses being anything more than moderate, and very few. In the open Rose classes Mr. Johnston, of Hawthorn, had no competitor; and in those for *amaranth* the Rev. Mr. Cole was the only exhibitor. *Messrs. T. Lang & Co.* contributed *Calceolarias* and *Irises*; Mr. Brunning, *Pinks* and *Carnations*; Mr. Cookson, *Verbenas*, *Picotées*, and *Pansies*. The best feature in the cut-flower classes was Mr. Sims' collection, which was shown in the amateurs class, and consisted of 128 varieties, very nicely staged and arranged. *Mrs. Ryan* showed a tastefully-filled "March vase;" Mr. Ronalds and another competitor had used too much colour, and had been too sparing of verdure. Bouquets were few, but were arranged according to the taste of the exhibitor; it was not tasteful, the postponement of the exhibition undoubtedly operated beneficially on the fruit classes; more *Cherries* and finer *Strawberries* than usual were present. Mr. H. M. Cole, of Shoreland, showed the following 6 dishes of good *Strawberries*, viz.:—*Black Prince*, *Black Knight*, *Black Knight*, *Black Knight*, *Black Knight*, *Black Knight*. The 2d best single dish was Mr. T. C. Cole's *Tyford Pine*. The 1st prize fell to Mr. John Eddy, of Myall's Surprise. Near these was a basket of *Cherry* branches laden with fruit, and, in addition, a box of the *Acclimatization Society* by J. F. Roberts, "showing how sparrows befriend the gardener." Mr. T. C. Cole showed purple *Guinge* and *Tyford Bigarreau* *Cherries*, very fine. Mr. Dunstan had single dishes of *Purple Guingé*, *Belle d'Or*, and *Wendell's Early Black*. The 1st prize of Mr. John Eddy's were *Black Eagle* and *Belle d'Orléans*. A fine collection of *Gooseberries* came from Mr. J. C. Cole, and from the Horticultural Society's Gardens a collection of *Strawberries* and *Cherries*, 78 varieties of *Sweet William*, 120 miscellaneous cut flowers, 41 varieties of *Belle d'Or*, and *Wendell's Early Black*. The 1st prize of Mr. John Eddy's were *Black Eagle* and *Belle d'Orléans*. A fine collection of *Gooseberries* came from Mr. J. C. 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which is a fair example of our author's treatment of this part of his subject:—

"This well-known plant, of which it has been said 'Olea prima omnium arborum est,' is cultivated in Charleston as a garden plant, and matures its fruit. A tree in Lambeth Street bears fruit of good size, which I have seen made into excellent oil, and used for soap, also pickled. Repeated attempts have been made to cultivate the Olive, and little doubt exists that with greater efforts it may become a valuable oil-bearing plant. In 'Patent Office Reports,' 1854, p. 28, is a brief statement of several efforts to introduce the Olive into South Carolina, Georgia, and other Southern States. A paper was also published on this subject by Judge M. King, of Charleston. In 1755 Mr. Henry Laurens imported and planted Olives, Capers, Limes, Ginger, &c.; the latter is still easily raised in our gardens in South Carolina, Georgia, and Florida. In 1785 the Olive was successfully grown in South Carolina; it is not easily propagated from seeds. A colony of Greeks, settled at East Florida, had planted the Olive, and 60 years ago, it is said, there were large trees marking the site of that settlement. The tree was also cultivated by Mr. Cooper, of St. Simons, and Mr. Spalding, of Georgia. See a paper in 'Southern Cultivator,' p. 7, vol. iii. (also, Jefferson's letter to Drayton, in his Memoirs."

We had marked several other passages for extract, but the above will serve to give some notion of the contents of the book. We notice a few typographical errors and awkward sentences, which will no doubt be corrected in a future edition; "Red Dead Nettle," applied to Urtica dioica (p. 316), is certainly a mistake. One or two eccentricities in spelling are new to us; the absence of the "u" from such words as "odour" one is accustomed to in American works, and is not incorrect, while the omission of an "f" from saffron may be accounted for on the principle of economising letters as much as possible; but such being the case, why is "chicory" spelt thus throughout four pages, in which its name constantly occurs? These, however, are but slight blemishes, and in no way interfere with our previously expressed opinion as to the value and usefulness of Dr. Forcher's work.

—The *Villa Gardener* for February contains, as usual, a variety of useful and interesting articles. May we suggest that some of the readers of this willed periodical are getting a little tired of the silly dialogues between George and Rosa? Far be it from us to frown at them, but chapters 10 to 15 in the same strain as chapters 1 to 9, in the sort of chat-chat we are all partial enough to at our own firesides, but we hardly think the public would be much interested therein; at any rate we should not have moral courage enough to try! The *Floral World* opens with a coloured figure and description of the Brockworth Park Pear, followed up by a good practical article on Pear culture by Mr. Trussler.—The *Bulletin de la Fédération des Sociétés d'Horticulture* for 1869-70, a copy of which we have just reached us, contains a portrait and memoir of the late M. Van den Hecke; a descriptive account of the vegetation and gardens of Egypt from Alexandria to the first cataract; a monograph of the Oaks of North America, with illustrative lithographs, by M. Alfred Wesmál, &c. We shall have further opportunities of advertising to the contents of this publication.

The *Food Journal*, a spiritedly conducted monthly, contains a variety of interesting and valuable information, not exclusively relating to food questions, but embracing hygiene and domestic economy generally. The article, "Food in Paris during the Siege," will have historic value.—The *American Agriculturist* for February merits our highest commendation for the great variety and thorough usefulness of its contents. Though nominally an agricultural journal, it really comprises almost every subject that can interest a dweller in the country, even to pictures—very good ones—for the children. The "Sundry Humbug" column, wherein swindlers of all degrees are exposed, shows either that there are an enormous number of such swamps on the other side of the Atlantic, or that the Editors do not stand in much terror of the law of libel.

Obituary.

WE have to announce, with much regret, the death of Mr. MANN, the much respected Superintendent of Hyde Park, an office he had worthily filled for many years. His health had been failing for some months past, and his death took place on Saturday last.

Miscellaneous.

WATERPROOF COMPOSITION.—Dr. Scherzer, says the *Eastern Budget*, an Austrian official at Pekin, has just sent to his Government some specimens of a Chinese composition called "Schioicac," which has the property of making wood and other substances perfectly water-tight. He has seen it in Pekin wooden chests which had been to St. Petersburg and had come back uninjured, and that the Chinese use the composition also for covering straw baskets, which are afterwards employed in carrying oil for long distances. Cardboard, when covered with the composition, becomes as hard as wood; and most wooden buildings in Pekin have a coating of it. It consists of three parts of blood deprived of its fibrine, four of lime, and a little alum.

Nature remarks that the laws which formerly existed in Scotland, and are still enforced in Denmark, to compel the extirpation of the Corn Marigold (*Chrysanthemum segetum*), have their parallel in New Zealand, in some parts of which it is a punishable offence to allow the growth of Thistles. In the colony of Lyttelton proceedings were taken, during the past year, against a gentleman for having neglected to eradicate certain Thistles, after he had been requested to do so. The defendant alleged that men had been employed for ten days in striving to exterminate them, and that ten donkeys were kept for the sole purpose of eating off the tops of the Thistles. The Bench, however, were of opinion that no adequate steps had been taken since a previous conviction, and imposed a fine of 5s. per day from that date.

THE WEATHER.

STATE OF THE WEATHER AT BLACKHEATH, LONDON, FOR THE WEEK ENDING WEDNESDAY, FEBRUARY 8, 1871.

1871. MONTH AND DAY.	AT 9 A.M.									
	Barometer reduced to 32° Fahr.	Thermometer in shade.	Thermometer in sun.	Thermometer in air.	Dew point.	Direction of Wind.	Force of Wind.	Height of Clouds.	Direction of Current.	Force of Current.
February.										
1. Thurs.	29.84	32.7	33.7	33.7	100	Gr.	2.2			
2. Friday	29.69	30.5	31.5	31.5	100	Gr.	2.2			
3. Satur.	29.57	41.0	41.0	41.0	100	Gr.	2.2			
4. Sunday	29.50	41.0	41.0	41.0	100	Gr.	2.2			
5. Monday	29.61	41.0	41.0	41.0	100	Gr.	2.2			
6. Tues.	30.01	42.3	41.4	41.4	93	Gr.	2.2			
7. Wednes.	29.86	42.3	41.4	41.4	93	Gr.	2.2			
TEMPERATURE OF THE AIR.										
1871. MONTH AND DAY.	Highest.	Lowest.	Mean.	Mean of day.	Mean of night.	Direction.	Force.	Direction.	Force.	Direction.
February.										
1. Thurs.	36.9	33.7	35.3	34.6	33.1	W.S.W.	115	0.00		
2. Friday	43.7	33.7	40.0	38.1	33.1	W.S.W.	115	0.13		
3. Satur.	47.0	40.4	43.7	41.0	38.1	W.S.W.	115	0.13		
4. Sunday	47.0	40.4	43.7	41.0	38.1	W.S.W.	115	0.13		
5. Monday	47.0	40.4	43.7	41.0	38.1	W.S.W.	115	0.13		
6. Tues.	49.5	38.0	43.7	41.0	38.1	W.S.W.	115	0.13		
7. Wednes.	51.7	41.0	46.0	43.7	41.0	W.S.W.	115	0.13		
FORCING HOUSES.										
Feb.	2.1	0.7	1.4	1.4	1.4	W.S.W.	115	0.13		
3. Satur.	2.1	0.7	1.4	1.4	1.4	W.S.W.	115	0.13		
4. Sunday	2.1	0.7	1.4	1.4	1.4	W.S.W.	115	0.13		
5. Monday	2.1	0.7	1.4	1.4	1.4	W.S.W.	115	0.13		
6. Tues.	2.1	0.7	1.4	1.4	1.4	W.S.W.	115	0.13		
7. Wednes.	2.1	0.7	1.4	1.4	1.4	W.S.W.	115	0.13		

TEMPERATURE OF THE AIR AND FALL OF RAIN AT DIFFERENT STATIONS, DURING THE WEEK ENDING SATURDAY, FEBRUARY 4, 1871.

NAMES OF STATIONS.	TEMPERATURE OF THE AIR.									
	Highest.	Lowest.	Range of Wind.	Mean of day.	Mean of night.	Mean of all.	Mean Daily Range.	Mean.	Fall of Rain.	In.
Portsmouth	47.0	38.2	19.7	38.2	34.4	36.3	3.8	34.9	0.15	
Blackheath	47.0	38.2	19.7	38.2	34.4	36.3	3.8	34.9	0.15	
Bristol	47.0	38.2	19.7	38.2	34.4	36.3	3.8	34.9	0.15	
Birmingham	47.0	38.2	19.7	38.2	34.4	36.3	3.8	34.9	0.15	
Wolverhampton	47.0	38.2	19.7	38.2	34.4	36.3	3.8	34.9	0.15	
Leicester	47.0	38.2	19.7	38.2	34.4	36.3	3.8	34.9	0.15	
Nottingham	47.0	38.2	19.7	38.2	34.4	36.3	3.8	34.9	0.15	
Sheffield	47.0	38.2	19.7	38.2	34.4	36.3	3.8	34.9	0.15	
Liverpool	47.0	38.2	19.7	38.2	34.4	36.3	3.8	34.9	0.15	
Manchester	47.0	38.2	19.7	38.2	34.4	36.3	3.8	34.9	0.15	
Salford	47.0	38.2	19.7	38.2	34.4	36.3	3.8	34.9	0.15	
Bradford	47.0	38.2	19.7	38.2	34.4	36.3	3.8	34.9	0.15	
Leeds	47.0	38.2	19.7	38.2	34.4	36.3	3.8	34.9	0.15	
Hull	47.0	38.2	19.7	38.2	34.4	36.3	3.8	34.9	0.15	
Newcastle	47.0	38.2	19.7	38.2	34.4	36.3	3.8	34.9	0.15	
Edinburgh	47.0	38.2	19.7	38.2	34.4	36.3	3.8	34.9	0.15	
Glasgow	47.0	38.2	19.7	38.2	34.4	36.3	3.8	34.9	0.15	
Aberdeen	47.0	38.2	19.7	38.2	34.4	36.3	3.8	34.9	0.15	
Paisley	47.0	38.2	19.7	38.2	34.4	36.3	3.8	34.9	0.15	
Greenock	47.0	38.2	19.7	38.2	34.4	36.3	3.8	34.9	0.15	
Leith	47.0	38.2	19.7	38.2	34.4	36.3	3.8	34.9	0.15	
Perth	47.0	38.2	19.7	38.2	34.4	36.3	3.8	34.9	0.15	
Dublin	47.0	38.2	19.7	38.2	34.4	36.3	3.8	34.9	0.15	

JAMES GLAISHER.

Garden Operations.

(FOR THE ENSUING WEEK.)

PLANT HOUSES.

In a properly constructed Orchard-house tanks or troughs should be formed expressly for holding heated water in an exposed position, for the purpose of constantly keeping up a high degree of humidity. These tanks, or troughs, should be regularly emptied at the advent of winter, or the proper resting season of this class of plants. They should be again filled about the middle or third week of the present month. It is rather difficult in a brief calendar like the present to give more than a general outline of the routine of practice to be

observed in connection with the various genera comprising the Orchidaceous family. I may suggest, however, that in the case of the most pronounced Epiphytes, such as produce large fleshy roots, which absorb a goodly amount of nourishment from the aerial moisture, actual root-waterings may safely be dispensed with for the longest period. The subjects which I may immediately refer to are *Aerides*, *Vandas*, &c. These remarks apply with even greater force to such as are growing in large pots, and have an excess of sphagnum moss in the ingredients in which the main body of the roots exist. As an opposite illustration, such subjects, when grown in a more exposed way—upon blocks of wood, for instance—may have actual root-waterings afforded freely, and with far less risk of giving them an excess too suddenly at the first. In watering large pots which contain other examples of the above or of true terrestrial Orchids, it is well just to pour a little tepid water around the inner rims of the pot only, once a week, for a fortnight or three weeks, by way of beginning to moisten the balls. Or what is better still (and it was taught me by the late Mr. May, of Durham Down, and Orchid-growing celebrity), carefully dip the outside of each pot up to the rim in a tub containing tepid water every third day at the starting, until the balls become thoroughly moistened. This I have found a good plan with the lovely *Anacochilus*, as by so doing the moisture is assured, as in its native habitat, at the base of the roots first. Keep the bell-glasses which cover these, scrupulously clean by wiping them daily, now that a warmer atmosphere surrounding the glasses causes a more plentiful condensation of moisture on the inner surfaces. Occasionally freshen up the surfaces of the sand and sphagnum cover in which they grow, and prevent them from becoming green, which often is the case at this season. Just a slight dash at first with tepid water from a syringe will do much to swell out the dry pseudobulbs of such as are grown upon blocks, if they show no signs of starting. Especially will this be necessary with *Renantheras*, *Angraecums*, &c.; whilst *Huntleyas*, which court the vicinity of spray-beding cataracts for their abode, may now receive water in plenty. Give a little air to these structures regularly, if the outer air be at all mild, and, if possible, through an aperture near the heating medium, so that it may become warmed before passing into the structure. Proceed with all potting operations in connection with such plants at every opportunity, as the earlier this is done in March the better; besides, garden work of all kinds multiplies rapidly with every week's progress at this season of the year.

FORCING HOUSES.

Now that the severe frost has gone, *Vines* that are in any stage of active growth may be pushed along more vigorously, according to the frequency and constancy of sunshine. In any case, a slight advance of heat may be maintained, with this difference, that true Muscat-houses should enjoy a warmth of 5° or 6° more than those containing such varieties as the Black Hamburgh; this only, however, when there is a fair leaf surface and a kindly growth is being made, and not by any means at the earliest stages, when a minimum temperature only, commencing at temperate, is advisable. Be careful not to moisten the hearts of *Fruiting Vines* which are showing fruit, or which are even approaching that stage. Drip, which often forms rapidly on the glass and rafters at this season, must likewise be very carefully guarded against. Look to the bottom of the pots, and procure the necessary quantity of new tan, placing it in a dry shed, or similar position, so that it will be ready for use on the first fine day that may occur. Be very careful not to overwater those that may be ripening their fruit in any stage, as an excess of root moisture at this time not only decreases the flavour, but often causes incipient decay in the fruit, depriving it of all merit when used at the table. Those who are unfortunate enough to have started their *Peach* and *Nectarine* houses amidst the severity of the past months should (if the fruit is sufficiently large) thin out a few somewhat by anticipation, and disbud moderately, unless there is an abundance of shoots, as a good amount of foliage at this time will be greatly favourable to real progress at the root, and so aid in recovering a moderate state of robustness. On the other hand, those who have delayed starting them will make better progress under the influence of more congenial weather, and by hastening the plants a few weeks hence will arrive at the desired end nearly as soon. To *French Beans* which have set their blossoms good liquid manure may now be given, as well as copious syringings, two or three times a day, according to the requirements of the other inmates in the same structure. Bring in another good batch of *Strawberry plants*, and forward the earlier successions by placing them in other structures in which an advance in the temperature is made.

HARDY FRUIT GARDEN.

I again advise all who intend planting young fruit trees this season, that they should not now delay another day in so doing. Every week's delay too certainly becomes a source of greater debility in the first year's progress of each tree than late planters are prone to believe. To succeed as they should do, all

frées of this kind should be planted before Christmas. Vigorously prosecute pruning work of every kind. With a few mild days following the harsh weather we have experienced, the trees will assume an active state, hence it must be patent to all that to cut off branches or branchlets at this particular season cannot be good practice, nor is it. Look through fruit rooms, and ascertain the health of the trees, and keep them cool and sound and fit to remain. Fine specimens of even the Gooseberry Apple looking sound at this season will only be found on close inspection to have lost their crispness and peculiar keeping ability, having "gone to sleep," as the country folk describe it.

KITCHEN GARDEN.

Broad Beans and Peas should now be examined, to ascertain if they have been injured by the frost. Any which have suffered should be made good forthwith by sowing others quickly in their place. Attend well to the making up and sowing of frames, pits, &c., with **Carrots, Radishes, and Potatoes**, maintaining an uniform bottom-heat around such as are already at work, by periodically renewing the lining, and by sowing and fermenting materials about every fourth or fifth day, so as to insure the dispersion of all rank unwholesome steam, &c. Pot off **Melon and Cucumber** plants already up, and encourage their growth, pinching out the young points when two or more rough young leaves are formed. The necessary stocks of seeds should be procured at once, as later on in the season some of the best samples may be sold out, obliging us to purchase inferior varieties. Those who purchase should also see that the necessary quantity of Pea-sticks in good time. **W. E.**

Perfection. Rev. E. Hawke, Royal Secret, Ruby Queen, Stanstead Rival, and Walden Queen.

CATALOGUES RECEIVED.—Mitchell, Arnott & Co., Catalogue of Garden Seeds.—Haage & Schmidt, Catalogue of Choice Seeds and Plants.—James Dickson & Sons, Catalogues of Vegetable and Flower Seeds, and Forest Trees, Ornamental Trees, and Plants.—W. F. Laird & Co., Catalogue of Choice Seeds, Vegetables, and Fruit Trees and Shrubs.—G. Cooper, Descriptive Catalogue of Kitchen Garden, Agricultural, and Flower Seeds.—John Stewart, Descriptive Catalogue of Vegetable and Flower Seeds.—E. Wilson Serpell, Catalogue of Agricultural and Garden Seeds, &c.—Edmondson Brothers, Catalogue of Vegetable and Flower Seeds, Garden Implements, &c.—Masters & Kimball, List of Kitchen Garden and Flower Seeds.

COMMUNICATIONS RECEIVED.—W. B.—G. T. H. B. S.—B. L.—B. W. F. J. E. H. T. W.—W. A. D.—S. G. J. R.—I. B. S. W. H.—R. A. J.—A. L. P.—W. W. S.—W. T.—B. S. W.—H. G. Rebb. F.—J. H. G.—W. S. H. P. S.

Markets.

POTATOS.—Southwark, Feb. 6.

During the past week the arrivals have been moderate, but more plentiful by rail, coupled with large quantities in store from former arrivals. The trade has been slow, at the following quotations:—Yorkshire Flukes, 90s. to 100s.; Yorkshire Regents, 70s. to 80s.; Lincolnshire do., 70s. to 75s.; Dunbar and East Lothian do., 75s. to 90s.; Perth, Forfar, and Fisherside do., 65s. to 70s.; Kent and Essex do., 60s. to 65s.; do. Rocks, 55s. to 60s.

COVENT GARDEN.—Feb. 10.

We have but little improvement to notice, but there has been a fair attendance of buyers. Better orders are also coming to hand from the provincial markets for Rhubarb, Seakale, and Cucumbers. A slight revival has also taken place in our intercourse with the trade in the midland districts of France. Common Apples are still offered, and we have had considerable importations. Amongst the most popular are the following:—Cyclamens, Primulas, Hyacinths, Tulips, Camellias, Lily of the Valley, Pelargoniums, and Cytisus racemosa.

FRUIT.

Apples, p. 1 sieve . . . 1 6 to 3 0 Oranges, per 100 . . . 6 0 to 10 0
Grapes, per lb. . . 0 10 to 0 10 Pears, per doz. . . 2 0 to 3 0
Lemons, per 100 . . . 0 6 to 1 0 Pine-apples, per lb. . . 0 3 to 0 8
Melons, each . . . 1 0 to 3 0

VEGETABLES.

Artichokes, Jersey . . . s. d. s. d.
lem, p. lb. . . 0 2 to 0 4 Herbs, per bunch . . . 0 2 to 0 4
Asparagus, p. bundle . . . 0 10 to 0 12 Radishes, p. bun. . . 3 0 to 5 0
Beet, per doz. . . 2 0 to 3 0 Mint, per bunch . . . 0 3 to 0 6
Brus-Sprouts, 4 sieve . . . 0 3 to 0 6 Mushrooms, p. pott. . . 1 0 to 1 6
Cabbages, p. doz. . . 1 0 to 1 6 Onions, per bunch . . . 4 0 to 9 0
Carrots, p. bunch . . . 0 10 to 0 12 Parsnips, p. bunch . . . 0 10 to 0 12
Cauliflowers, p. doz. . . 2 6 to 3 0 Rhubarb, p. bundle . . . 0 1 to 0 6
Celery, reg. p. bun. . . 1 6 to 2 0 Salads, per bundle . . . 3 1 to 6 1
Cress, p. doz. . . 0 10 to 0 12 Spinach, per bushel . . . 2 0 to 3 0
Cucumbers, each . . . 0 2 to 0 3 Shalloots, per lb. . . 0 8 to . . .
French Beans, p. 100 . . . 3 0 to 4 0 Spinach, per bushel . . . 2 0 to 3 0
Potatos, Regents, per doz. . . 1 0 to 1 2 Kidneys, 80s. to 130s.;
Roa, 50s. to 60s.

WANTED, A GROUND FOREMAN.—Mr. W. M. PAUL is in want of a Man of character, ability, and experience to take charge of the cultivation of Fruit and Hardy Ornamental Trees. The Roses are under a separate head.—Address, by letter, to Mr. W. M. Paul, 10, William Court, London, E.C.

WANTED, A PRACTICAL WORKING FOREMAN.—Accustomed to Grow Plants for Market (chiefly Soft wood); none need apply whose references for capability, &c., will not bear the strictest investigation.—Address, by letter, to Mr. W. M. Paul, 10, William Court, London, E.C.

WANTED, AS HEAD GARDENER. One who has been employed for a number of years in the cultivation of Fruit and ESTATE MANAGER, accustomed to grow Plants for Market, and to manage the business in which he would be expected to take a prominent part. The High wages will not be given to commence with, but will be increased to the ordinary rate of the trade, and the position is one of trust and energetic men need apply.—W. S. T., *Gardeners' Chronicle* Office.

WANTED, AN EDUCATED FIRST-CLASS GARDENER AND ESTATE MANAGER. Accustomed to grow Plants for Market, and to manage the business in which he would be expected to take a prominent part. The High wages will not be given to commence with, but will be increased to the ordinary rate of the trade, and the position is one of trust and energetic men need apply.—W. S. T., *Gardeners' Chronicle* Office.

WANTED, A YOUNG MAN, to take charge of the Florist's Flower Department in a Metropolitan Nursery. To one who could show ability and natural talent in Hybridising, Cultivating, and growing such plants as Pelargoniums, Dahlias, Pyrethrus, Delphiniums, Carnations, &c., this would be a favourable opportunity of acquiring a valuable and important branch of the business in which he would be expected to take a prominent part. The High wages will not be given to commence with, but will be increased to the ordinary rate of the trade, and the position is one of trust and energetic men need apply.—W. S. T., *Gardeners' Chronicle* Office.

WANTED, A GARDENER, thoroughly experienced and well recommended, to take charge of the Garden and to manage the business in which he would be expected to take a prominent part. The High wages will not be given to commence with, but will be increased to the ordinary rate of the trade, and the position is one of trust and energetic men need apply.—W. S. T., *Gardeners' Chronicle* Office.

WANTED IMMEDIATELY, for the Archery Ground, a Gardener, to take charge of the Garden and to manage the business in which he would be expected to take a prominent part. The High wages will not be given to commence with, but will be increased to the ordinary rate of the trade, and the position is one of trust and energetic men need apply.—W. S. T., *Gardeners' Chronicle* Office.

WANTED, IN A WEST END NURSERY, an active MAN, who thoroughly understands the general Propagation of Stove and Greenhouse Plants, and who is well recommended by his references. Apply by letter only, X. Y., Mr. De Kock's Library, Clifton Road, Maida Vale.

WANTED A STEADY AND EFFICIENT ROSE PROPAGATOR, principally Out-of-doors; also to assist in Seed Sowing. First-class reference required.—Mr. GEORGE WATSON, 10, William Court, London, E.C.

WANTED, A RESPECTABLE YOUNG MAN, quick at Potting and Tying, and used to the Growing of Roses.—Apply with reference, to JOHN TURTLE, East Wickham Nursery, Wallingford, Kent.

WANTED IMMEDIATELY, in a Wholesale London Seed Warehouse, a MAN to take General Charge of the Warehouse and to manage the business in which he would be expected to take a prominent part. The High wages will not be given to commence with, but will be increased to the ordinary rate of the trade, and the position is one of trust and energetic men need apply.—W. S. T., *Gardeners' Chronicle* Office.

WANTED, A BOOK-KEEPER AND CLERK.—Apply to Mr. WILLIAM BULL, New and Rare Plant Establishment, King's Road, Chelsea, London, S.W.

WANTED, AN ACTIVE YOUTH, for a Retail Seed Shop in the suburbs; one who has had experience preferred.—Apply, in own handwriting, to A. B., Post Office, Kingsland Green, E.

WANTED, AN ASSISTANT in the Seed Department.—Apply to Mr. WILLIAM BULL, New and Rare Plant Establishment, King's Road, Chelsea, London, S.W.

WANT PLACES.—Letters to be Post Paid.

Gardeners.

B. S. WILLIAMS has much pleasure in stating that he has upon his GARDENERS' REGISTER many Men of the highest standing, thoroughly conversant with the business of the trade, and who are well recommended by their references. He has upon his REGISTER, GARDENER, GARDENER, and BALIFF, or UNDER GARDENER. Ladies or Gentlemen requiring such may rely upon the recommendations only, and who are worthy of their trust.

EXPERIENCED GARDENERS (or as GARDENER and BALIFF), of various qualifications, recommended to Gentlemen.—Further particulars given upon application to Messrs. E. G. HENCKSON and SON, Wellington Nursery, 21, Upper Holloway, N.W.

GARDENER (HEAD).—Age 35, married; considerable experience in all the requirements of a good place. Very highly recommended.—Victoria Road, Upper Holloway, N.W.

GARDENER (HEAD).—Age 30, married; thoroughly practical in all branches of the profession, highly recommended.—H. 9, Gortley Road, Upper Holloway, N.

GARDENER (HEAD).—Age 30, married; thoroughly practical, and experienced in all branches of the profession. Eight years' reference from a Nobleman, and 15 months from last employer.—ALPHA, Essex, York.

GARDENER (HEAD).—Age 40, married; thoroughly practical in all branches of Modern Gardening, Management of Woods and Plantations, Measuring and Value of Timber, and Land and Stock of regularity.—Upper Holloway, N.W.

GARDENER (HEAD).—Age 40, married; thoroughly practical in every department of the profession; has served three years under the Duke of Sutherland's late Gardener as Foreman. An excellent character, and a most reliable man. No objection to take charge of Land and Stock.—JOHN HARRIS, 10, Horse House, Huddersfield, Yorkshire.

GARDENER (HEAD).—Age 38, married; has had considerable experience amongst Orchids, and is a good Cultivator of Plants and Fruits of every description. Over nine years' good character from a Nobleman, and 15 months from last employer.—ALPHA, Essex, York.

GARDENER (HEAD).—Age 35, married; first-class Cultivator of Stove and Greenhouse Plants, Orchids, Ferns, &c.; successful in growing and forcing Pines, Fuchsias, Melons, Cucumbers, &c.; extensive practical knowledge of the trade. Good character.—H. BARNARD, The Gardens, Warden Hall, Preston, Lancashire.

GARDENER (HEAD).—Age 30, married; has had considerable experience amongst Orchids, and is a good Cultivator of Plants and Fruits of every description. Over nine years' good character from a Nobleman, and 15 months from last employer.—ALPHA, Essex, York.

GARDENER (GOOD).—Age 32, married; no inexperience; respectable. Wife can take charge of a small household.—Address, by letter, to Mr. W. M. Paul, 10, William Court, London, E.C.

GARDENER (FOREMAN).—Age 24; good practical knowledge of the profession in all its branches. Highly recommended by present and previous employers.—Address, stating terms, to Mr. W. M. Paul, 10, William Court, London, E.C.

GARDENER (SINGLE-HANDED).—Age 26, married; can take charge of a small household. Good character from a Nobleman, and 15 months from last employer.—ALPHA, Essex, York.

GARDENER (SECOND). In a Gentleman's Garden.—Age 20; two years in present place as Under Gardener, Y., Post Office, Reigate, Surrey.

GARDENER (SECOND OR UNDER).—Willing to be useful; horse objected to. Good character.—J. F., Mrs. Finch, Reigate Hill, Surrey.

GARDENER (UNDER).—Age 21; six and a-half years' practical experience. Good character and references.—W. K. W., 6, Peel Street, Farnick, Glasgow.

GARDENER (UNDER). In a Gentleman's Garden.—Age 20; can be well recommended.—A. COVE, Coxwell Road, Farnick, Glasgow.

SEED TRADE.—A well-educated young Man, age 22, is in a situation to take charge of a first-class Nursery, and has had some experience in a Seed Shop.—Messrs. DOWNE, LALAGE, and LAURENCE, 20, Strand, London, W.C.

NURSERY FOREMAN AND PROPAGATOR.—Age 40, married; has a practical knowledge of the profession in each branch. A first-class Florist and Grafter indoors and out; a good salesman, and thoroughly acquainted with the value of Nursery Stock. Satisfactory testimonials.—A. B., Messrs. F. & A. Dickson & Sons, Upton Nurseries, Chester.

FOREMAN in a Nobleman's or Gentleman's Garden.—Age 30, married; understands Early and Late Forcing; Stove and Greenhouse Plants, Flower and Kitchen Gardening, &c. Good character.—Address, by letter, to Mr. W. M. Paul, 10, William Court, London, E.C.

To Nurserymen.

FOREMAN.—Thoroughly understands the Propagation and Growing of Stove and Greenhouse Plants, Orchids, Roses, Vines, Fruit Trees, &c.; has a thorough knowledge of the general routine of Nursery Work, both inside and out. Good recommendations.—Address, by letter, to Mr. W. M. Paul, 10, William Court, London, E.C.

To Gentlemen.

BALIFF.—In a Gentleman's family; understands the Management of a Farm, Stock, &c.; Wife, Poultry and Dairy. Good character.—B. A., 97, Westbourne Park Road, Park, Kent.

FARM BALIFF (WORKING).—Age 36, married; respectable; has a thorough practical knowledge of Cattle and the general Management of a first-class Farm. Five years' excellent character from present employer, and also from several of the respectable Farmers in this neighbourhood, of which he is a native.—WILLIAM KENEDY, 10, Farnick, Glasgow.

TRAVELLER AND CLERK, or SHOPMAN.—Mr. FORBES, who has represented in England with success for the last years the Firm of Messrs. James Carter, Duggan, and Beale, is about to re-engage a young man, who is well recommended by his references. Apply by letter only, X. Y., Mr. De Kock's Library, Clifton Road, Maida Vale.

IMPROVER, in a Gentleman's Garden.—Age 20; six years' experience in various branches.—A. Y., The Gardens, Clifton, Bristol.

SALESMAN, FURNISHER, or FOREMAN.—Great experience in Market, Town, and General Nursery Business. Highest testimonials and references.—H. H., 26, Great Quebec Street, London, E.C.

SHOPMAN (HEAD).—Has had seven years' good experience in one of the best Wholesale Houses.—U. S., *Gardeners' Chronicle* Office.

SHOPMAN.—Age 24, seven years' experience; is open to an engagement.—J. T., Post Office, Stanley, Perthshire, N.B.

Notices to Correspondents.

APPLE TREES: *W. H. S.* If the sorts are good, and the trees not sickly, we should recommend to head them, and to double the supply of vici-rus young wood. If they are not worth saving, bette grub them up at once and plant anew.

BLACK WALNUT: *A. S. D.* Apply to any respectable nurseryman.

BROWN'S FORESTER: *I. N.* "Lindley's Theory of Horticulture" you will find the Table you require. *W. H. S.* We do not know of any work which gives instruction on the kitchen and flower garden, the cow, the pig, and the horse. "The Manse Garden" would probably suit you, so far as gardening information goes. *DR. AINSWORTH:* *G. E. H.* It is very deep and not so secure from the roots of Elm trees. Water-lodging as described, would be very likely to cause decay. Cover the part with a thin sheet of lead.

FRENCH BEANS: *D. C.* We have no fault to find with your earlier treatment, though we prefer sowing in large 60s, and shifting on into 24s for final growth. We use open, fibrous loam, moderately enriched, as you describe, and press the whole reasonably firm. An expert gardener would not "break off all the young fibrous roots, leaving nothing save the long tap-roots," when pressing the soil firmly around them. Indeed, the plants, additional to those to the old sowing, pressing down firmly in the centre, then giving each pot smart jerk on the potting-bench, adding more soil, and carefully pressing the hand on the whole and around each stem, it would be difficult to do so. To "deprive them of air" is a mistake, and to the old sowing, pressing amongst the crocks, in small pots, would suffice, apart from any other causes, to produce the ills you complain of.

MARKET GARDENING: *Adam.* 1. Yes. Dig deeply: use a good spade. 2. Yes. You had better use one who has been for some time accustomed to similar kinds of work. 3. We know of no work on fruit growing written especially for market gardeners. Many works treat on the subject, such as "Thompson's Gardener's Assistant." See also, "H's Fruit Manual." Cut-hill's pamphlet on market gardening is very good, so far as vegetables are concerned. 4. We are not sufficiently well acquainted with your neighbourhood to advise you.

MISCELLANEOUS: *H. S.* They should certainly be kept under, though they may be in some degree beneficial. **NAMES OF FRUITS:** *Inquirer.* We cannot distinguish your Apples, as they possess no distinctive features whatever.

NATIVE PLANTS: *A. D. I.* Imperfect, but apparently Pterocarpis membranacea; 2. Gynogramma; 3. Adiantum philly; 4. Senecioaphis Giesbreghtiana; 5. Adiantum formosum.—*Cambrian.* Gynogramma species of gardens; a slender form of G. Calomelanos.

POPULARS: *X. Z.* The Black Italian Poplar of most English nurseries is P. monilifera, the fast-growing Canadian Poplar. P. nigra is an European species, and Continental nurserymen consider the Black Italian Poplar to be a variety of this species.—Wesmael even identifying it with our Lombardy Poplar.

ROSES AND HOLLYHOCKS FOR EXHIBITION: *J. Wilson.* The former will flourish in any soil, and the latter in a fine situation.—Hybrid Perpetuals: Alfred Colomb, Abel Grand, Baroness Rothschild, Black Prince, Dr. Andry, Duke of Edinburgh, Devienne Lamie, Dupuy Jamin, Elie Morel, Horace Vermet, John Hopper, La France, Madame C. Joigneux, Madame Noman, Madame Therèse Lével, Madame de la Roche, Madame de la Roche, Marquis de Mortemar, Mons. Noman, Prince Camille de Rohan, Thyra Hammerich, Victor le Bihau, Victor Verdier, and Xavier Olibo. Noisette: Maréchal Niel, Tea-scented: Adrienne Christophe, Gloire de Dijon, Madame Falcot, and Madame Margot. Bourbon: Souvenir de la Malmaison. Hollyhocks: Bill, Curas Chater, Conquest, Countess of Craven, Eclipse, Exultant, Fascination, Fred Chater, Invincible,

by insects ; the other, excrescences produced by injury to the tender rootlet, caused by the irrita-

tion of stones or other hard bodies on which it might press in the course of its growth.

The character of the excrescences is different in the different kinds of leguminous plants. In the Pea they congregate chiefly on the main stem.

In the French Bean they are isolated, heart-shaped tubers on the lateral fibres. (See fig. 40.) In the common Bean they are coarser, and mainly confined to the tap-root.

If the excrescences, whether of Pea or Bean, be cut open at an early stage, they will be found to consist entirely of vegetable cells. We have never succeeded in finding any insect, or trace of an insect, in them at that stage. At a stage farther on, when the excrescences on the Pea root have reached half or three quarters of their full size, we, in the great majority of cases, find a small grub, which is larger in the large galls. At a later stage still the gall is found to be an empty skin with a hole in it, rotten in the inside, and perhaps with a number of acari running about in it.

In the excrescences on the French Bean we have not found any insect, but those we examined were not far advanced. In the common Bean the texture of the excrescence is harder and more woody than in the others, and in it we have sometimes met with grubs, sometimes not—but we have never met with any like those in the Pea—occupying the whole of one gall (living in a bag as it were), but they have been in a corner of the gall, and had not attacked the central harder part. All the grubs we have seen, whether in the Pea or the Bean, have been curculionidous, that is, have belonged to the weevil tribe of beetles; but as that tribe is immensely numerous, and the larvae are without distinguishing characters by which we can tell one species from another, we can rarely learn more from the examination of one of them than that, from its size or habits, and food, it may be guessed at to belong to some species with which, on these points, it corresponds.

Having traced the thread up to this point we are like to be stopped here—"no thoroughfare." Let us leave it for a moment, and take up another end of the string, and see if we can unravel it from that side.

Who that has a farm or a garden but has occasionally suffered from a failure of their Pea crop? It has, perhaps, been sown too soon, and an envious frost has come and killed, or thrown out, the promising young germs; or, after having been fairly started, to the owner's surprise and annoyance, he has found all the young leaves eaten away by some insect. Generally speaking, it is in the grub state that insects do harm, but in this case he will find that the mischief has been done by a perfect insect, a small dull, light brown weevil, named by the learned *Sitona lineata* (see fig. 41). It is easily overlooked, for, like most of its tribe, at the least touch or alarm it affects dith, or drops from the plant and lies motionless, like a piece of earth, with which its colour exactly corresponds; but be cautious, and watch awhile: it picks itself up, reascends the stem, and soon may again be seen sitting on the leaves, and gnawing away with great voracity. CURTIS gives a very good account of it and its ravages, but tells us that its early stages are unknown. He adds, however, that his friend Mr. SPENCE had informed him that owing to the crops of Beans in Yorkshire suffering from galls found upon the roots, there was some reason to believe that they are the nidus of it or some allied species. He adds:—"I have, however, examined the Bean roots where the weevils are abundant in this country without discovering any of the galls." This is rather curious, incidentally, as showing that although usually so common, now and formerly, still they are at times not so.

Last summer our correspondent, "E. A. O." drew attention in our columns to the abundance of galls in the Pea roots at that time, and the grubs found in them; and as the early Pea grub had been much infested by *Sitona lineata*, "E. A. O." drew the inference that, like PHARAOH's dream, the two were one, and the interpretation thereof the same. Professor WESTWOOD, however, took an opposite view. At a meeting of the Scientific Committee of the Royal Horticultural Society a week or two after-

wards he explained that he thought that this was an error, and exhibited at the meeting a weevil grub which he had found attacking his Pea roots *ab extra*, and which he regarded as the grub of *Sitona lineata*. It was a little larger than the grubs found in the Pea-root excrescences, but as neither his grub nor the Pea-gall grub have ever been bred, it is as yet alike matter of conjecture in either case. Professor WESTWOOD, however, made one remark which struck us as of weight in estimating the claims of the grub in the Pea galls to be *Sitona lineata*. He observed, that if it were so, it would be the first instance in his experience in which a broad-snouted beetle made a gall. They are always made by narrow-snouted creatures, as



FIG. 40.



[FIG. 41.]

in fig. 42, which represents the weevil of the Cabbage-root gall (*Ceutorhynchus assimilis*).

Now, without at all committing ourselves to a definite opinion, and reserving full power to be as versatile as the *Times*, or as human nature itself, we think that the facts, so far as we know them, seem to point in the following direction:—

1. That the galls, although often the abode, are not (at least always or necessarily) the work of insects. In Pea roots we may sometimes see a solitary tiny gall near the end of long fibrils as much as a couple of inches from the main stem, and this is not a rare circumstance. The tenuity of the fibril at that distance from the stem, and far underground, is, we think, adverse to the idea of its having been made by a perfect insect laying its egg in it. If it were so, the perfect insect must be roaming about in numbers in the bowels of the earth, which is a fact in entomology which has not yet fallen under the notice of any of our observers. Then the numbers of galls in the earlier stage in which we find no grubs is inconsistent with the gall being their dwelling-place and constant habitation.

2. The numbers of grubs of weevils all apparently of the same species found in the galls, one in each and no more (we have seen dozens,



FIG. 42.

and therefore speak with something of the authority of personal observation) show that the insects make the galls a regular residence.

3. The coincidence of their numbers on the Pea roots with the number of the perfect insects on the Pea leaves, and the size of the grub not disconform to that of the perfect insect, and our ignorance of the early stages of *Sitona lineata*, all suggest some connection between them.

We plead guilty to being fond of hypotheses. We think there is nothing like this, if ridden lightly, for working out the truth. We shall, therefore, conclude with an hypothesis (only stipulating that it is provisional, and of limited liability). The Peas and Beans produce the

* Fig. 41 represents *S. lineata* (the striped Pea weevil); 3, natural size; 4, magnified.

† Fig. 42 represents *C. pleurostictus* (the Turnip-gall weevil), very similar to *C. assimilis*; 6, natural size, magnified at 7; maggots at 2, magnified at 3.

For figs. 41 and 42 we are indebted to Messrs. Blackie, of Glasgow, in whose "Cyclopedia of Agriculture" they were used.

galls without the assistance of insects—perhaps by irritation, in the way above suggested. The *Sitona lineata*, although not of the section of weevils that can make galls, may lay its eggs alongside the galls on the main root, which are the largest, and in which we have usually found the grub, which makes its way into it from without, instead of being born within.

In conclusion, we recommend the study of the origin and nature of these excrescences to our physiological readers, and that of the insect that feeds on them to our entomological, nothing doubting that, ere another season passes by, the mystery will by their joint assistance be satisfactorily solved.

THE opening meeting of the FARMERS' CLUB promises well for the current season, 1871. Mr. J. COLEMAN, Park Nook, Quornden, Derby, read a paper on ENGLISH CHEESE FACTORIES, which, for practical utility and tersely given serviceable information, has never been excelled. There was a large and influential meeting of members—landowners and tenants being in fair proportion—Mr. T. B. SPEARING, Reading, the Chairman for the year, being in the chair. There was an agreeable diversity of opinion expressed, but the general tone of the discussion was strongly in favour of the factory system, whether carried out by individual enterprise, as in the example of Mr. GEORGE JACKSON, of Tattenhall Hall, Chester, or on the co-operative system, as in the two Derbyshire factories.

The first speaker (Mr. ANDREWS) endeavoured to take exceptions to the factory system, doubting if it would pay. Where he resided (Somersetshire) farmers would expect more money for their milk than the Derbyshire factories gave; he did not like the idea of American managers, and thought English farmers would look better after their own affairs. The next speaker (Mr. CALDECOTT, Warwickshire) thought cheesemaking afforded profitable employment to small farmers and their families, and that they should not be deprived of it. The third (Mr. RIGBY, Cheshire) continued the same line of argument; many farmers made better cheese than the factories, and he could not see why farmers generally should not do so. He further thought the Derbyshire factories had not shown that they could make good cheese when the milk was injured by thunderstorms in the summer time. Mr. ALLENDEN, Manager of the Aylesbury Milk Company, said that milk could be conveyed 50, 60, or even 70 miles, if properly cooled.

Dr. VOELCKER supported the factory system, but thought the Derbyshire factories were open to improvement in several respects. If farmers would cool their milk to 60° they could carry it long distances to the factory without injury. Notwithstanding the arguments of the previous speakers, economy was manifestly in favour of the factory system. He thought the Derbyshire factories should heat their "ripening rooms" by hot-water pipes rather than by stoves. He then considered the argument based on the advantages of quick returns. It took six months to ripen a Cheddar cheese, Gloucester, or Cheshire cheeses for the market, whereas the factory could turn them out in six weeks, the quality being in favour of the latter.

He next turned attention to the fact that the American farmers visited the different dairies of this country—adopted the Cheddar cheese as their standard—returned home, and commenced making Cheddar cheese in their manufactories; and now two clever Yankees are teaching successfully the dairy farmers of Derbyshire. It was, in point of fact, the Cheddar system reduced to practice on sounder principles.

The details of the Cheddar system, did time permit their discussion, would be seen to be more suitable to the factory than to farmers with a herd of cows too small for profitable practice. Bad rennet, an improper temperature of the milk, imperfect breaking of the curd, and bad ripening rooms accounted for the inferior quality of the cheese of the common dairyman. The factory, on the other hand, had the entire control of these conditions. If a farmer had a sufficiently large number of milch cows he could adopt the factory system; otherwise co-operation was advisable; and the piggery question will be found no objection ultimately.

Lord VERNON had never listened to a paper with greater interest; he thanked Mr. COLEMAN for the able assistance he had rendered in introducing these factories successfully into Derbyshire, and was glad to see landowners and tenants united

in the solution of the factory problem. The increasing importations, and the improvement made in the quality of American cheese, rendered this a work of necessity, otherwise the American manufacturer would rule the English market. Exceptions had been taken to the cost of buildings necessary for a factory. Now, their building cost about 40s. per cow, or £1000 for 500 cows, whereas common dairies cost twice the sum. The emancipation of the farmer's family from the slavery of cheese-making was another important advantage; so that its social effects will be in keeping with its profits in other respects. It was a movement which will go on and prosper as sure as to-day will be followed by to-morrow; and the result will be, that we shall beat the Americans in our market, if we cannot drive them out of it.

Mr. JACKSON admired the public spirit of the Derbyshire farmers. Improvements always met with opposition, but their movement would triumph. It will be a great advantage to small farmers, but a greater to large farmers. He referred to his paper on this subject—1868, and his experience since. He had been obliged to separate the factory from the house system. In the common dairies of Cheshire a good dairy-maid costs £25 a year, and as good dairymaids soon get married, the dairyman has to look out for another. He experienced at first some difficulty in getting the milk delivered sweet at the factory, but had recourse to two sets of cans—cleaning them at the factory, so that when the farmer delivered his milk he got clean cans home with him for the next milking. Since he adopted this plan he had been able to dispense with making cheese on Sunday. He had a fine cool spring of water at from 50° to 52°, and was able to cool his own milk during the heat of July and August, 1870, and make good cheese. The movement was in favour of large farms—landlord and tenant would both be gainers—but the former would gain most.

Sir GEORGE JENKINSON, who has large dairy farms on his estates in Wilts and Gloucestershire, thought farmers' wives and those who milked the cows would have nothing to do between milkings, and differed with Lord VERNON on the subject of "emancipation." The wives of his tenantry were proud of their cheeses, and appeared in market in full dress to pitch and sell them. Would not like to see this done away with without greater security than the Derbyshire factories promise; moreover, some of his tenants, who had 70 cows, sold 1000 pigs in a season.

Mr. SIDNEY (Agricultural Hall) knew nothing about cheese-making, but was of opinion that if farmers got more money for the milk at the factory than at home, Sir GEORGE JENKINSON's sentimentality about farmers' wives would fall through.

Mr. JENKINS (of the Royal Agricultural Society) referred to the American system and the use thus made of the whey in feeding pigs and calves. He had visited the dairies of Wiltshire, and found them in the two extremes of good and bad. Under the factory system, there would be as much manure for the land as under the common dairy system.

Mr. FOWLER supported the views of the paper. The improvements brought to bear upon cheesemaking in factories are manifest. With regard to robbing the land, Cheshire farmers had long been familiar with that operation, and with the remedy for it; and now the manufacture of artificial manures removed all difficulty.

The CHAIRMAN gave a brief summary, and Mr. COLEMAN answered satisfactorily the several questions put, and exceptions taken; and thus concluded a most useful and interesting discussion.

An article, which appeared in the *Agricultural Gazette*, on THE MERITS OF THE DEVON CATTLE exhibited at Islington, written soon after the show at the Agricultural Hall, has displeased an enthusiastic Devon breeder, who, whether writing from his house in Sussex or his present abode in Italy, evidently carries with him the interests and reputation of his favourite stock as among the most precious bits of old England. Admitting the special excellence of the Devon class in the Smithfield exhibition, and the really substantial and business-like excellence of the stock, as seen from a point where the eye could rest on all the classes in the Hall at once, the writer had pointed out that a sort, whether hardy, early ripening, and furnishing good meat or not—which was so small in number and in bulk—ought not to have

precedence over the large and fleshy Herefords and the everywhere extending Shorthorns, which is given them by the Smithfield Club. The true measure of their importance is to be seen, not in the pet classes of an annual exhibition, but in the great London meat market, of which the following is a fair description by an eye-witness at a recent Christmas time:—

"We were in the metropolitan market on Monday morning between 6 and 9, and among 8000 head of cattle there tied up we came upon the 'thin red line' of Devons, neater and cleaner, better put out of hand as a whole—if some of the large French cattle be excepted—and so well adapted to the soil and climate of the country. There were, however, but a few scores of them altogether. They were far outnumbered by the Herefords and the Shorthorns and their crosses quadrupled both these breeds together. But the Shorthorns were not less a merely local breed at the end of last century than at the present time. Their inherent merits—and shall we say the superior ability of their breeders?—have multiplied them until, not merely in every county, but in almost every county, they are the best leading sort of cattle. The force of events is stronger than any argument."

Dozens, in fact, of Shorthorns are sold every week for every Devon ox that offers. The *Agricultural Gazette* has more than once discussed the relative merits of the two breeds, contending that there should be some relation in the consideration shown by societies to the importance of the breeds which they distinguish. If this were more carefully borne in mind than it seems to be, what share do you suppose of the whole prize list representing the interests of beef producers and of beef consumers in this country would be fairly allottable to Devons and to Shorthorns respectively?—to the merely local Devons, which still stand first on the lists of the Smithfield Club, and retain an equal place in the front rank of its premiums, and to Shorthorns which have spread into every county of the island? If the relative contributions of these two breeds to the meat supply of the country be any guide to their relative importance, let those members on the Council of the Club who are acquainted with the metropolitan market say what shares of the beef sent up to London they severally supply. If the profitable conversion of the Turnips, hay, and grass of our farms be any guide, let the country members of the Council say which breed represents the greater economy, and to which is English agriculture generally the more indebted.

If, indeed, general utility is to be our guide, as certainly it ought, the Devon breed is simply nowhere in the race; ranking first, probably, in the second rank of such local kinds as Norfolk, Sussex, Longhorns, but hardly exceeding the special serviceableness or value of Kyloes, Galloways, or Polled Angus. That is the conclusion to which we think an unprejudiced observer of the sources of the English meat supply must come; and it is not by strict arithmetical examination of weights in particular instances, or special effort, such as the Smithfield Club could best be by a general view of this kind, that the mind will be convinced. That we may satisfy our correspondent, however, of the entire fairness with which we wish to treat this subject, we reproduce for his satisfaction the vigorous defence of the Devon breed which was communicated to our columns some years ago by a writer apparently as enthusiastic as himself.

"What spirit of evil from the lower region of mere gluttony and grossness can have prompted the attack which I have just been reading in your pages, on the most beautiful, the very best of all our British breeds of cattle? Admitting as you do their 'symmetry and quality, precocity and artistic beauty,' why should you begrudge the very kind which the Smithfield Club ought most strenuously to advocate and patronise? But go one step higher, and consider the economy of the process by which the green crops of the farmer are converted into meat. Has the size of the animal by which this process is accomplished—the mere size, in which you seem to judge the Devons far so much below the Shorthorn standard—anything whatever to do with the economy of the meat manufacture?"

"I believe that BAKEWELL, in that wonderful process of improvement by which he brought the modern Leicester out of the former one-headed Midland County sheep, altogether disregarded size. He believed that when quality and early maturity have been achieved in any breed, and, indeed, in order to their successful achievement, the only

object to be aimed at is diminished offal in proportion to the quantity of useful carcass—increased relative amount of the first-class joints as compared with the weight of second-rate and inferior sorts—not increased bulk and weight, but increased proportion of the whole live weight which is saleable as carcass.

"And no doubt this is the wise and proper judgment. It is not the animal which will convert an immense daily ration into growth and meat that is necessarily the best. It is that beast which, whatever the amount which requires *per diem*, will spend least of it in growing skin and bone, and most of it in growing fat and flesh, that we desire. And, judged by this test, I believe that, the outward conditions of health being given, the small and beautiful pure-bred Leicester or Southdown sheep will require less food than the heavier sort, and the small and pretty Devon will hold its own against the Hereford or Shorthorn.

"I will, however, take the argument one step higher, and contend that a breed which presents such admirable illustrations of perfect form and quality as the Devons, so well deserves its foremost place upon the lists of the Smithfield Club, whether or not it be so generally useful to the feeder, or so generally serviceable to the consumer, as the Hereford or Southdown are. Is not this indeed one great object I had almost said *the* one great object which the Club has in view? Certainly, that which presents to the admiring gaze so many more ewes, or tons of beef on a given number of legs than on any previous occasion has seen, does not thereby necessarily excel its predecessors. It is that collection of animals which we call 'the best,'—the quality, especially, of the beauty—not the only, which can point to the heaviest beasts, that is the best. And notwithstanding that M'COMBIE'S ox, carrying 18 to 20 cwt. of carcass, takes the Gold Medal of this year, I venture to say that the show of 1867, which was its characteristic season, is not more than others have seen when a little Devon ox has had the place of honour; and has held out for emulation and for imitation a model of 'quality and precocity, symmetry and artistic beauty,' to copy which would benefit the breeders and the feeders and consumers of this country even more than the rule which the same words ox to become the rule instead of merely the wonderful exception.

"And I may ask a further question still, and call attention to the qualities displayed by the men who have bred generations of such animals. Do you think the breed Ought this to be nothing, do you think, to the Council of the Smithfield Club? Do they not know that it is the resolution and endurance, the energy and pluck which the leading men among our breeders display, from generation to generation (not merely of the cattle but of the breeders themselves), that is the real source of the excellence which they stimulate by their rewards? The 'thin red line' in the Agricultural Hall, at which your criticism is levelled, indicates qualities as sterling and precocious in their way as those to which the same words refer in the story of Crimean heroism. And these qualities are not productive of merely good cattle, they are productive of similar moral qualities in other men. Take the resolute and the patient skill of JONAS WEBB for an example. What has been his fruit in English agriculture? Has it been merely an unvaluable flock of Southdown sheep? Not Abraham only, but half our English counties felt his influence. Wherever a black or brown-faced sheep exists, some share of it may be said, red, not only Sussex, but Wiltshire, Hampshire, Oxfordshire, even Devon, owe their being to the point of fruit this day with which the character, agricultural and personal, of JONAS WEBB, is to be credited. The late Lord DUCIE, too, may be quoted as another instance of the personal influence of a resolute and persistent adherence to good breeding, and to the best of the breed, as an especial aim and object of the Smithfield Club. His herd was dispersed 15 years ago, but its results are felt directly in 20 others, and they are still more recognisable indirectly. At Didmarton, Siddington, and Kingscote, in its own neighbourhood, and county, we may read the influence of his character quite as much as the direct and immediate effect of the particular strain of Shorthorn blood to which he was devoted.

"I contend, therefore, that the Smithfield Club should beware how they suffer criticism, such as that which I am criticising, to be the result of the bias of the point of view. Let them beware how, on merely economical or utilitarian grounds, they refuse their patronage to a class of breeders who, though small in numbers, have for a century or more persistently and successfully contended against the vast and justly popular but, in point of almost every county in the kingdom, and have justified by their indomitable pluck the leading place which a merely local and a comparatively little breed of cattle has obtained."

—THE short supply of English Wheat, on Monday, at Mark Lane, was in poor condition, and it accordingly sold but slowly at the prices of the previous week. On Wednesday prices were well maintained.

—The prices of seeds are all higher, Cloverseed is scarce, Rapeseed is 2s. a qr. dearer, Linseed is tending upwards, and Sainfoin is scarce and dear.—At the Cattle Market on Monday, at Islington, there was a short supply, but a still shorter demand, and trade was slow at somewhat lower prices.

—Among the coming sales of PURE-BRED SHORTHORN STOCK is the large draught from the celebrated BARNET FARM (Gloucestershire) which will be sold on March 8 by Mr. STRAFFORD, and to which we shall refer in detail next week.—Mr. WOOD'S herd at Stanwick Hall, near Darlington, is to be sold on April 20. It dates from the time of the COLLINGS, and has in its day sent out such animals as ST. ALBANS (2582) and *Nell Gwynne*. Mr. THORNTON will also sell on the following day another old-established herd, belonging to Mr.

NESHAM, of Ganeford and Haughton-le-Skerne, in the county of Durham. In the following week, on April 26, Mr. EASTWOOD's small but celebrated herd, at Whitewell, near Clitheroe, will be disposed of; and on the following day, at Preston Hows, Whitehaven, Mr. JEFFERSON's herd will be sold. The herd of the late LORD WALSINGHAM will be sold on Thursday, May 18—the flock at end of June or beginning of July.

A numerous meeting of the Council of the CENTRAL CHAMBER of AGRICULTURE was held on Tuesday, Sir MASSEY LOPES, M.P., in the chair. It was announced that Mr. Edward Henegad had accepted the office of chairman for 1871. Several new members were admitted, and among them the Duke of Rutland, the Earl of Leicester, the Earl of Morley, Lord Leigh, the Earl of Powis, Lord Sondes, Lord Aveland, Lord Clinton, and Lord George Manners, M.P.—The Local Taxation Committee reported progress, and urged that the question of local taxation should be brought before Parliament as early as possible in the ensuing session, and that it should be the subject of a large and comprehensive measure, a deputation from the Central Chamber and others interested should wait upon the Government and represent the necessity of speedy consideration “with a view to a full and an impartial inquiry into the whole matter.”—Some discussion took place upon the subject of a uniform system of weights and measures. Mr. J. B. SMITH, M.P., and Professor LEONE LEVI spoke in favour of the metrical system, and eventually the following resolution was agreed to:—“That the Council, in receiving the report of the joint committee on weights and measures, adheres to its former resolutions to the effect that all agricultural produce, except liquids, should be sold by weight only, and, appreciating the advantages of the recommendations contained in the report of the joint committee, is of opinion that it is desirable, in the first place, to afford facilities for an increased acquaintance with the metric system, by introducing instruction in its principles in public schools; and that the subject should be taken with reference to the Malt-tax were then considered, and it was resolved:—“That this Council urge the Government, when reviewing the general licensing system of the country, to consider the unjust pressure of the Malt-tax upon the growers of Barley and upon the labouring classes, who are the great consumers of beer.”—On the subject of private or occupation roads, the Chamber adopted a resolution to the effect:—“That in the opinion of this Council, some legal provision is necessary, and ought to be made, for enabling persons interested in occupation roads, not being highways, to co-operate for the purpose of making, imposing, and maintaining such roads at their own charge, and that the subject is one of sufficient public importance to justify an application to the Government to initiate legislative action thereon in the next session of Parliament.”—A motion, of which notice had been given, deprecating the present system of maintaining highways as a charge upon real property through the ratepayers, was postponed until the next meeting of the Council in March, the proceedings terminated with a vote of thanks to Sir MASSEY LOPES, as Chairman.

In a paper recently read before the Metropolitan Association of Officers of Health, Dr. T. SPENCER COBOLD discussed THE RELATIONS OF ENTOMOZA TO PUBLIC HEALTH AND THE SEWAGE QUESTION. Measles in pigs as well as sturdiness in sheep are two of the intermediate grades through which the tapeworm ova pass. The tapeworm ova from dogs, rabbits, or the human subject produce measles in pork or sturdy in sheep; and conversely the measly pork or the sturdy brain of the giddy sheep induce tapeworm in dogs, men, or other animals. Cattle, he pronounces, contrary to the opinions of butchers and other persons concerned, to be obnoxious to attacks of the same kind, and he seems disposed to believe that even pleuro-pneumonia may proceed from parasites.—Dr. COBOLD's observations on animals dying at the Zoological Gardens abundantly testify to the prevalence of entozoa, alike in wild and domesticated animals. Their ova are a precious life; they may float unperceived by hunters in water of apparent purity; and hence unsuspected they may gain access to the bodies of men or of the domestic animals which form the food of men. Such a contingency, Dr. COBOLD considers, will be apt to occur if sewage water from towns is applied directly to growing crops. In such sewage there must often be the ova of tapeworms, fleshworms, and various other parasites. In or on the grass or vegetables fed or watered with the sewage the minute tapeworms lurk, and then may find entrance into the bodies of animals, or even get directly into the body of man himself. The short life of town-country crops on such average produce as that of the Edinburgh Craig-tinny Meadows, their liability to pleuro-pneumonia and other disorders, and the great losses which occur amongst them, are indicated by Dr. COBOLD as some

evidence of the mischief which results from the use of town sewage.—It is, perhaps, proper to add that in Edinburgh, where milk from sewage-grown grass and beef from grass-fed cows have been consumed for generations, there is no special development of tapeworm disease known; and Edinburgh, as the seat of an extremely active and energetic medical school, could not have kept such an infection secret if it existed.

The Veterinarian of February states that though, at the close of the year, Belgium Luxembourg was believed to be free from the CATTLE PLAGUE, the disease having been reported as effectually stamped out within a few weeks of its introduction from France, yet the risk of its entrance into the province still remained, in consequence of the progress of the German army in the north of France, led the Belgian Government to despatch troops to the frontier to assist the customs' officers in preventing the fraudulent attempts which were being made to bring cattle over it. The latest intelligence from Belgium shows the plague to be on the increase in the province of Luxembourg, and among other places at Halanzy near to Longwy. Besides this reintroduction of the cattle plague into the province, the further spread of the disease in the northern parts of France, the malady is reported to have shown itself at Limours, about 20 miles south of Versailles.—We are also informed that pleuro-pneumonia exists in 35 counties of Great Britain, and the centres of the infection number 87. One rather serious outbreak in Dorsetshire was traced to the purchase of some Irish beasts at Bristol market. The malady still prevails in the London dairies and in the environs of the metropolis.—The fluctuations in the foot-and-mouth disease continue in a somewhat remarkable manner, fresh outbreaks taking place in districts which were thought to have been effectually cleared of the malady, and a great increase of attacks occurring in some localities which have long suffered from the affection.—Diseased pigs have been sent here from the Continent, and chiefly from Belgium. In each instance the animals have been killed at the landing place.—The accounts which have reached us from the Continent relative to the sheep plague, the effect of the malady is very spruce existing in the north of Europe, and that in the consular districts of Stettin and Köslin, in Pomerania, it is on the increase. The greatest vigilance against the introduction of the disease is being exercised by the customs inspectors at the several ports, and all sheep coming from ports of the North German Confederation have to be killed at the place of landing.

MEAT VERSUS CORN.

THE question as to which pays the tenant best, meat or corn, is one which has often been discussed. As to which pays the landlord best there cannot be a doubt. Now, as we see it seems there are very few districts in this country where first-rate meat can be produced, and where the production of that meat would pay the farmer a very much higher profit than the production of corn. Mr. Mechi is for producing both meat and corn upon the same farm, selling the corn and buying some cheaper material to push off the straw in the production of meat; but Mr. Mechi's land does not lie in the districts to which I allude. Mr. Mechi has a fine climate, a rich clay land, well adapted for Wheat, and he is well situated, both for selling his Wheat at a high price and for buying cheap feeding stuffs at a low price. Now, the districts to which I refer are hill farms (often far away from good corn markets), where a considerable quantity of rain falls, which is excellent for producing fine crops of roots, but which is apt to lay the corn crops while growing and to stain them while harvesting.

Every one who is in the habit of travelling about England knows well that in the South or even in the midland counties the roots are very good, but are sometimes failing altogether, and at other times giving only 5 or 10 or 15 tons to the acre. But as one goes further North and West the root crops are found to be most abundant; a total failure is unknown, and 20, 25, or 30 tons to the acre are ordinary crops. In hilly districts especially the root crops never fail, and yet corn grown on hill farms has often to be sold at the lowest price of the market, because the sample is uneven from the crop having been laid, or because it is stained from having got wet in harvesting. Nevertheless, this same corn will answer for feeding purposes quite as well as if it were as bright as gold.

To illustrate the difference of profit between meat and corn, let us take an example. Suppose we have a hill farm of 900 acres of clear land, that is to say 900 acres exclusive of roads, fences, and plantations; and let us assume that 150 acres of this lie too steep or inconvenient to plough, and so are in permanent pasture, leaving 750 acres of good ploughable land, capable of bearing fair crops of Oats, Rye, Barley, Rye-grass and Clover, and roots. And let us suppose these 750 acres arranged in five divisions to be worked round in rotation, three years under plough and two years in grass, thus:—

1st year, half Rye, half Oats, sown after a Clover and Rye-grass ley.
2d year, roots.
3d year, half Oats, half Barley, laid down with Rye-grass and Clover.
4th year, hay, Rye-grass and Clover, first crop.

5th year, grazing, Rye-grass and Clover second crop; after which it would be again broken up for Rye and Oats.

This plan would give us 300 acres of corn crops, viz., 75 acres of Rye, 150 acres of Oats, and 75 acres of Barley. But of roots, although there are only 150 acres in the division, we should really get 170 acres of crop by drilling 20 acres with Mustard, giving a dressing of nitrate of soda and salt; and these being fed off by the middle of June, we could get white Turnips into the same land.

1. In estimating the weight and feeding value of green crops, I shall take them all as root crops, estimating the acre to produce 45,000 lb. of roots as the average, or just about 20 tons to the acre, no great crop for good hill land.

2. In estimating grain crops, I shall assume that each acre produces 2000 lb. of corn and 3000 lb. of straw (about 27 cwt.) on the average. In every 4 acres of crop we have

1 acre of Rye, say 36 bush, at 48 lb., 2088 lb.
1/2 Barley, say 36 “ 51 lb., 1926 lb.
1/2 Oats, say 48 “ 45 lb., 2016 lb.
1/2 Oats, say 48 “ 42 lb., 2016 lb.

4 acres produce “ “ 8024 lb., or 2007 lb. per acre.

3. I shall estimate each acre of hay (first crop of Rye-grass and Clover) at 3000 lb., being about 27 cwt. per acre.

4. Now taking the foregoing figures, the farm ought to produce the following feeding stuffs:—

Grain “ 300 acres, at 2,000 lb., say 600,000 lb.
Straw “ 300 “ “ 2000 lb., say 600,000 lb.
Hay “ 150 “ “ 3,000 lb., 450,000 lb.
Roots “ 170 “ “ 45,000 lb., 7,650,000 lb.

besides the pickings on 300 acres of stubble and the after-grass on 150 acres of Rye-grass and Clover, and the fall 12 months' grazing in 150 acres of Rye-grass and Clover two years old, and 150 acres of permanent pasture.

I calculate that this quantity of feeding stuff will fatten 200 bullocks bought in about the end of October, and sold out about five months thereafter, besides keeping 1000 breeding ewes and selling off their progeny fat at 16 to 18 months old. Let us see, then, if the food we have will do this.

6. I reckon that each fattening bullock will consume:—

Grain “ 1000 lb., or 2000 will consume 200,000 lb. grain.
Straw “ 2000 lb., “ 400,000 lb. straw.
Hay “ 1000 lb., “ 200,000 lb. hay.
Roots “ 10,000 lb., “ 2,000,000 lb. roots.

7. I reckon that store sheep and ewes, besides running over 300 acres of grass land, 150 acres of after-grass, and 300 acres of stubble, will require for each sheep:—

Grain “ 70 lb., or 2000 will consume 140,000 lb. grain.
Straw “ 200 lb., “ 400,000 lb. straw.
Hay “ 30 lb., “ 30,000 lb. hay.
Roots “ 2000 lb., “ 4,000,000 lb. roots.

8. Fattening sheep are partly provided for among the store sheep, but after the lambs are weaned provision has to be made for them; so I put down for fattening sheep, of which we have 1000, the following “extra” allowance, which will amply cover all that the lambs will require. I allow for each fattening sheep, then, the following “extra”:—

Grain “ 180 lb., or 1000 will consume 180,000 lb. grain.
Straw “ 30 lb., “ 30,000 lb. straw.
Hay “ 30 lb., “ 30,000 lb. hay.
Roots “ 1200 lb., “ 1,200,000 lb. roots.

These sheep are feeding during summer and autumn, so that hay and straw are only small quantities, if needed at all.

9. There are 450 acres of ploughed land each year (three divisions), and I reckon that 14 horses will do the work, and I allow that each horse will consume 15 lb. of Oats, 5 lb. of hay, and 20 lb. of straw daily all the year round; or, for the 365 days each horse will consume,—

Grain, 5475 lb., or 14 horses will consume 76,650 lb. grain.
Straw, 7300 lb., “ 102,200 lb. straw.
Hay, 1825 lb., “ 65,550 lb. hay.

10. Adding all these various quantities together we have:—

Consumed by.	Grain.		Straw.		Hay.		Roots.	
	lb	lb.	lb.	lb.	lb.	lb.	lb.	lb.
Bullocks	..	200,000	400,000	200,000	2,000,000			
Store sheep	..	140,000	400,000	30,000	4,000,000			
Fat sheep	..	180,000	30,000	30,000	1,200,000			
Horses	..	76,650	102,200	25,550	..			
Consumption	..	596,650	932,200	455,550	7,650,000			
Produce	..	600,000	600,000	450,000	7,650,000			

which figures agree pretty well, showing that if the estimated produce and estimated rations are correct, the farm would really keep the stock I name. Now let us estimate income and expenses.

1. Fat bullocks, 200, have 200 of these, and if bought in at £10 to £12 per head, they ought certainly to sell out fat at £20 to £22 per head, leaving a gross profit of £10 per head for their feeding, or £2000 for the 200.

2. Fat sheep: we ought to have 1000 fat sheep to sell out every year, and these would be moderately estimated at 40s. each, 16 to 18 months old; and as they have been bred on the farm, the whole price is gross profit, and will produce £2000. I make no

* Our readers have, no doubt, seen that in the Queen's Speech, on the reassembling of Parliament, mention is made of “the adjustment of local burdens,” as one of the measures to which attention was last session directed, and to which renewed attention is now promised.

allowance for deaths, because twin lambs ought to make up for that. Neither do I make any allowance for draft ewes, because they would be fattened off, and should produce quite 40s. each.

13. Wool: We should have 2000 fleeces every year, one-half of which would be hogget wool, and, taking them at an average of 5s. each, they would produce £500.

14. Wages I put down at £750 per annum.

15. Artificial manure reduced at £150 only, because, all the grain being consumed on the farm, very little artificial manure would be required to keep it in condition.

16. Repairs of fences I estimate at £100 per annum.

17. Seed would cost a considerable sum, because I estimate that all the corn is consumed by the stock, and in a hill country it is always a good thing to get seed corn from a warmer and a drier climate. It secures an earlier and a safer harvest. I estimate the seed as follows:—

75 acres Rye (3 bush.), at 10s. per acre ..	£37 10 0
75 acres Barley (3 bush.), at 15s. do. ..	56 5 0
150 acres Oats (4 bush.), at 15s. do. ..	112 10 0
150 acres Rye-grass and Clover, at 15s. do. ..	112 10 0
170 acres roots, at 3s. do. ..	25 10 0
Making in all	£344 5 0

18. Blacksmith's bill, saddler's bill, repairs of carts, repairs of implements, coals, and various other petty expenses may be put down at £255 15s.

19. Rent, tithe, local rates and taxes, may be put down at £1000.

20. Farming capital may be estimated at £6000, and interest upon it should be a charge against the farm before reckoning profits. Taking it at 5 per cent., it would amount to £300.

21. Bringing all these things together, we get the following summary:—

Income.	£ s.	Expenses.	£ s.
From bullocks ..	3000 0	On wages ..	750 0
" sheep ..	3000 0	" artificial manure ..	150 0
" wool ..	500 0	" repairs of fences ..	100 0
		" seed ..	344 5
		" sundries ..	25 10
		" rent and taxes ..	1000 0
			£5000
		" Interest ..	300 0
	£4500 0		£5300 0

—showing a farmer's profit of £1600 (besides interest upon farm capital at 5 per cent.), if the whole grain is consumed with stock on the farm.

Now, let us contrast this with the probable profit to be realised if the grain were sold off the farm.

1. The corn being grown in a hill country, we could not reckon upon selling it for more than 7s. per bush., which would give 23s. 10d. for Oats, 29s. 8d. for Barley, and 32s. 6d. for Rye per imperial quarter. But in the former estimate the sheep and bullocks consumed 520,000 lb. of grain, and that, if sold at 7s. per 100 lb., would produce £1820.

2. But, if we sell off this large quantity of grain, the stock we can keep will fall greatly in number. Instead of 400 bullocks, 150 would be as many as we could manage, and these we could merely winter as "stores," getting about £4 per head for their winter's keep, or say, £600.

3. Sheep, too, would fall in number, and also in value. The sheep sold would have to be sold as "stores," at about 28s. each instead of 40s., and instead of keeping 1000 breeding ewes, 700 would be as many as could be managed, and the sales would be only 700 sheep, at 28s., or £1960.

4. Wool, too, would be only 1400 fleeces at 5s., say £350.

5. The cost of artificial manure would be greatly increased. If instead of consuming 520,000 lb. of grain on the farm we sell off that quantity, we should have to bring in quite £300 more artificial manure to replace the manure so sent away, making the cost for artificial manure £450 instead of only £150.

6. Wages and interest would be slightly decreased, say about £50 each, but all other things would remain the same.

7. Putting all these things together, we get the following summary:—

Income.	£ s.	Expenses.	£ s.
From grain sold ..	1280 0	On wages, reduced ..	700 0
" cattle ..	600 0	" manure, increased ..	450 0
" sheep ..	600 0	" fences as before ..	100 0
" wool ..	350 0	" seed as before ..	344 5
		" sundries as before ..	25 10
		" rent and taxes as before ..	1000 0
		" interest, reduced ..	250 0
	£1780 0		£3000 0

—showing a farmer's profit of only £650 instead of £1600, or a reduction of £950 in farm profit!

This result is startling, and many of your readers will be induced to say that it cannot be true. Let them, however, pick my figures to pieces; I shall be glad to have the error pointed out, if there be an error. To my mind, however, the solution of the riddle is to be found simply in the difference between fat and lean beasts. Every animal requires a certain amount of food to keep it alive, so that it shall neither increase nor decrease in weight. Now, suppose I have as much food as will keep 100 full grown oxen for six months in such a state that they shall neither increase nor decrease in weight, at the end of that six months they will have

eaten up the whole of my food, and will not be 1s. more valuable. I shall have made a dead loss of my food. Suppose, however, instead of keeping 100 oxen, I keep only 60, and I cram those 60 with as much food as I can get them to eat, they will fatten rapidly, and when the food is all gone, and I come to sell them out, they will be a great deal heavier, and of course worth a great deal more than they cost, thereby making a return for my food. But even this is not all. Fat animals are worth more per pound than lean animals. For instance, if I buy a lean sheep which weighs 80 lb. live weight, it is worth perhaps 34d. per lb., or 27s. 4d. Now, if I fatten up this sheep until it weighs 120 lb. live weight, I shall have added only 40 lb. to its weight, which at 34d. per lb. would be 11s. 8d., but instead of that my 120 lb. sheep will be worth 42d. per lb., and deducting 27s. 4d., his original cost, it leaves me a profit of 16s. 4d. instead of only 11s. 8d. That in my opinion is the solution of the riddle, and shows why a farm which turns out "fat stock" instead of only "store stock," can pay a high rent, and yet leave a high profit to the farmer. The hill country farmer who sells his grain can only turn out store stock, whereas the farmer who gives his corn to his cattle and his sheep can turn them all out fat. G. A. H.

UNEXHAUSTED IMPROVEMENTS.

(We now report the discussion which took place after Mr. Fletcher's address on this subject before the Monmouthshire Chamber of Agriculture (see p. 159).)

MR. R. STRATTON (The Duffryn) said it stood to reason that if a man took his land in a low condition, and improved it, and was turned out of it at six months' notice, great injustice must be done. But Mr. Fletcher had hinted at some national scheme. He thought that was out of the question. The circumstances of different localities were totally different. For instance, in some parts of the country straw was worth nothing. There were many of the midland districts where the straw was not saleable at all, or was simply worth 7s. 6d. a ton for manure. In the hill country it was frequently worth £13 to £14 a ton, or more. They could not make one price in different parts when they saw such a difference in the value of the produce. As to the differences which Mr. Fletcher spoke of, in the value of the ploughing in one part and in another, he did not think there was much to take exception to on that subject. They knew what it was worth to plough clay land, and what it was worth to plough light lands. What they wanted was encouragement to high farming. If a man spent 50 tons of cake on a farm one year, and was turned out next year, he must lose a lot of money. They wanted to determine how much he was to be paid for the cake he had spent the year before; and how much, if any, for the cake and corn he spent before that. Half the covenants of the country were really become obsolete. He believed on many estates the owner simply said to the lawyer, "Copy this out," a something which had been framed 50 years ago. The leases were signed, and he was off. Half understood thing that they were to be broken. Half the persons who signed the leases intended to break them, and it was understood by the landlords and tenants that they were to be broken. If all the agreements were accurately carried out, the business of the country would be at a standstill; there would be no hay or straw in the country; and how would the business of the world be carried on? It was ridiculous to prohibit farmers selling hay, or to impose certain conditions upon them. He would say, "Require the best crop you can, and when you cease to grow good crops you shall cease to occupy my land." It was undoubtedly to the interest of landowners that there should be a good system of compensation for unexhausted improvements. Good farming must improve the value of the land. And suppose the case of a tenant taking a bargained-out farm. One argument against the system of heavy payments on taking a farm—the principal argument, he believed—was this: "If you require too much capital." He thought that was a very bad argument. If anybody present had had experience in taking a farm which was bargained-out, he believed any such man would say that rather than do such a thing again, he would pay £2 an acre for unexhausted improvements. He thought if they went into figures they would find the man who paid money down required no more capital than the man who took a poor farm and had nothing to pay down. If he had to wait two or three years before he got a shilling for himself he was worse off than if he had paid £2 or £3 an acre for unexhausted improvements. What they wanted, it appeared to him, was to recommend some system for this country. His own impression was that they could not do much business in a meeting of that sort, and that the proper procedure would be to appoint a committee to inquire into the matter, and recommend some scheme, some scale of charges and prices for unexhausted improvements—simply that and nothing more.

MR. DONALD MACKINTOSH (Wernddu) instanced a farm which had some time been occupied by the owner, who farmed it remarkably well; it then fell into the hands of an absentee landlady, whose idea was the maximum rent with the minimum outlay, and the farmer, when he found he had no security, set work to plough all the old leys and pasturages he could, and these fields had continued to be ploughed since, though they were so sidehanging that they could not take an empty wagon without danger of upsetting. The tenants had been changing frequently since, but they had been too poor, or they did not care to lay out money; the fallow had become so barren they could not turn a furrow in them; and the result was, that vegetation was burned up in the hot summer they had had lately. He believed a great many years would elapse before the landlords would see it their interest to give leases, and encourage that system of giving compensation to tenants for unexhausted improvements, as he believed in legislation on the matter. They all knew that where long leases were the rule, as in Scotland, for instance, and not the exception, as here, farming had made greater progress. He had been struck with a statement made by Mr. Gladstone on the Irish Land Bill was before the House. Mr. Gladstone had quoted statistics showing the increase that had taken place in the value of land in Scotland since a given period, but he did not remember the exact figures; the increase was, however, considerably more than in England and in Ireland, again, where the insecurity of tenure had become a proverb, the produce had been less than in England. He agreed with much that had been said by preceding speakers; but he would rather see a national measure brought forward, and supported by the country, for he had no faith in these small measures.

Colonel LYNNE said the suggestion of Mr. Stratton as to the appointment of a committee to consider the matter was of very great moment, because, if he could gather from the opinions of the several gentlemen who had spoken, they were rather "at sea." He was afraid that if they endeavoured to carry out their relative hobbies, instead of acting in concord with the landlords, they would have the landlords diametrically opposed to their institution. If they called for comparative enactments to compare the value of that which the landlords would oppose them in every possible way. Because they would naturally resent the views of the gentlemen who spoke last, with reference to legislative enactments similar to that in Ireland. With respect to agriculture, he was glad to say that Monmouthshire and that England were not in the same condition as Ireland. As agent to one of the largest estates in Monmouthshire, he felt that one of their most serious objections was, to force their own views upon the tenants. Well, to Mr. Stratton he said his hobby; he said he should be allowed to sell hay and straw, and cultivate the land as he liked. That was all very well, so long as they had tenants like Mr. Stratton, a man of capital, and so forth, but it would be a very bad principle to allow all the hay or straw to be sold off the land. He had listened to Mr. Fletcher's observations with great interest, and with great deference.

He went to the third part of the generation of cattle eating and he thought he had a long way where pasture land had reaped the benefit of that. He thought that, acting on that principle, they would find very few fields, however bad, where oilcake had not been consumed. But in the main he agreed with the observations made. He thought it was to the interest of the landlords and to the interest of the tenants that as much should be got from the land as grass field could bring forth. Because if a grass field they could feed a cow instead of one, or a bullock instead of half a one; if they could develop on considerably improved arable land—if, instead of producing 12 bush, they could bring 50 or 60 bush, out of the land—the tenant and the landlord would equally gain; and therefore the interest was mutual—they were so mixed up together that what was the interest of one was the interest of the other; and they would best promote the interest of the agricultural community by coming to some agreement. He would depend upon it, if a landlord put on extortionate rent, or inserted arbitrary clauses in his agreements, the farm would not answer: the one would try to get all he could, and the tenant would try all he could to make the covenants valueless, and to break them in every possible way; whereas, if the covenant was good for the one and good for the other they would fall into harmony. If buildings were necessary, it would be a matter of arrangement; if drainage was necessary, it would be a matter of arrangement; if drains were necessary it must be to the landlord's interest to find the drains, or the drains and labour, charging interest, and it must be as much to the interest of the tenant as of the landlord. So it was with regard to artificial manures; the great thing was to give artificial manure to land in such proportion as it was entitled to for its benefit; and for any such act during tenancy the tenant would be left should be act during tenancy the tenant would be left should be compensated for a fair outlay agreed upon between himself and the agent. He thought they would have no difficulty if they had a conciliatory measure; if they had not they would not succeed. Especially farmers would not succeed, because farmers (and he did not say it offensively) were fit for no other business as a rule. Where they had one farm to let they had 20 applicants for it; and that was not the case generally speaking, in common pursuits. That was one reason why farmers were not precisely on the same footing as others. He did not say it with

disrespect, but as a fact, and therefore they would not obtain by coercion that which by conciliatory means and by requirements honourably and straightforwardly brought before the landlords, they would get. He concurred in the appointment of a committee; and he hoped they would take his observations in the spirit in which he desired to make them—not in any opposition to the farmers of the county, but with every wish, representing a large landed interest, to assist them in carrying out their object.

Mr. JOHN LAWRENCE (Crick) cordially agreed in the observations of Colonel Lyne, and in the suggestion made by Mr. Stratton. Before they could properly speak upon any subject, they must really know what they want. The man who six months was an unreasonable short notice to give to a respectable tenant to quit his holding. It was no doubt the law, but it was as far as could possibly be from the practice of the county. He believed every landlord in the county felt his relation to his tenant was a very different thing from the ordinary commercial transactions of life. If he sold a thousand tons of iron to a man he was glad to get the highest possible price, and it was a matter of perfect indifference to him who the man did with it; but the right of the man and the iron, and he cared but little comparatively what became of them if he got paid. But it was different with a tenant. He had a few small tenants, and he did not feel towards them the same as he did towards the merchants who bought his iron. There was not an event in the tenant's life but he felt an interest in. If he lost a cow or had a failure in his crops, it excited his sympathy and sorrow; and he believed that was the feeling that prevailed largely in this country between landlord and tenant, and he believed it would be the most disadvantageous thing that could happen if that feeling were to be severed. He wished them to bear this strongly in mind when the subject of tenant-right was discussed, that they must remember that there was a landlord right also; and every man must remember that the landlord's right was a right that overrides all other rights; because the landlord's right, although it was his privilege, was, he assured them, a very expensive privilege. He believed every man who owned a large estate in this country (and he believed he gave a liberal estimate) received but 2 per cent. for his money; but if a man had mortgaged property he had 5 to 6 per cent.; if a man chose to hold property yielding 2 per cent., with its acquisitions and its privileges—and no doubt a great landed estate had privileges and had great pleasures—yet if a man chose to hold that property, tenant-farmers must not diminish those privileges which attached to it and its laws. In making that statement, he did not want to deprive tenant-farmers of any conceivable privilege they should enjoy. If he saw a man go into an estate with a liberal sum of money—managing that estate liberally, investing and properly expending his money—cultivating it and effecting the greatest improvements that could be effected upon it—he said that man was entitled to every consideration from his landlord, from his neighbour, and from the country at large; and he hoped they would adopt the suggestion of their excellent friend Mr. Stratton, and would let some of the wisest and most sensible men of the interest of the landlord and the interest of the tenant, and if it were possible, as he believed it was, to chalk out some simple scheme which would be a sort of outline as between the outgoing and incoming tenant. He had only to remark upon one other point. He agreed with Mr. Stratton that it was almost the universal practice that landlords obliged their tenants not to sell hay and straw; and he believed it was the universal practice for tenants to sell hay and straw; and consequently there was a continual breach of covenant between the two. But at the same time he thought protection was due to the landlords. No doubt Mr. Stratton's suggestion was excellent—that if a tenant grew good crops, he should be allowed to grow whatever he pleased. But he thought when a tenant became an outgoing tenant, it was undoubtedly necessary to protect the landlord, while yet, however, they were not really protecting the landlord, but they were protecting the interests of the incoming tenant.

Mr. W. GRAHAM knew parishes where custom had been set up, and actions tried in the county court particularly for the purpose of establishing custom; sometimes with results favourable to the incoming tenant, and sometimes favourable to the outgoing tenant. But, at all events, so determined had farmers become in some districts to establish that custom shall override and become law, that he thought it desirable that this matter should be settled, in the interest of all parties concerned. He had had a conversation recently with some very large and very good farmers in various districts of England, particularly the Gloucester district, and there he found a growing opinion in favour of yearly tenancies, but not for two years' notice. He thought that there shall be a two years' notice to quit. He thought yearly tenancies with two years' notice to quit, with some security in the shape of repayment for unexhausted improvements, would be far more beneficial both to the landlords and the tenants than a lease. He supported the suggestion for the appointment of a committee.

Mr. HENRY WILLIAMS (Red House, Llanarth,)

could not help agreeing with the gentlemen who had spoken last, representing as they did the landlords' interest, that it was no use attempting to carry anything in antagonism to the landlords, because their interests were not identical; when they got to cross purposes they knew the landlord's power was the greater of the two. The great Lord Palmerston had once said that tenants' rights meant landlords' wrong, and tenant-right applied to England as it had been applied to Ireland, might be justly called by some people the landlords' wrong. He did not give that as his opinion; it would, however, interfere with the landlord's position, his right of doing what he liked with his own. But that something was wanted there could be no doubt, because they could look over a man's hedge and see agriculture brought to a certain pitch, and there it stopped. Why? "I cannot venture to go further!" was the answer of the tenant-farmer, "I have no security." Now, in commercial matters there was no limit to enterprise. He, as an agriculturist, had felt this. No doubt some of them had seen an article in the *Daily Telegraph* on "saving corn by artificial means in a wet harvest." And the *Telegraph* had said, "If this were a commercial matter instead of an agricultural, the problem would be solved in a few weeks." He thought that a sneer on agriculturists which they did not deserve; because in commercial matters those gentlemen who solved these problems were the same as the agriculturists themselves. But, in agriculture, the moment a man stepped in advance of his fellows, he tied a chain around his neck, for he placed himself in the power of any one to bid him out of his land, and that prevented the agriculturist going to the expense he otherwise would incur. He did not believe agriculture had arrived at its highest point any more than commerce. He did not believe but there were vast improvements that could be made in agriculture, and he knew the amount of security in the same way as in commercial matters. He had been once asked the question, "Have you anything on your farm that you could do, if you had security, that you cannot do now?" He looked around, and he could not help answering in a moment that there were such things. They knew what Mechi, and Smith, and Howard had done. Of course, they had not the advantages of those men; but he would not say the time might not come when what those gentlemen did should be done by tenant-farmers. Ordinary work, and others would be so far in advance as that their successors would look at and wonder at them, even as they themselves now wondered at what was done by such gentlemen as he had named. The only thing that tenant-farmers wanted, was more security than they now possessed—a security which he was bound to think, acting in unison with their landlords, they could get. Because they must have noticed that at agricultural meetings, in discussing this and that, the man said to another, "I have no security to get up and say, 'I have a good landlord; I have no fear.' He was glad to say there were good landlords in Monmouthshire. He had one, and he had no fear. But there were accidents of life which would interfere, in respect of which the agriculturist had no redress. Why should not the outlay of capital by the tenant improve the value of the owner's property in rural districts as well as in towns? He was sure it could. They were to eat out of the improvements that they might revert to the landlord, because they would not expect permanent claims that occupation could not satisfy. Looking at these properties they could not help seeing that it was to the interest of the landlord and tenant that capital should be liberally applied. They were all agreed some kind of security was due to the tenant-farmers, and the next question was, what it was, and how it was to be applied? He had a full theory of compensation for unexhausted improvements, naturally divided itself under three heads. First, the improvements which the landlord ordinarily should and did make; second, the improvements which the tenants made, which ran over a series of years in their results; and third, the work of the year, which every tenant should make, whether he left his farm or not. With regard to these, he did not believe in any classing system of work, but thought there was a simple way of arriving at the worth by the valuation of disinterested persons, one appointed by the landlord or incoming tenant and the other by the outgoing tenant. He did not think the first improvements of a farm, which ordinarily were done by the landlord, ought to be done without his sanction. At present he thought they should be satisfied with such work being done only with the sanction of the landlord; so that no tenant should have a claim for work without registration. If he thought all was comprised in the two words, registration and valuation—that every six months a list of all works done during the last half-year, or intended to be done during the next half-year, should be prepared, so that the landlord might sanction or prevent them, or do them himself. Coming to works extending over a series of years, it opened a wide field, because they had no accurate information as to the manures which offered a permanent benefit, and the manures which were stimulated for a short time. But he did not see there would be any difficulty in arriving at that if they appointed a committee, as Mr. Stratton

suggested, when they might arrive at a conclusion which would be of service to Monmouthshire, and useful in assisting in a general arrangement throughout the kingdom. He had always thought it a most inconsistent thing that the moment a man received notice to quit his farm he should stop his work and discharge his labourers. They knew the ploughing and the farming should be done—the casting of manure and other labour should be done whether he was to leave his farm or not. But because the man had no claim there he stopped. He held that the outgoing tenant should have a claim, subject to valuation. Why should a man have a farm idle for six months, and then another man call all his neighbours to pull up that work simply because the outgoing tenant had no claim for compensation?

The CHAIRMAN said it appeared the object they had in view was to deal honestly with themselves, and to do no harm to the landlords. There was no question the benefit to the incoming tenant would be as much as that to the outgoing tenant, if they had a system by which unexhausted manures could be paid for. He looked upon that as really the great thing. He did not think much about the draining or improving of buildings, because that was the landlord's work. Where they had manures very beneficial in consequence of the description of food given to cattle, it was not to put the manure on the land, but to use it as ordinary manure. Then he thought it was to the interest of all to give cumulative improvement to the land, so that the stage at which a man gave up his land should be the stepping-stone to further improvement, each succeeding tenant compensating his predecessor, or the landlord compensating both as they went along. As to what Mr. Graham had said about the great demand for custom, and custom over-riding the law, either he had misunderstood Mr. Graham, or Mr. Graham, he thought, had not intended to express himself as he had misunderstood him. Custom was law; it did not override law. Wherever they could establish good custom, it was more powerful than law. A lawyer could penetrate through the meshes of an Act of Parliament, but he could not override custom. Then he thought Mr. Fletcher had spoken of the desirableness of having an "understanding." He took it for granted that Mr. Fletcher meant a written understanding: but the understandings not written were misunderstandings. Now, as to the suggestion of Mr. Stratton. Mr. Stratton went to their meetings with good, practical, common sense; and in the suggestion that a committee should be appointed to consider the subject, and bring more matured views before some of their meetings than they had yet heard, he very strongly coincided. But he would not stop the course now going on. He thought the time to appoint a committee was when the Society had made its roundings, and when the paper introduced had had opinions expressed upon it by all the farmers in each part of the county. Thus they would facilitate the work of any committee that might be appointed. That committee would ascertain the opinion of different localities, gather those opinions, derive information, enlarge their own ideas, reject what they could not conscientiously approve, and adopt and mature what they considered to be beneficial to the county.

Mr. FLETCHER replied at some length, correcting some misapprehensions which he thought some of the speakers had formed as to his views on certain points, the consideration of which had been included in his paper.

Home Correspondence.

To Feed and Fatten Calves Without New Milk.—A good substitute for new milk to fatten calves is fine wheat-flour mixed with skimmed milk. I put about a gallon of fine wheat-flour in a stone pan, and let it remain in an oven through the night after bread has been baked in it. The flour will be less white, but it should not have had heat enough to make it brown. I take half a pint of this flour, mix it with a little cold water, and then I add milk to the mixture. When warmed to the heat of new milk, I give this baked flour in 1 gallon of skimmed milk, morning and evening, and in ten weeks the calf is fat, being taken from the cow at a fortnight old. This baked flour is an excellent food for calves either for fattening or for weaning for stock, as it hinders the "scouring" to which young calves are particularly subject during a change from skimmed milk or other food. Calves can be gradually weaned from milk at two or three weeks old, and be very healthily reared without any milk at all, either on gruel made with the best oatmeal or Linseed (crushed Linseed is the best). Both should be made in the same way—half a pint of the meal is enough to be given at each time, twice a day to each calf. I have given it mixed with three or four quarts of water, rather more liquid being good, as the calves grow older. The oatmeal or Linseed should be first mixed with some cold water, and then the rest of the water should be added boiling hot. If it stands in large quantities, and so keeps hot for 12 hours, it is sufficiently done in this way. The morning meal should be made at night, and the evening meal in the morning. If a small quantity only for two or three calves is

made it should be heated to thicken in a tin placed in a boiler of hot water or over a very slow fire; great care should be taken that all vessels be kept very clean and sweet, and that the food should never be at all burnt in the heating it, or "scouring" will be sure to follow. The food for calves should be as delicately prepared in these particulars as for children. Linseed oil should have all the oil of the seed in it—that made from ground oilcake being comparatively very poor food. No doubt calves would fatten on this food well, with a larger quantity of meal than the above, which is used for weaning calves for stock. There is more care needed in giving this than the baked flour food, which should at any time be given instead of the Linseed or oatmeal, if this should produce too great losses. Weaning calves should, for the first, have a little hay put for them to pick; fattening calves should instead have some dry meal left with them to lick. *C. C. M.* [The paragraph at p. 122 is not credible in respect of the quantities of meal and molasses which are mentioned.]

Record of Farm Cultivation.—In answer to your correspondent, "An Irish Landowner," I may say that although it is the work of the Editor to mention him, yet as "Jennett's Annual Farm Account Book and Records" are in use, an account is brought out against each field, showing cropping, &c., which may be an assistance to him. He might apply to the author, whose address is Binfield, Berks. *A Constant Reader, Grove Lodge, York.*

The Game Question.—I think the subject of foxhunting has been pretty well discussed. I fear it is of no use to try to convince its lovers that they do mischief. Here is another subject for those to write about who defend abuse of the power that the law gives to landlords. A neighbour of mine has this year threshed the Wheat grown on a manured fallow, and had less than two bags (of 3 bush.) to the acre. The field adjoins a wood on a strictly preserved estate, swarming with rabbits and game. On the same estate another farmer is about to be sold up under a distress for rent, the distress being mainly caused by game and rabbits. The rent is made safe, although the crops by means of which it ought to be paid, be destroyed. The landlord can seize for his whole rent, while the rest of the creditors must put up with poundage, although it is almost entirely owing to the vermin bred by the landlord that the tenant fails. Will any honest man say that we do not want in England laws to protect the tenant? The insecurity of tenure must be destroyed. Farmers will some time learn their power at the threshing-booths. I despair of any other remedy for the monstrous injustice under which they groan. *H. H. O.*

Farm Memoranda.—The communications under this head lately have been particularly interesting and instructive, as showing the different systems practised in different parts. But I hope the accounts of the Lowland farm copied into the *Agricultural Gazette* last week from an Irish paper will not have escaped attention, such as, from the evident truthfulness of the details and marvellous results, it fully deserves. We find on the first glance upwards of £6000 worth of human food grown and sold off 500 acres annually. And on further investigation it appears that this is accomplished, not by a driving process of corn after corn in succession, but by growing Wheat and Barley only once in seven years with a two years' rest in grass. And the system must be a profitable one for we hear Mr. Murray spoken of as a thriving, prosperous tenant, though he pays a rent of nearly £5 an acre. Is not this enough to make our southern mouths water? Does not this beat Mr. Mechi, and all the high farmers we have lately had held up to us for examples? No doubt the land is good. £2000 is realised by the sale of corn off about 150 acres; but the interest upon the large sum of £2000 is a large percentage of human food. Another £2000 is realised by the sale of 70 acres of Potatoes. A still larger sum, or £2500, must be returned by the fattening stock beyond the cost of their purchase, leaving an ample margin for the hay and root crops consumed, the cake bill, and attendance. We have no means of arriving at the annual expenses of this farm, but, with the exception of the Potato crop, they cannot be excessive as 150 acres are so intensively grazed. I believe the local rates in Scotland are payable to a great extent by the landlord; but putting any reasonable figures against the costs of cultivation, there must still remain a balance of £1000 per annum in the tenant's favour. I shall probably be told that this is an exceptional farm; that Potatoes cannot be grown every seven years in this part of the country. It may be so to some extent, though the rents in Scotland are generally much higher than in England. But what I would ask English farmers to consider is whether, by growing a larger quantity of food, they cannot make some approach to this example; whether, instead of growing poor crops over a large acreage, they cannot concentrate their means, and the productiveness of their fields, so as to present a less shameful contrast to the farming of East Bams. Why should they be content with a gross produce of £5 or £6 per acre, when the latter can show more than double that amount? *J. B. M.*

Societies.

THE HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND.

At a monthly meeting of the directors of this Society, held last Wednesday,

The SECRETARY read the following proposal by the President to form a committee on the general improvement of land in Scotland:—

"In consequence of being so often asked, I have brought this subject before the directors. I have for many years thought that the improvement in breeding cattle, sheep, pigs, &c., had reached its climax of perfection; and, though I would not desire to see our prizes for stock discontinued, it appears to me that there is a question of greater importance to the public which should occupy the attention of the Highland Society, viz., the improvement of the cultivation of land, so as to increase the produce of human as well as of animal food. I make this proposition, as I believe from experience that the land of second and third quality is capable of a very great improvement, at a much less expense than farmers imagine, were they possessed of the means applied by the most experienced in carrying out successfully the contemplated improvement. It is in the hope of accomplishing this object that I am induced to propose to the board to form a committee in order to report how they would recommend it to be accomplished."

The proposal being approved, of the following gentlemen were appointed:—The Marquis of Tweeddale, Mr. Dickson, of Corstorphine; Mr. Smith, Whittingham; Mr. Swinton, Holyn Bank; Mr. Young, Keir Mains; Mr. Elliot, Laighwood; Mr. Stephens, Redbrae; Mr. Mitchell, Alloa; Mr. Hunter, of Thurston; the Marquis of Tweeddale conconvener.

Relations of Chemistry.—The following letter from Dr. Anderson, addressed to the secretary, was read:—

"London, January 16, 1871."

"My dear Sir,—The letter from Mr. Melvin, which was read at the meeting of directors of January 4, calls for some observations from me, as he has in certain respects greatly misunderstood my meaning, and in others entirely overlooked the knowledge and the nature and extent of the work done in the laboratory. He says that little has come of the attempts which have been made to utilise refuse matters as manures. But it seems to me that, if fairly considered, results of much importance have been obtained. A great number of refuse matters have been examined, their value as manures, and some of them are actually now employed with advantage as manures. Much more frequently, however, it has happened that refuse matters have been brought to me with the statement that, having been used by some farmers in the neighbourhood of the works where they were produced, they have been found to give results equal to or better than those obtained from the best Peruvian guano; while analysis has shown that where the cost of carriage and expense of application were taken into account they could not be dealt with any prospect of success, except in the most special and exceptional circumstances, and could not be made to replace the ordinary artificial manures as had been alleged. I need scarcely say that such conclusions, though less gratifying, are not less exacting in agriculture, and prevent the serious losses which ignorance so often entails. The fact is, that the utilisation of refuse matters is not a field in which a great deal can be done, for the valuable constituents of manures are so useful for other purposes that they are seldom allowed to go to waste when it is possible to economise in their use. The negative results so often obtained in inquiries are due to the prevalent impression that what is of no value for other purposes must be of great value as a manure. As regards the utilisation of the ammonia from shale works, my attention has been directed to that subject. The mode of economising and converting it into a marketable commodity is perfectly well known to all manufacturers who understand their business, and in most of those with which I am acquainted it is regularly worked up and brought to market, but I know that in some cases the ammonia is sold at a considerable price, and its manufacture cannot be carried on with profit; and in regard to this point it must be observed that the profit which can be obtained depends not merely on the quantity of the substance, but to a great extent on the proportion of worthless matter with which it is intermixed, by which the cost of obtaining it in a marketable state becomes so high, that it exceeds the value of the material obtained. As a remarkable illustration of this point, though bearing upon a totally different subject, I may state that the sands of the River Rhine are known to contain gold amounting in value to many millions of pounds sterling; but no one has tried to extract it, because the cost exceeds the value of the gold obtained. Mr. Melvin refers also to the refuse obtained in the manufacture of oatmeal, but does not seem to be aware that all the different kinds of mill refuse were examined in the laboratory some years ago, and that details of their composition and value were published; and I think I am fairly entitled to claim as the result of the labours of the chemical department, the fact that the refuse formerly burnt forth fumes, according to Mr. Melvin's own statement, and that the same thing can be done certainly the full value of the article at the present price of manures. Mr. Melvin seems to think that it is employed for the adulteration of manures, and resold to the farmers at a price above its value; but I do not think this is a correct statement, for the cost of manipulating it in such a manner as to conceal its texture would be considerable; and even if, be it, I do not see that any one is to blame except the farmer if he purchases an article without having ascertained himself its real value."

"I am, dear Sir, yours truly,

"F. N. Menzies, Esq."

"THOMAS ANDERSON."

Farmers' Clubs.

SMITHFIELD.

January 31.—A Council meeting was held this day; there were present, Mr. Torr, trustee, in the chair, and afterwards the Right Hon. Lord Tredegar, Vice-President; T. C. Booth, John Beasley, J. N. Beasley, C. S. Bigge, W. B. Canning, Walter Farthing, Branderth Gibbs (Hon. Sec.), John Giblett, Richard Hornsby, Chas. Howard, Robert Leeds, E. W. Moore, R. J. Newton, Wm. Riden, T. L. Senior, C. Sturges, Jacob Wilson.

Professor Simonds' report on foot-and-mouth disease at the late show was read.

The subject of the detention of animals that may occur at future shows was referred to the stewards to investigate and consider, and report to the next Council.

The Hon. Secretary reported the deaths since the last Council meeting of Lord Walsingham and the Earl of Aylesford, Vice-Presidents of the Club.

It was resolved—

"That the thanks of the Council be forwarded to the Right Hon. Lord Walsingham, President elect, for his handsome donation of £750 to the funds of the Club, and also the regret of the Council that his lordship is unable to accept the presidency of the Club for the year 1872."

Mr. E. W. Moore, of Colehill, Highworth, and Mr. Jacob Wilson, of Woodham Manor, Morpeth, were elected stewards of live stock for the ensuing three years.

Mr. Joseph Druce and Mr. Robt. Leeds were re-elected stewards of implements.

The prize sheet for the next show was revised. In the Scotch polled divisions the ages of heifers in class 29 is in future to be not exceeding four years, and a new class established for cows above four years old (that must have had at least one live calf), with one prize of £15, and a silver medal to the breeder. In the Irish division the 2d prize in each class to be discontinued, and after the words "Irish breeds of cattle," to be added, "not being Devons, Herefords, Shorthorns, Sussex, Norfolk, Longhorns, Scotch, or Welsh breeds." It was resolved—

"That class 62 for long and short wool cross-breed sheep, one year old, not exceeding 220 lb. live weight, be abolished."

"That rule 9, having become obsolete, be erased. "That rule 12, which has hitherto precluded animals being exhibited again except in extra stock be expunged, and the following substituted, by which animals may now be exhibited again in the classes, but not again in the same class, viz., "No animal exhibited at any previous show of the Club can again compete in the same class."

Rule 21 was amended.

In the division of mountain sheep, the words "not being Cheviot" were added.

Several alterations and corrections were made in the wording of the conditions of some of the classes.

It was resolved:—

"That in future the men in charge of live stock at the show lead out their animals before the judges."

On the suggestion made at the general meeting, that the house list should be sent either to all members of the Club or to the members of Council, being discussed, it was determined that the rule should remain as it is, viz.:—

"A list of the members of the Council who retire by rotation shall be prepared by the Council. The Council shall prepare a list of the eight members whom they propose for election in place of those who retire, and a copy of this printed list shall be given to any member who applies for it to the secretary, either on the day of the general meeting or on any of the three days previously (Sunday excepted) between the hours of ten and four."

On the suggestion that a portion of the Council should act with the stewards in the selection of the judges, it was resolved:—

"That such of the eight senior members of Council as shall be named to be added to the judges by the selection committee, which at present consists of the President and stewards of live stock. Also that the said committee shall report their recommendations to the November Council."

It was decided that the Council meeting and general meeting during the show should be held on the Tuesday, as heretofore, the former at 11 o'clock, and the latter at 1 o'clock.

It was decided that the statement of accounts for the past year should be printed and handed round to the meeting during the show, instead of being read by the honorary secretary, as heretofore.

It was determined to take measures to ensure the herdsmen and shepherds having the prize placards referring to their animals to take home. Also that copies of the same be duly prepared to be delivered to the butchers purchasing the animals, on their removal from the show.

The council gave instructions that the attention of the Agricultural Hall Company be again directed to the subject of improved ventilation in the pig hall. Also as to more accommodation for the herdsmen and shepherds in attendance on the live stock at the show.

The application from the *Farmer* newspaper to be placed on the list of papers who receive the Club's advertisements was granted. Letters were read, and instructions given thereon.

plan, and this for a first season, and such a difficult one, too! These facts must prove to any one that our movement is a right one, and only wants to be known to be adopted. We have to make on an average quite 55 per cwt. more of the factory cheese than can be made in the farmhouse (with the exception of isolated cases), and this adds another £1 per cow per annum, or £1500 a year, clear gain, upon a factory of 750 cows.

If you have any doubts or calculations, but come and see what we are doing as soon as the season commences, and depend upon it you will soon be of our way of thinking. The actual labour at the Longford factory, without reckoning the American manager, has been only £675s. 5d., and upwards of 60 tons of cheese have been made. Take the make of English cheese at about 300,000 tons, and save £10 per ton in manufacture and improved quality, there is just a million to go in the farmers' and landowners' pockets. Some of you may say that I have not made the most of the milk of the factory, but this you will find a very considerable item when three or four farmers join together for the purpose. Mr. Lowmes, of Longford, with a dairy of 44 cows, joins with two of his neighbours, and the cost to him is 4s. per week, £84 a season of 40 weeks, the utmost duration of the English dairies, and for the same quantity of milk he pays much less by a factory than by private dairies, but there is a very great saving by the wholesale purchase of all the articles which enter into the manufacture of cheese; for instance, in our own home dairy I find our butch has paid 10s. 6d. per dozen for the skins of which we make the factory have given but 6s. 6d.; anatto, if used, is the same; only one fire to keep up instead of 30, so that the saving in fuel is something considerable. In fact, turn any way you will, you have the same result as is derived from manufacturing cheese in a factory, and the more is done, the less the cost. I have made very minute calculations of the actual economy of a factory of the size I name, but I do not think one year a sufficient test, for we may find it necessary to increase our working staff; for we must be careful to attract the best quality of the quality of our cheese for the sake of an extra hand to bestow more labour, if necessary, upon its manufacture.

I think I have now said enough upon what we have been doing in the past season in Derbyshire, and I will therefore pass on to the establishment and management of factories which landlords, farmers, or others may think proper to start in districts beside our own.

History and Advice.—Some present may say we in Derbyshire cannot claim the merit of being the first to draw public attention to the want of a factory for the English dairy farmer. This I am quite willing to allow; but I hold in my mind the fact that in 1860, at the M.P., before this Club, in November, 1860, on "Dairies in America," in which he says: "Dairying is an important branch of rural economy in America. A very novel feature is the introduction of the factory system. In Oneida Co., N.Y.S., there are about 40 cheese manufactories, or 'Associated Dairies' as they are called, having 16,000 cows. I have only time to glance at this subject. The advantages claimed are that the farmer's family is relieved of a good deal of drudgery;—that by the employment of a factory superintendent a more uniform and better quality of milk is obtained, and that the higher prices realised. Messrs. Moore, cheese merchants in Buffalo, told me that for two or three years past their shipments of factory cheese had commanded the highest prices in the 'cheese-pool market.' His remarks, as far as they apply to the drainage of the farmer, and as a farmer, are quite correct; and I am sure some of my Norfolk friends would not call us farmers at all, but slaves, particularly the female portion of the household. In establishing these factories in future, there are two modes which present themselves to the mind, the co-operative plan (which to some degree we have adopted in Derbyshire), and the other is the purchase of milk by an individual—who runs all the risk of loss or gain by the manufacture of the milk into cheese. The co-operative plan is the only one that need be adopted upon for the factory system in its infancy; for this reason, viz., that I find not one farmer in twenty knows the value of his milk, and therefore he will be unwilling to dispose of it at a price which any one could make it answer his purpose to give; and another reason is, that if any one does so purchase as to see what he can get for his milk, that the thing has employed in his business—and the use of this capital must be paid for, and would form a stiff item of expenses. By the co-operative plan, the farmer who supplied milk would receive his share of the money made by the sales of cheese, and no one else. The plan is in agricultural pursuits makes so quick a return—for no sooner has the cow consumed the grass than it is in the milk-pail, and at the factory, and in six weeks or two months from that time, it is in the market as cheese. Therefore, there is no need to put up with a small sum with capital, who would only want to share the farmer's profits; and, small as they are now-a-days, this is quite needless. My advice, therefore, to those who think of starting factories is to make them co-operative; but I feel sure that in other districts cannot pull together as well as in Derbyshire—at any rate, they may try, and I think I have shown that the trial is worth making.

I will now notice some points which when your factory is well on the require attention, and the first is, that you have an efficient manager, or as good a one as you can get—for if you for you sow cows only in a factory, you are dealing with from 80 to 500 tons of cheese per annum (at the lowest estimate). This, at present prices, means above £400 worth; so you see you have a large quantity of a very ticklish commodity, and you must be careful of those whose hands you put the management. I am aware that we have very few Englishmen who are capable of running a factory; but to say as we can in the Derbyshire factories, we are managing a team, a young man or two who may wish to learn; and as they must act as tutors to others when factories are started in fresh neighbourhoods. Your manager having been secured, the next thing is to

have the right sort of hands under him—young men who can move about quickly and turn work off while some would be looking at it. These must be put under the orders of the manager, who will at all times have to be responsible to a committee of management (if there be one) for everything that goes on in the factory. I think some may fancy the disposal of a large quantity of whey a stumbling-block to the factory system; we thought so at first, but we have carefully considered it, and the factory settled it yet. Our milk suppliers have a certain quantity allotted to each of them, and their water-carts are branded with their contents in gallons, and they send once or twice a-week, as the case may be, for their share. This has worked pretty well, but has its disadvantages; and one is, that at hay or harvest time, and other busy seasons, they sometimes neglect to fetch it away, and this causes loss. The only way is, to have proper pigsties at or near the factory, and the consumption of the whey for the purpose of manure is certainly not to be despised. Milk supply can send straw for bedding in the proper proportion, and take back his share of the manure made; this would reduce haulage to a minimum, and make the most of the whey, which will more than pay the working expenses of the factory by the but that is made from it, or the part of the profit which is left to all the parties. Small matters as these, as well as cheese-making itself, that the factory manager will have to pay attention; for the many little things, that a farmer does not think much of, will amount to a considerable item when seen through the 500 or 600 multiplication table of the factory.

Having now finished my remarks upon the subject as far as the factory will not be a failure, the reasons why these factories should be established, and the persons who would derive benefit from them.

Advantages of Factories.—I am hearing every day in Derbyshire of the great dearth there is of good dairymaids, and that it is impossible to have the cheese made as it should be, unless the farmer's wife herself attends to its manufacture; and I may say, that in many farmhouses the wife has but a hard life of it, and that her children are not so well educated as they should be, and that the milk and I hope we shall have the ladies with us in the movement. Cheese-making is not fit work for women, and it very often does them very much harm, from the very bad accommodation the farmhouse dairy very often affords; and in America, as Mr. Howard says, they would not put up with its drudgery; no more will English farmers' wives when factories are started, and I have no doubt the next generation will wonder how their grandmothers managed to make cheese as well as attend to their other duties, as now we wonder how our own would do it. I have said by the factory, and I will say upon it, that when once the farmer has got rid of cheese-making from his house, his wife will take good care that she does not have it back again, and small blame to her either. Ever since I have been in Derbyshire I have been finding fault with the mode of farming in the cheese-pool, and I have said so, and I have blamed our farmers for not putting manure upon their pastures, but saving all for their meadows; and I have been told over and over again that if they manure their pastures they will spoil their cheese. Now, this is a very old story, and it is not true, but it is a very must by the help of science in the factory get over it. From what I see of our dairy land in Derbyshire, I am of opinion that it produces less than it did 50 years ago, and in many places is even now going backwards; for we all know that the dairy cows form the sole stock on a farm, and have little or no purchased food given to them, that they must soon take the heart out of the land they are kept on, and I have no doubt many practical men will bear me out in this opinion. Another thing a cheese factory will do is, that it will bring more capital on to the farm, and I think it is worth the while to want to see many of our men are but nominees of the wealthy cheese maker, who advances them money before the cheese is made, and of course fixes his own price when it is for sale. A man of fair standing and ample capital will not have much to say to the farmer, who is content with his dairy farm, and looks for a grazing one. I have had an instance of a tenant who has lately taken a farm on the estate of which I have the management, who, although knowing that grazing would not pay near as much as cheese-making, yet preferred the former simply because he had no one but hired servants to attend to his cheese. Landowners who have estates in dairy districts ought to do all they can to establish factories, for if the tenant receives an immediate benefit, we know who will soon participate in it, and although it is not a new thing, it is a new thing now-a-days; there is very great need to help the tenant-farmer to pay his present rent, to say nothing of rates and taxes, which imperceptibly increase every day. I could give no end of reasons for the adoption of cheese factories; in fact, there is nothing in their favour, and nothing that will disappear in practice, against them. The principal opposition we in Derbyshire meet with is from the local factor, who sees his trade interfered with, and naturally sets his back up; but we shall manage to get over him, and you expect to see this class of men, as I have, go farther than I do, and I shall say no more, but will answer any question that may be put to me as far as I am able.

The Week's Work.

FEBRUARY 11.—*Young Wheat* go over as soon as the weather will permit, and fill the blanks produced by the snow and can be filled up by transplanting. This is the best course, as the transplanted corn ripens more equally with the non-transplanted than when blanks are filled up with the dibble and gapping drill. It is only in

certain cases, however, that a supply of plants from thick places can be obtained to fill up blanks, so that in others where plants cannot be had the dibble and gapping drill should be used. In bad cases, fields, or portions of fields, may have to be resown, and in such cases any plants remaining may be used in filling up blanks in others. In all such cases every individual example must be its own rule as to how the work is to be done. Where fields have to be resown, the land should be prepared with the steam-cultivator or harrow, and the seed sown with the steam-drill. In many cases it may be advisable to resow fields by means of team, when it would be otherwise with horses.

Autumn Wheat, as soon as the weather will permit, should be top-dressed with guano or any of the salts of ammonia, artificial Wheat manures (mixed nitrate of soda and common salt) &c., where the land requires manuring. Not a few defer the application of spring fertilisers to hoeing time, but if the plants require food the sooner they get it the better, as the Wheat ear is formed at a very early period, and if the manure can be sown just before the hoeing will do harm afterwards, but not the reverse. The frost, however, should be settled and fresh, as frost immediately after sowing guano, &c., will do harm.

A Proper Seed-bed, according to the old maxim, is the "watchword" of the farmer in seeding his land, and "early to bed and early to rise" his "sheet anchor;" and these old sayings will this season have more than their usual significance. Steam tillage and artificial manuring are the best means to contend with the weather more successfully than under the previous practice, and both should be employed as extensively as practicable. Those who have steam tackle of their own will experience a very great advantage over those who have to hire; the hiring system not being generally adapted for changeable and fickle weather.

Storing Turnips, to clear the land for Wheat, Barley, or Oats, is sometimes done in early spring as in autumn. The work should be done before the bulbs begin to run in seed; but after the severe winter it may be as well to let vegetation commence, as a healthy growth is the index of sound roots, so that dead ones can be thrown aside for immediate use. In wet, growing weather, when carting would do harm to the land, some open up a narrow trench with a double turn of the plough; into this the topped and tailed Turnips are thrown, and then covered by another bout of the plough. This checks the growth, and preserves the roots until the time when they are to be used in the carts, when they are carted home and the land ploughed. Others collect the bulbs into heaps of a cartload each upon the surface by means of baskets, then cover with earth and cart off when the land dries. The too common practice of allowing the Turnips to remain unplucked until they are required for stock, keeping down the seed stems by the scythe, is not to be commended, as it wastes the land and roots to no purpose.

Clumping Turnips is preferred in some places to storing in the usual way. The practice is seldom adopted in southern districts, but it is common in the North, where more difficulty is experienced in storing in pits. The Turnips being carted without topping or tailing are planted on some piece of grass or stubble near the homestead if clumped in autumn, and at this season very generally in the empty part of the stack-yard. The Turnips are first and the smaller ones above and between them so as to make a close, thick covering of green top; warm growing weather is more to be dreaded than frost and snow. When clumped in the autumn they may require to be re-clumped in spring to prevent running to seed. Begin at the side you left off planting, and in replanting take off the top roots this time. A large field of Turnips may be clumped on a small area of land, and the roots should be carefully topped and tailed before they are given to stock.

Live Stock require vigilant attention early and late. The increase of light and temperature gives a stimulus to animal life, so that bone, nerve and muscle have their respective demands upon the food consumed; consequently, if the supply is defective, growth and symmetry will be unfavourable. Breeding stock that have attained maturity of growth, and also the teams, are equally affected, and none of our common and animals enjoy more the invigorating influence of the lengthening day than pigs and poultry. If neglected, lice make their appearance, spread rapidly over the whole body, and thus prove a torment to animals of every kind. Various washes are held up in high repute by their vendors, but the best thing is an improved diet with the free use of the curycomb and brush. Foultry, when they become lousy, should have plenty of fine dry sand to roll in under cover, but exposure to the mid-day sun. Keep sheep pens and pigsties dry. Sheep folding is a barbarous practice any season, but more so this year than usual, and should be given up to pens under cover. *W. B.*

Notices to Correspondents.

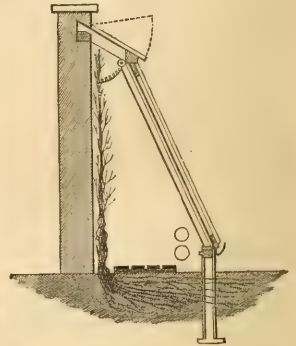
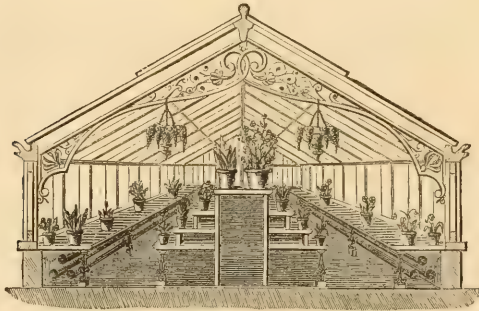
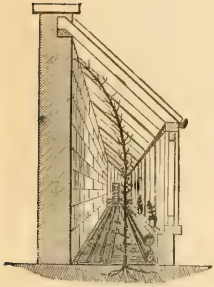
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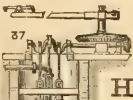
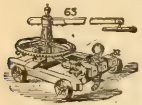
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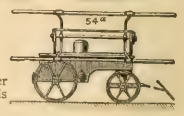
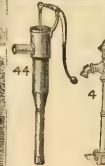
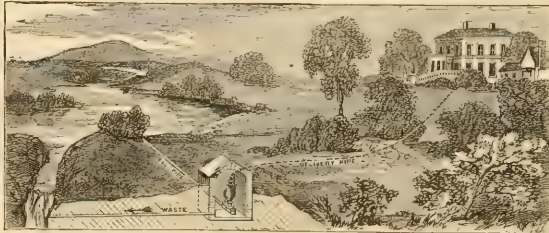
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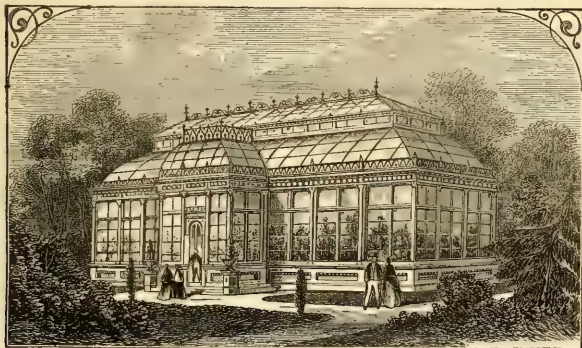
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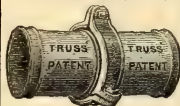
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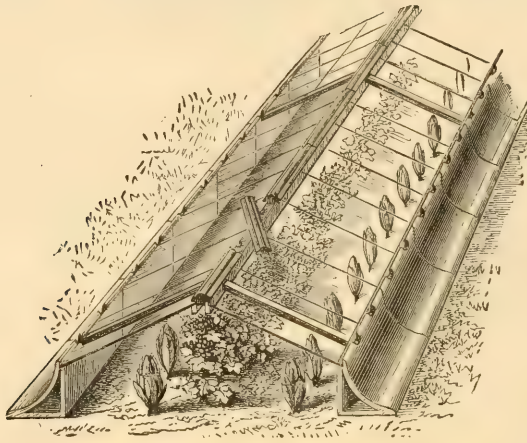


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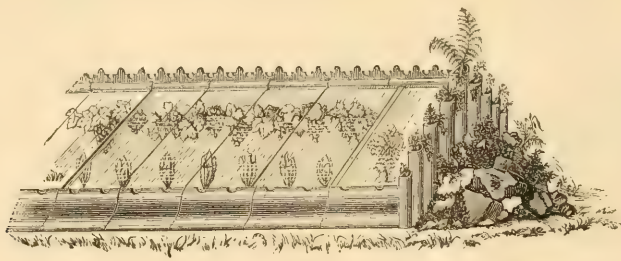


Fig. B.

In Fig. A an open end view of the ACME FRAME is represented, and Fig. B shows a side view with closed end. The closed ends consist of half round earthenware tubes in three pieces, rising and falling as steps, according to the shape of the end of the Frame. Each tube being of the capacity of a small garden pot, Ferns and other plants may be grown in them, giving the Frame a particularly neat and finished appearance. Ornamental terra cotta caps are also made, as shown in Fig. B. The Acme Frame, complete with ends and ornamental caps, forms one of the most pleasing, as well as useful structures that could be placed in a garden.

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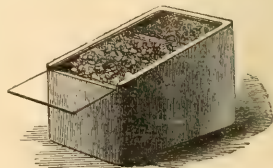
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No. 7.—[1871.]

SATURDAY, FEBRUARY 18.

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BOVINA, or CATTLE FEEDING POTATO.—See new variety, early, bushy, cheap by the ton. Price LIST of other kinds on application. SUTTON and SONS, Seed Growers, Reading.

POTATOS.—A fine sample of Myra's Prolific Ashleaf, clean and true to name, at 20s net per ton, delivered at Kendal Station, London and North-Western Railway. JAMES H. MONRO, Kendal.

Potatoes.
EARLY SHAW and EVERGREEN REGENTS (true stock). Price per cwt. or ton on application to JAMES FRASER & CO., Seed Growers, Donington, E.

To the Trade.
ASHLEAF KIDNEY, DALMAHOV, and PATERSON'S VICTORIA SEED POTATOS. For prices apply to JAMES FRASER & CO., Seed Growers, Donington, Spalding.

Potatoes, Selected for Seed.
JAMES DICKSON and SONS invite attention to their large and excellent stock, of which they will be happy to send Price Lists on application. "Newtown" Nurseries, Chester.

GOLDEN DWARF POTATO, the best early variety grown, very prolific, dwarf top, and of excellent quality, for 14s per 100. KIDNEY EARLY LEMON, 6s per bushel. H. and R. ST. MONRO, Seed Growers, Lancaster.

FORTY TONS OF SEED POTATOS, consisting of Golden Dwarf (this is the earliest and most prolific variety known, and of first-class quality), Early Handmade, Oxford, Fortyfold, Dalmaine, Kidney, and Lemon, &c. For prices which are very reasonable. Apply to H. and R. ST. MONRO, Skerton Nurseries, Lancaster.

Nuneham Park Onion (True.)
W.M. CUTBUSH and SON continue to supply this superb Onion, in sealed packets, 1s. Trade price on application. Highgate Nurseries, London, N.

Borecole or Kale.
THOMAS KENNEDY and CO., Dumfries, offer to the Trade extra fine DWARF GREEN CURLED BORECOLE. Price on application. Highgate Nurseries, London, N.

GIANT ASPARAGUS.—Fine 3-yr. old roots, 2s 6d per 100; 2s 10d per 100. Trade price on application. JOHN MONRO, Seed Growers, Lancaster.

RICHARD WALKER has to offer, for cash, WHITE SPANISH ONION SEED, 1s 9d per lb.; INTERMEDIATE and NUNEHAM PARK ONION SEED, 6d per oz. all new and genuine. ASPARAGUS SEED, 3-yr. old, 1s 6d per 100; 2-yr. old, 10s per 1000; planting out SEAKALE, 5s per 100. H. and R. ST. MONRO, Seed Growers, Lancaster.

CUCUMBER PLANTS. Strong plants of the true Telegraph and Rabley Cucumber will be ready by March 1. Orders will be sent out as received; delivered, at 1s per dozen, at FILER & ST. MONRO, Fruit Salesmen, Covent Garden Market, London, W.

JOHN MONRO, Potters Bar, N.
RHUBARB STOKES for SALE.—A large quantity of various sorts; also strong transplanted AUCUBAS, LAURUSTIUM, LAURELS, large AKOR-VITE, SPURGE FIRS, and IRISH VIVIES. Will be sold cheap, a portion of one of the Nurseries being required for building purposes.

THOS. EVES (late England Clarke), Gravesend Nurseries.

NEW AND CHOICE SEEDS AND PLANTS, &c.

E. C. HENDERSON & SON,
WELLINGTON NURSERY,
ST. JOHN'S WOOD, N.W.

CHOICE FLOWER SEEDS.

	Per packet—s	d
ACHYROCLINE SAUNDERSONII—Fine ..	1	0
AGERATUM—Tom Thumb, dwarf bedder ..	0	6
ANTIRRHINUMS—Tom Thumbs, 12 sorts for ..	3	0
BALSAMS—Splendid double. See List.		
BEGONIA SEDENI—Most beautiful ..	5	0
VEITCHII—Rich scarlet flowers ..	5	0
BLANDFORDIA CUNNINGHAMII—True ..	2	6
CALCEOLARIA—Finest in the kingdom 2s. 6d., 5		0
CARNATIONS—Beautiful double. See List.		
CLOVES—Scented, all colours ..	1s. 6d.	2
CENTAUREA CLEMENTEI—Distinct new ..	2	6
RAGUSINA COMPACTA—Best of Silver Leaves ..	1	0
CINERARIA—1st quality, from named ..	2s. 6d.	5
ACANTHIFOLIA—Distinct white foliage ..	1	0
CLIANTHUS DAMPieri—English seed ..	1s.	2
COBEA PENDULIFLORA—New species ..	1	6
CYCLAMEN—First-class quality ..	2	6
FERULA ASPERIFOLIA—Very elegant foliage ..	0	6
GOETIA WHITNEYI—Beautiful; the best ..	1	0
GRINDELIA HIRSUTULA—New species ..	1	0
HELIANTHUS GLOBULOSUS FISTULOSUS ..	1	0
HUMEA ELEGANS PURPUREA—Extra fine ..	2	6
LAPAGERIA ROSEA—English seed ..	1	0
LEPTOSIPHON ROSEUM—Most lovely ..	1	0
LILUM COLCHICUM—Pure yellow ..	1s. 2d.	6
LINUM GRANDIFLORUM ROSEUM—New var.	0	6
LOBELIA—New varieties, Pumila, see List.		
PUMILA GRANDIFLORA—True ..	1	0
LOPHOSPERMUM SPECTABILE PUNCTATUM ..	1	0
MALVA MOSCHATA ALBA—Pure white ..	1	0
MIMULUS NEUBERTI—New, true, dbl. 2s. 6d.		5
TILINGI—New species, distinct ..	2	6
HYBRIDS—From private collection, most beautiful, 12 sorts ..	3	0
PENTSTEMON GLABER—Most lovely blue ..	0	6
SPECIOSUS—Fine blue, true ..	0	6
PLEROMA MACRANTHA FLORIBUNDA—New ..	5	0
PHLOX DRUMMONDI—General Grant, rich ..	1	0
Rose d'Amour, lovely; and Cardinal, brilliant, each ..	1	0
POTENTILLA—New double flowered hybrids ..	1	0
PRIMULA SINENSIS FIMBRIATA. See List.		
MAGNUM BONUM—Extra ..	2s. 6d.	5
SALVIA HISPANICA—New, distinct ..	1	0
PETSCHERI—New, fine ..	1	0
SCHIZANTHUS PAPHIOLACEUS—Very gay ..	1	0
STANTICE SPICATA—New and distinct ..	2	6
SWEET WILLIAM—Perpetual flowering, 6d. and ..	1	0
THALICTRUM MINUS—Elegant Fern-like leaves ..	0	6
VIOLA LUTEA GRANDIFLORA PERFECTA ..	1	0
ODORATA LAUCEANA—Perp. hybrid, 1s., 2		6
PUBESCENS—Clear yellow-flowered species, ..	1	0

CENTAUREA RAGUSINA COMPACTA.—This very effective and beautiful plant is an improvement on the well-known *C. ragusina* (syn. *C. candidissima*), being of a much neater growth, and, as its name implies, of a more compact dwarf habit. One of the most valuable and productive of distinction from its original species consists, also, in its purer white leaf surfaces, by which it yields a very rich and silvery brilliancy in contrast with opposite dark green leaves, and the delicate coloured leaf tints. It is also free from the coarseness observable in the mature summer growth of *C. ragusina*. Equally beautiful for vase culture in terrace adornment, or for temporary effects in cold conservatories, this desirable plant undoubtedly in the end will supersede the older form. Seed, per packet, 1s. per 100; 1s. 5d. plants, each 6d.; by the 12 plants, 6s.; by the 50, 21s.; by the 100, 39s.

PLEROMA MACRANTHA FLORIBUNDA.—As a hortense shrub the most splendid species in its tribe, and the finest salver now offered, having a compact branching habit, with exceedingly beautiful and large intensely rich violet-purple silver shaped blossoms, 4 in. in width, and lasting the summer and autumn months. 5s. per packet; plants, 10s. to 21s. each.

DOUBLE-FLOWERED TUBEROSE.—The tubers of this delightfully fragrant flower are generally known to differ much in their value for producing bloom. The smallness of the French and Italian tubers, especially the former, produces but small stems and few flowers, and many fail in the latter. The finest roots now offered are those of the present tubers, grown of August growth, and certain to produce fine long flower-scapes. 6s. per doz.; 2s. 5d. per doz.

NEW GRAPE, FERDINAND DE LESSEPS. for Cultivation. A distinct new Golden Grape, awarded the first class Certificate by the Royal Horticultural Society of London, for its vigorous nature, its long and high perfume, the result of hybridization of Royal Nelson and the French variety of the Noble Grape. And also other fine kinds, in trusses and bunches, each, for 6d. each.

Full Descriptive Lists of the above and other Novelties may be had Post Free on application.

PAUL & SON, THE "OLD" NURSERIES, CHESHUNT, N.

Have still large quantities of the articles following.
Intending Planters would do well to inspect the Stock.

PRICED LISTS free on application.

50,000 ROSES, Standards, Half-Standards, and Dwarfs.

FRUIT TREES.

Standard APPLES, PEARS (Market kinds), VICTORIA PLUMS, MELARS, QUINCE, and WALNUTS, 6 feet stems, fine heads, 6s. to 12s. per 100.

Pyramidal APPLES on Paradise, PEARS on Quince, and PLUMS, fruiting trees, 18s. to 30s. per dozen.

Horizontal and Dwarf-trained APPLES, PEARS, and PLUMS, large fruiting trees, 42s. per dozen.

Fan-trained Dwarf APPLES, CHERRIES, PEACHES, and APRICOTS, 42s. per dozen.

Standard-trained fruiting trees, PEACHES, PEARS, PLUMS, and CHERRIES, 60s. to 84s. per dozen.

CURRENTS, Early and Late Market sorts, 25s. per 100.

VINES, fine planting Cans, and FIGS, fine Bushes, 42s. to 60s. per dozen.

MADRESFIELD COURT, ROYAL ASCOT, WHITE LADY DOWNES, GOLDEN CHAMPION, 7s. 6d. to 10s. 6d. each.

AMERICAN PLANTS,

GROWN AS WELL AS IN SURREY.

RHODODENDRON PONTICUM, bushy, for Covers, 1 foot, 30s. per 100; 1 to 1½ foot, 40s.; 1½ to 2 feet, 50s.; 2 to 2½ feet, 75s.

RHODODENDRON CATAWBIENSE, bushy, for Plantations, 1 foot, 40s. per 100; 1 to 1½ foot, 50s.; 1½ to 2 feet, 75s.

Well named kinds, 30s. to 42s. per dozen.

KALMIA LATIFOLIA, 1 to 1½ foot, 75s. per 100.

CONIFERÆ,

ESPECIALLY ARAUCARIA.

ARAUCARIA IMBRICATA.—All specimens, of rich green colour (moved last June), 3 feet, 7s. 6d. each; 4 feet, 10s. 6d. each; 4½ to 5 feet, 15s. to 21s. each. All specially selected plants.

WELLINGTONIA GIGANTEA.—Plants, safe for removal (transplanted February, 1869, and February, 1870), 5 to 8 feet, 10s. 6d. to 31s. 6d. each.

PINUS, Don Pedri, Devoniana, Hartwegii, Macrocarpa, Rigidula, Ponderosa, 2 to 4 feet, 5s. to 7s. 6d. each.

CUPRESSUS LAWSONIANA, ALBA PENDULA (Paul & Son).—See further Advertisements. The new Conifer of the season.

ORNAMENTAL TREES.

THE IMPERIAL CRAB.—The new hybrid between Siberian and Red Astrachan Apples: standards and fine pyramids, 5s. each; dwarfs, 3s. 6d. each.

PAUL'S DOUBLE SCARLET THORN.—Some hundreds of magnificent pyramids, most ornamental for lawns, 5 to 6 feet high, 24s. per dozen; standards, nice heads, 24s. per dozen.

ACER NEGUNDO VARIEGATA, pyramids .. 7s. 6d.

LEOPOLDII, pyramids 18 0

LEOPOLDII, standards 24 0

Variegated Sycamore 13 0

ALNUS IMPERIALIS LACINIATA, dwarf .. 18 0

FRAXINUS ACUCIFOLIA, 6 feet 75 0

ASPENIFOLIA, 6 feet 24 0

FAGUS (Beech) PURPUREA, 5 to 6 feet .. 18 0

ÆSCULUS (Horse Chestnut) VARIEGATA, 2 kinds 30 0

RUBICUNDA, scarlet, 7 to 9 feet .. 24 0

CASTANEA VARIEGATA, 3 feet 18 0

DISSECTA (a charming ornamental tree) 2 to 3 feet 24 0

CERASSUS (double Cherry), 2 kinds, standards, .. 24 0

(double Cherry), 2 kinds, dwarfs .. 18 0

MAHALEB VARIEGATA, standards .. 30 0

a charming addition to variegated trees, dwarfs 15 0

ULMUS (Elm) MARGINATA, silver-edged, 6 ft., 24 0

PURPUREA, 6 feet 75 0

HOLLIES, a collection of 50 kinds, pyramidal specimens 30s. to 42 0

WILLOWS, Weeping, in three kinds, fine stems and heads 18s. to 24 0

Priced Lists of all the above on application.

CARRIAGE PAID TO LONDON.

NEW AND GENUINE SEEDS, CARRIAGE PAID.

B. S. WILLIAMS,
NURSERYMAN AND SEED MERCHANT,
VICTORIA AND PARADISE NURSERIES,
UPPER HOLLOWAY, LONDON, N.

Complete Collections of Vegetable Seeds,
to suit Gardens of various sizes,
10s. 6d., 21s., 42s., 63s., and 84s. each.

NEW AND CHOICE VEGETABLE SEEDS.

	Per packet—s	d
Dell's fine dark Crimson BEET ..	1	0
Williams' Alexandra BROCCOLI ..	1	6
Backhouse's Winter White Protecting BROCCOLI ..	1	6
Osborne's Winter White BROCCOLI ..	1	0
Williams' Early Nonsuch CABBAGE, the earliest and best in cultivation ..	1	0
Wheeler's Cocoa-nut CABBAGE ..	6d.	1
Sandringham Sprouting CABBAGE ..	1	0
Williams' Matchless Red CELERY (The two best) ..	1	0
White CELERY (in cultivation) ..	1	6
Woolley's Improved Telegraph CUCUMBER ..	1	6
Digswell Prize ENDIVE ..	0s. 12d.	0
Lee's immense Hardy Green Cabbage LETTUCE ..	1	0
Williams' Victoria COS LETTUCE ..	1	0
Webb's Climax MELON, the finest flavoured Green-fleshed variety in cultivation ..	2	6
Williams' Paradise Gem MELON, scarlet flesh, splendid flavour, the earliest in cultivation ..	1	6
Nuneham Park ONION, true ..	1	0
Cullingford's Champion Marrow PEA, the finest flavoured Wrinkled Marrow in cultivation, per quart ..	3	6
Earley's Defiance TOMATO, 14 days earlier than any other in cultivation ..	2	6

NEW AND CHOICE FLOWER SEEDS.

Williams' superb strain of PRIMULA, Red, White, or Mixed, 1s. 6d., 2s. 6d., 3s. 6d., and 5 0
Neill's extra choice CALCEOLARIA, 1s. 6d., 2s. 6d., 3s. 6d., and 5 0
Weatherill's extra choice CINERARIA, 1s. 6d., 2s. 6d., 3s. 6d., and 5 0
Williams' superb strain of BALSAM, 1s. 6d., and 2 6
Wiggins' prize strain of CYCLAMEN, 1s. 6d., 2s. 6d., and 3 6
Eckford's fine strain of VERBENA .. 1 0
AGAVE DENSIFLORA, fine for sub-tropical work .. 2 6
CENTAUREA CLEMENTEI, superior to C. candidissima .. 2 6
GOETIA WHITNEYI, the largest of all .. 1 0
HELENUM GRANDIFLORUM .. 1 0
LEPTOSIPHON ROSEUS, very pretty .. 1 0
Parsons' new WHITE MIGNONETTE .. 2 6
PERILLA NANKINENSIS ATROPURPUREA .. 1 0
FOLIS LACINIATUS .. 1 0
East Lothian STOCKS, per collection of three colours .. 2 6
SOLANUM HYBRIDUM COMPACTUM, awarded a First-class Certificate by the Royal Horticultural Society, March 10, 1870, 3s. 6d., 5 0
STANTICE SPICATA, suitable for dwarf beds or edgings .. 1 0
TAGETES SIGNATA PUMILA FL. PLENO .. 1 0
VIOLA CORNUTA var. PERFECTIO, 1s. 6d., 2s. 6d., and 3 6
VIOLA ODORATA LAUCEANA, superior to the old Russian Violet .. 2 6
VIRGINIAN STOCK, New Pigmy .. 1 0

Imported GERMAN ASTERS, BALSAMS, LARKSPURS, PHLOX DRUMMONDI, STOCKS, WALL-FLOWERS, ZINNIAS, &c., in collections, as imported.

B. S. WILLIAMS'

DESCRIPTIVE CATALOGUE

OF

FLOWER, VEGETABLE, and AGRICULTURAL SEEDS

Is now ready, Post Free on application.

Seed Catalogue, 1871.—Notice.

MESSRS. JOHN AND CHARLES LEE will be happy to forward, post free, on application, a second copy of the CATALOGUE of their Goods which may not have been received it, several having been lost in the post. The Royal Vineyard Nursery and Seed Establishment, Hammersmith, London, W.

RICHARD SMITH'S SEED CATALOGUE contains a Calendar of Time for sowing, particulars of Collections, with Prices, Directions for Cropping well and economically, and Lists of the best and most valuable Seeds, Durum, Height, Colour, Storing, Use, Flavour, and other qualities described. The List free by post for one stamp. Seeds direct from the Growers, the surest way to success.

RICHARD SMITH, Seed Merchant, Worcester.

Chrysanthemums, Geraniums, &c.

CHRYSANTHEMUMS, in the best varieties, 6s. 6d. per dozen; **GERANIUMS**, good bedding sorts, from 12s. per 100; **DAHLIAS**, pot roots, 2s. 6d. per doz. A CATALOGUE of the above, and of Fuchsias, Verbenas, Carnations, Hollyhocks, Pansies, Pelargoniums, &c., sent on request. **WILLIAM CLIBBARD AND SON**, Millbank Nursery, near Warrington.

New and Unadulterated Seeds.

BUTLER, MCCULLOCH AND CO.'S SPRING CATALOGUE is now ready. In addition to the General Lists of Vegetable and Flower Seeds, it contains Select Descriptive Lists of all the new, rare, and choice Vegetable and Flower Seeds of the present season. Sent free and post paid on application.

27, South Row, Covent Garden Market, London, W.C.

Established upwards of a Century.

Vegetable, Agricultural, and Flower Seeds. MISCELLANEOUS SEEDS, for BEDDING and DECORATIVE PURPOSES, &c.

ROBERT PARKER begs to announce that his CATALOGUE, containing Descriptive Lists of the finest kinds in cultivation of JAPANESE, CHINESE, and EUROPEAN FRUIT TREES, &c., is now ready. The stocks of seeds have all been preserved in the most perfect manner, and are healthy and vigorous. They are offered at the lowest possible prices. *Intending purchasers are requested to compare the prices with those of other houses.*

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B. S. WILLIAMS' GENERAL PLANT CATALOGUE, now in application, contains Lists of Orchids, Palms, Tree Ferns, Stove and Greenhouse Ferns, Hardy Ferns, Filmy Ferns, &c.; Dracenas, Agaves, Yuccas, Beaucarniens, &c.; Acazias, and other exotics. Healthful and Ornamental Plants, and Amaryllids, &c.

WILLIAM WILLIAMS respectfully invites inspection of his numerous COLLECTIONS OF PLANTS, which at all times well repay a visit.

Post 8d. cloth, price 5s., offered by post, 5s. 6d.

ILLUSTRATED CATALOGUE OF WORKS, by B. S. WILLIAMS, F.R.H.S.

CHOICE STOVE and GREENHOUSE FLOWERING PLANTS, CHOICE STOVE and GREENHOUSE FERNS, &c.

LEAVED PLANTS, forming a sequel to the above.

SELECT FERNS and LYCOPODIA, BRITISH and EXOTIC.

Published and sold by B. S. WILLIAMS, Victoria and Paradise Nurseries, Upper Holloway, London, N.

Choice Hardy Scarlet and other Rhododendrons.

JOHN WATERER AND SONS have the pleasure of announcing that the CATALOGUE of plants, exhibited at the Royal Botanic Gardens, Regent's Park, is now published. It will be found to be a valuable and interesting work, containing the names and descriptions of the plants, and also the names of the Rhododendrons, and also contains selections of the most approved CONIFERS, with heights and prices, as well as the leading EVERGREENS and ROSES.

The American Nursery, Bagshot, Surrey.

EIGHT THOUSAND CALCALORIES (Herbarceus), of choicest strain, fine young well-rooted plants, out of pots 9s. 6d., 100 for 10s. 6d., free by post; established in pots, 15s. per 100.

PEARLIES, blooming plants, in variety, 12s. per dozen.

AZALEA ANGEN, double, blooming plants, 12s. per dozen.

INDICA AZALEA, strong plants, choice sorts, 12s. per dozen.

EMILIE LEMOINE, double, Madame LEMOINE, strong plants, 12s. per dozen.

GERANIUM, double, EMILIE LEMOINE, strong plants, 3s. 6d. per doz.

H. AND R. SANDERS, Skerton Nursery, Lancaster.

To the Trade.—Special Offer.

DWARF-TRAINED CHERRIES, capital stuff, 15s. per dozen; 45s. per 100.

Standard PEARS, very fine, 12s. per dozen; 75s. per 100.

Pyramidal PEARS, very fine, 12s. per dozen; 75s. per 100.

DWARF ROSES, on Manetti, leading sorts and good plants, 3s. per doz.

VINES—Golden Champion, Madresfield Court, Muscats, &c. Planting Cases, 3s. per dozen; stronger, 4s. per doz. Fruit in Pots, 4s. per doz.

ASCA PAVANAY AND CO., Dumfries Nursery, Dumfries.

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CHARLES B. SAUNDERS respectfully offers

Pyramidal PEAK TREES, best sorts, on Quinces, 12s. to 18s. per dozen.

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Strong Black Hamburgh and Muscat VINES, 3s. per dozen.

Evergreen OAKS (in pots), 1s. 6d. to 7s. 6d. per plant.

CARNATIONS and PICOTEES, a good selection, 9s. per dozen.

PAINTED TREES, General NURSERY STOCK on application.

STRONG Standard APPLES, PEARS, and WALNUTS.

PEACHES, and NECTARINES; bushy LAURUSTINUS and PORTUGAL LAURELS; a select collection of Standard and Dwarf

PERNIAL TREES, of the leading sorts; strong, deciduous flowering

SHRUBS; ASH, 3 to 5 feet; LARCH, SPRUCE, SCOTCH and

ALDER, 1 to 2 feet; all the above have been regularly transplanted and are well rooted. Prices

on application to **CHARLES BURGESS**, The Nurseries, London Road, Cheltenham.

New Strawberry, Brown's Wonder.

CHILD AND LORIMER have much pleasure in

introducing this new STRAWBERRY to the Public, and

which can safely assert to be by far the heaviest crop yet

introduced.

The woodcut which appeared in the *Gardeners' Chronicle* of

January 1871, is a true and correct representation of a plant grown

under ordinary circumstances in a market garden, amongst other

plants, and is a quality and good, the plant being taken up from the

ground when in full bearing.

This variety will supersede all others for market purposes when

planted in the fruiting border from the first of June to the end of

September, and will bear well in any situation, and if grown on

rich soil, will be found to be a most valuable and profitable one.

Price 21s. per 100 plants. Trade price on application.

CHILD AND LORIMER, 49, Darley Street, Bradford; and

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RICHARD SMITH'S ROSE LIST, containing all the leading and most popular kinds of Roses, may be had on application to **RICHARD SMITH**, Nurseryman and Seed Merchant, Worcester.

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RICHARD SMITH, Nurseryman and Seed Merchant, Worcester.

Orchard Planting.

W. MAULE has a supply strong

STANDARD APPLE TREES, with straight 6 feet stems

at 7s. 6d. per 100, all of which are the most esteemed kinds in the cider

districts of Devon, Somerset, Gloucester, and Hereford.

• The usual distance in planting Orchard Trees in Grass Land is

35 feet apart.

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35 feet apart.

Forest Trees, Ornamental Trees, and Shrubs.

PETER LAWSON AND SON have to intimate that

CATALOGUES for the present season may be had upon

application.

The stock of Seedling and Transplanted LARCHES, SCOTS

FIRS, and other FOREST TREES is both unusually extensive and

superior in quality. When in the ground, it is not convenient,

samples and special offers will be sent if required.

Edinburgh and London (50, Rudge Row, Cannon, E.C.)

Tox and Game Covers.

JOHN PERKINS has to recommend the

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and making New Cover.

PRIVET, Evergreen, 1 to 2 feet, 3s. per 100.

The above are all bushy and well-rooted plants.

Apply to **MARKET SQUARE, Northampton.**

Planting Season.

TO BE SOLD, cheap, the ground being required for

other purposes, 6 acres of RHODODENDRONS, from 1

to 3 feet, 1s. 6d. per 100; 2 acres of LARCHES, from 1

to 3 feet, 1s. 6d. per 100; 2 acres of SPRUCE, from 1

to 3 feet, 1s. 6d. per 100; 2 acres of SCOTCH FIR, from 1

to 3 feet, 1s. 6d. per 100; 2 acres of COMMON LAUREL, from 1

to 3 feet, 1s. 6d. per 100; 2 acres of BUSHY, and other Forest Trees,

Shrubs, &c., 1s. 6d. per 100. Apply to **B. WHITMAN**, The Nurseries, Reddish, near Stockport.

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J. SCOTT, Merriott, Somerset, offers a large stock of

LARCHES, 1 to 2 feet, 1s. 6d. per 100; 2 acres of

SCOTCH FIR, 1 to 2 feet, 1s. 6d. per 100; 2 acres of

SILVER FIR, 1 to 2 feet, 1s. 6d. per 100; 2 acres of

COMMON LAUREL, 1 to 2 feet, 1s. 6d. per 100; 2 acres of

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A fine stock of MAGNOLIA GRANDIFLORA, from 2 to 4 feet.

All at moderate prices.

FOR EVERGREEN HEDGES.

FREE BOX of SIBERIAN ARBOR-VITAE, 1 to 2 feet, 5s. per 100.

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SIBERIAN ARBOR-VITAE, 1 to 2 feet, 5s. per 100.

ENGLISH YEW, 1 to 2 feet, 5s. per 100.

SCOTCH FIR, 1 to 2 feet, 5s. per 100.

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CATALOGUE of the above STOCK sent post free

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MESSRS. LITTLE AND BALLANTYNE, of

Carlisle, beg to announce that they have received a

large stock of FOREST and ORNAMENTAL TREES, SHRUBS, &c., and

are now in receipt of orders for the same. They are

able to supply the most extensive and complete stock of

FOREST and ORNAMENTAL TREES, SHRUBS, &c., and

Cheap Variegated Geraniums.

Cheap, Cheap, Cheap.

New Seeds—"Only the Best."

MR. WILLIAM BULL'S CATALOGUE
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NEW VEGETABLES,
NEW FLOWERS
"Only the best" *Fine descriptions in Mr WILLIAM BULL'S*
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Establishment for New and Rare Plants, King's Road, Chelsea
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LILIU M AURATUM.—Fine picked Bulbs supplied by Messrs. TEUTSCHEL AND CO., 3A, Lion Walk, Colchester, Agents for Messrs. Kramer & Co., Seedsmen and Nurserymen, Yokohama, Japan, Exporters of Japanese Seeds, Plants, Bulbs, &c. A few Bulbs on hand of **LILIU M REICHLINI**, **THUNDER-GIANU M MARMORATUM**, and other new kinds. Price LIST on application

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Illustrated, price Sixpence.

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H. & F. SHARPE

INVITE THE ATTENTION OF THE TRADE TO THE FOLLOWING VARIETIES OF

SEED POTATOS.

Which they have grown from the finest selected stocks. The quality is very fine, and prices low.

EARLY ANGLEINGHAM KIDNEY	EARLY DALMAHOY EARLY	EARLY KING
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AMERICAN EARLY KING KIDNEY	" ROYAL	" FLORENCE
MONA'S PRIDE KIDNEY	EARLY OXFORD	WHEELER'S MILKY WHITE
EARLY ANHFAK KIDNEY	" FOX'S SEEDLING	EARLY LAPSTONE KIDNEY, TRUE
HEATHBURN KIDNEY	" HEDGECOCK	" EARLY ANHFAK KIDNEY
WALNUT LEAVED KIDNEY	" GOLDEN GLOBE	WALKER'S IMPROVED REGENT
MYATT'S PROLIFIC KIDNEY	" ROUND FRAM	" LUKY KIDNEY
WINDMILL KIDNEY ORCH	" MARTIN'S GLOBE	" KINGDOL'S EARLY DON
DAVEY'S EARLIEST	" FORTYFOUL	" PATERSON'S VICTORIA
LION OF DON EARLY PROLIFIC	" ROYAL	" YORKSHIRE REGENT
KIDNEY	" FLOREBALL	" PATERSON'S BOVINA

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BY SPECIAL APPOINTMENT.



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NEW CATALOGUES OF SEEDS, FRUIT AND FOREST TREES, ROSES, SHRUBS,

STOVE AND GREENHOUSE PLANTS, FERNS, &c.,

Are now ready, and will be forwarded Post Free on application.

J. WILLS also begs to remind his numerous Friends that all Letters should in future be addressed
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FOOT OF QUEEN'S GATE, AND NEAR THE ROYAL HORTICULTURAL GARDENS,
SOUTH KENSINGTON, LONDON, S.W.

WANTED.--Large FOLIAGE PLANTS, suitable for furnishing, such as PALMS, DRACÆNAS, RHOPALAS, ARAUCARIAS, Large FERNS, &c., from 3 to 20 feet high.—Address, stating size, price, and other particulars, JOHN WILLS, Royal Exotic Nursery and Floral Depot, Sussex Place, Old Brompton, London, S.W.

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WILL PRODUCE A SUPPLY OF CHOICE
VEGETABLES ALL THE YEAR ROUND.
PACKING and CARRIAGE FREE.

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carrriage free, 21s. GARDENS.
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carrriage free, 42s. GARDENS.
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carrriage free, 63s. GARDENS.
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From Mr. McVICAR, *Gardener to the Dowager Lady
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"I have no hesitation in recommending your Seeds to any person, for the simple reason, that, during the last four years I have never had occasion to make a single complaint against any article received from you either for garden or field."

All Seeds Carriage Free.

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Ordinary stocks at reduced rates.
CARTER'S IMPERIAL HARDY SWEDE.—
By careful selection we have produced the best
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Reduced Rates for quantities of more than ten acres.

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Col. LAFFAN, Commanding the Royal Engineers, reports as follows,
under date February 4, 1871.

"Col. Laffan, R.E., presents his compliments to Messrs. Carter, and begs to inform them that all the Grass and Clover seeds supplied by them to the War Office for use at Aldershot last year and the year before have succeeded admirably. Last year a very fair crop of excellent hay was produced on what had previously been a barren and

For the best information on Laying-down Land to Grass, see CARTER'S ILLUSTRATED FARMER'S CALENDAR for 1871, now in the press; gratis and post free to purchasers.

JAMES CARTER AND CO.,

THE ROYAL SEEDSMEN

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LOUGHBOROUGH HORTICULTURAL

SOCIETY.—EXHIBITION, JULY 12.

SPECIAL ROSE PRIZES (Open to all England).

1st, For the best Collection of 72 Roses (24 varieties), single trusses:

1st Prize, 45s. 5s.; 2d, 35s. 4s.; 3d, 25s. 3s.; 4th, 15s. 2s.; 5th, 10s. 1s.; 6th, 5s.

2d, For the best Collection of 48 Roses (16 varieties), single trusses:

1st Prize, 35s. 4s.; 2d, 25s. 3s.; 3d, 15s. 2s.; 4th, 10s. 1s.; 5th, 5s.

3d, For the best Collection of 24 Roses (8 varieties), single trusses:

1st Prize, 25s. 3s.; 2d, 15s. 2s.; 3d, 10s. 1s.; 4th, 5s.

4th, For the best Collection of 12 Roses (4 varieties), single trusses,

For Amateurs only: 1st, 15s. 2s.; 2d, 10s. 1s.; 3d, 5s.

SPECIAL PRIZES FOR PLANTS.

For the best 12 Stove or Greenhouse Plants (distinct varieties), six

foliage and six in flower (Orchids excluded): 1st, 25s. 2d, 2s. 7d.

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The Society offer 25s. to be competed for at the Royal Show at

Nottingham. Rules and Regulations may be obtained of

WM. PALLETY, Secretary.

The Gardeners' Chronicle

SATURDAY, FEBRUARY 18, 1871.

MEETINGS FOR THE ENSUING WEEK.

MONDAY, Feb. 20.—Entomological 7 P.M.

THE proceedings of the ROYAL HORTICULTURAL SOCIETY, as representing the Central Horticultural Association of this country, are naturally watched very keenly by those who feel concerned in the advancement of horticulture, as well as by those who have the interests of the Society at heart. It cannot be overlooked that a numerical majority of the Fellows care little or nothing for horticulture, and feel an interest in the Society proportionate merely to the tangible advantages they derive from it. Others, probably their number is not large, care a great deal for horticulture and little, if at all, for the Society; while a third, and, as we believe, the body most powerful for good, yield allegiance in the first instance to horticulture and its associate arts and sciences, and in the next to the Society as on the whole the best and most active agency for promoting the progress of their favourite pursuit. It is quite clear that the support of this latter class can only be reckoned on *durante bene placito*. Let the Council persist in some ill-judged scheme, and away goes the allegiance of those who really constitute the sinew and bone of the Society. True the younger contributors more largely than any other class financially, and are hence greatly to be encouraged; but if the working horticulturists did not contribute their full share to the show, we apprehend the spectators would be few. It is the working horticulturist, then, who will most narrowly scan the Report of the Council to the general meeting, alluded to in another column, and we may at once congratulate them on the far more hopeful prospect laid before them this year than was the case last season.

Selecting certain special topics for comment, we may first of all add our testimony to the great merits of the Wednesday meetings, whose success is so modestly alluded to in the report.

The severance of the connection with the Royal Agricultural Society, in the matter of the provincial show, has been received, we believe, by a large majority of horticulturists with much satisfaction, and the prospects for the forthcoming show at Nottingham are hopeful.

The several committees work harmoniously and well, but we may observe that, as is usually the case, the burden of the work is not equally distributed, but falls on the few "willing horses" to a greater extent than it should do. On the question of publications, it is evident that the majority of the Fellows care little or nothing about what is issued, though the value of the contents of the Journal has been notably increased in the last year or two, and the regularity of its issue has been improved. Still, the publications of the Society do not, as they should do, form a strong bond and medium of intercommunication between the Fellows. The announcement that a course of lectures on Economic Entomology is to be delivered by Mr. ANDREW MURRAY will be received with pleasure by those who know the importance of the subject, and the skill and pains bestowed by Mr. MURRAY in the formation of the collections illustrative of Economic Entomology in the South Kensington Museum. The paragraphs of the Report relating to the new arrangements at Chiswick are so satisfactory that we need not stop to cavil at the ingenious way in which last year's proceedings are explained away.

It is natural to expect that the Society may derive considerable benefit from the approaching International Exhibition, though some of the speakers at the meeting were of opinion that a sufficiently good bargain had not been made with the Commissioners in return for the loss of

privileges sustained by the Fellows. The omission of any reference to the arrangements that have been made for the establishment of a permanent display of horticultural products during the continuance of the International Exhibition, is probably an oversight.

It will be seen that casual allusion is made to the circumstance that foreign exhibitors, notably those from Belgium, are likely to take part both in the permanent and in the fortnightly shows. We have reason to believe that new plants, and in the autumn collections of fruit, will be forthcoming from Belgium, and that collections of trained trees will be sent over, and allowed to remain and form part of the permanent exhibition.

As matters of detail, perhaps not thought worthy of mention in the Report, are certain arrangements for prizes at the forthcoming Wednesday shows, and which have elicited much comment out-of-doors, such as the prize proposed by Mr. MARSHALL, and the prizes offered by Messrs. CARTER & Co., of Holborn. On this latter point opinion seems to be much divided as to whether the Society has not lost caste by allowing one firm to advertise itself in so effectual and unwonted a manner. The objection raised is that the prizes are intended, not so much for the promotion of horticulture, as for the advancement of those offering the prizes. On the other hand, it is said that no favoritism is shown to one particular firm, but that the same privilege would be extended to others on demand; and again, that the promotion of horticulture is at least indirectly secured, inasmuch as the seedsmen who offer the prizes principally for products sent out by themselves will naturally take every means of sending out the best within their power; and, lastly, that the practice is one which is not altogether an innovation, but is one which has been found to work well at agricultural shows.

—In a previous number (p. 104) we reprinted some observations of Mr. MEEHAN on the subject of EMBRYONIC INARCHING, a point of some interest horticulturally, as certain anomalous "mixed products," as a chemist would call them, have been supposed to have originated in such a manner. In reference to the same subject we have received, through the courtesy of an unknown correspondent, the following extract from the *Friends' Intelligencer*, accompanied by a specimen, on which we shall make some comment further on:—

"At the last meeting of the Academy of Natural Sciences, THOMAS MEEHAN exhibited several specimens of the *Maciura aurantiaca*, the common Osage Orange, in which the plants were inarched together in pairs in a remarkable way. He said:—The Osage Orange was formerly grown in England, and in digging up the one-year plants these united twins were usually found in the proportion of about one score in ten thousand. Double kernels were common occurrences in many seeds. There were double Peaches and Almonds, but these their separate seeds covering or meeting, consequently the separate embryos produced distinct plants. But these indicated that there had been two separate embryos under one seed covering, and that the radicular portions of this double embryo, having no membrane to separate them, had inarched themselves together while growing up to the ground. If it were the true explanation, he thought there was no such case recorded. That it was true seemed probable from the fact that all the specimens were united in exactly the same manner, showing that time, place, and the circumstances of the union were uniformly the same. The scars showed that there were four cotyledons and two germs, and that the place of union was midway between the pairs of cotyledons. From the base of the cotyledons, extending the whole length of the radicle, the union existed. The length of this united part was not much more than an inch, according to the vigour of the plant. Another lesson, he thought, was afforded by these specimens. Dr. ASA GRAY had recently remarked in 'Silliman's Journal,' that European botanists still believed what American botanists had learned to doubt, that the radicle was a true root rather than a morphological part of the stem. If it were as he believed, an illustration of the American view. These radicles, which had evidently united together under the seed coat, had elongated after protrusion, just as a young shoot, with all its parts formed in the bud, elongates after the bursting of the bud scales. They comprised the half inch, or inch united portions referred to. If these radicular portions of the seed were of the nature of root rather than of stem, we might expect to see lateral fibres push from them as we see from the true roots which start out below the union. But the germs are above the cotyledon points, indicating, as had been suggested, that their properties were rather of stem than of root. *S. R. R.*"

The double Almonds and Peaches referred to by Mr. MEEHAN are of course due to the development of two ovules or two seeds in place of one; but in the case of the Osage Orange, as we understand it, two embryo plants were produced in one and the same ovule. This, though assuredly unusual, is yet easily intelligible, from the fact that under ordinary circumstances the several germinal vesicles in the same embryo-sac, though usually only one of these vesicles becomes fertilised and developed into a new plant. Plurality of embryos in the same seed has been noticed in several

genera, and is indeed frequent in the seeds of the Orange. Several such instances are recorded in Dr. MASTERS' work on "Vegetable Teratology," wherein instances of the adhesion of the double embryos so produced are alluded to, though Mr. MEEHAN seems to have overlooked them, in particular one case cited by Mr. TWIGATES, "wherein two embryos were contained in one seed of a Fuchsia, and had become adherent. What is still more remarkable, the two embryos were different, a circumstance attributable to their hybrid origin, the seed containing them being the result of the fertilisation of *Fuchsia coccinea* (Hort.), *f. c.*, magellanica, by the pollen of *F. fulgens*." This last is a very important fact for horticulturists, as bearing on the question of graft-hybridisation, Potato grafting, and the like, while it affords confirmation of the much doubted "Trifacial Orange," produced as is affirmed by causing the seeds of the Citron, the Orange, and the Lime to adhere together. "The fruit produced by this tree exhibits three distinct species included in one rind, the division being perfectly visible externally, and the flavour of each compartment as different as if it had grown on a separate tree." The specimen kindly forwarded us by our correspondent consists of two seedling plants of the Orange free above the scars which indicate the position of the cotyledons, and free from the commencement of the roots downwards; the caulicles (tigella), which are nearly 2 inches in length, are firmly united together. There is nothing in the specimen before us to indicate when the union took place; it may have done so in the seed itself, or it may have occurred in the early stages of germination from the close contact of two seedling plants.

— In reference to the **COUNTRY MEETING of the ROYAL HORTICULTURAL SOCIETY**, we learn that it was agreed at the last meeting of the General Committee, held in the Mayor's parlour at Nottingham, that the Local Prize Committee should be called the Floral Committee; and as many members would be engaged as exhibitors, it was thought desirable to form a Managing Committee, consisting of Mr. H. Smith, Rev. S. R. Hole, Mr. Newton, Mr. Ingram, Mr. Pearson, Mr. Fellows, Mr. Carter, Capt. Parry, Mr. Chapman, Mr. Goodall, and Mr. Evans. A Visitors' Committee was also formed, for the purpose of offering the hospitality of the town to the principal botanists and horticulturists who might be expected to attend the meeting. A sub-committee, under the presidency of the Rev. S. R. Hole, proceeded to make the necessary practical arrangements for the distribution of the Special Prize Fund, which, we are glad to hear, has reached to about the sum of £500.

— We are glad to see that Mr. GRAVES is about to bring the subject of the SAMPLE POST, and the present vexatious restrictions, under the notice of the House of Commons on the 28th inst. So far from decreasing the convenience of the public, the aim of the authorities should be directed towards increasing postal facilities in all ways consistent with the speedy delivery of letters.

— Mr. J. C. BUCKMASTER has been appointed by Her Majesty's Commissioners for the LONDON INTERNATIONAL EXHIBITION of 1871 to deliver an address on the value of the Exhibition and its bearing on industrial instruction, designed particularly for the working classes in all the large towns of the country, which express a desire to have it.

— Any alteration, however slight, in a periodical so useful and so long established as the **BOTANICAL MAGAZINE** is worthy of notice, and we may therefore put on record two or three which we observe in the January number for the present year. The first is the omission of the word "English" in the "English name" of the plant described, for which is substituted, immediately beneath the scientific name, an indication of its native country. Besides these changes the place of the species in the Linnean system of classification is no longer given. Those who notice small indications of great changes will see, in the gradual displacement of the artificial by the natural method in the pages of the magazine, a correspondence to the supplanting of the old by the other among botanists. In 1787, when the magazine was started, the Linnean, then of course the best method of classification, was followed. In November, 1826, at t. 2689, the place of the plant in the natural system was first given, after that in the Linnean arrangement. From 1845 (t. 4132) until the end of 1870, both were given, but their relative posi-

tions were changed, the natural system taking precedence; and we now find the Linnean method abandoned altogether. Slight as these three changes may seem, they are worthy of note, and each must be looked upon as an improvement.

— So far as we know, **DOUBLE-FLOWERED PENTSTEMONS** have not yet made their appearance in our gardens, nevertheless, from evidence before us, we are in a position to state that we shall not be long ere we see them. We have before us some sketches of Mr. WORTHINGTON SMITH, showing some semi-double flowers of Pentstemons. The doubling seems to arise in this case from an actual increase in the number of petals, and not from the assumption by the stamens of a petaloid guise.

— The **MAXIMUM TEMPERATURES** in England during the week ending February 11 ranged from 55°.2 at Portsmouth to 50°, showing a range of 5°.2 as against 11°.8 in the preceding week; the mean of the maximum temperatures recorded at the different stations was 51°.6. In Scotland the temperatures ranged from 51°.5 at Leith to 46° at Dundee, thus the highest in the northern country was less than the mean for the southern country. The mean for the several stations in Scotland was 49°.1. The **MINIMUM TEMPERATURES** in England were much less than those in Scotland, for whilst in the former country the temperature descended so low as 20° (at Norwich), 24°.2 (at Portsmouth), and 25° (at Blackheath), in the latter country the lowest were 31°.6 (at

brought by spirit hands. JAMES AGHARNA tapped out that he had brought it from Kew Gardens, 'he would have brought flowers, but that they would find so many.' We cannot suggest any method for organising a spiritual police force to prevent a recurrence of these larcenies, and we are by no means sure that a police force would be a better agent for the repression of crime in spirit-land than it is in London. But that is a question for the Kew authorities to consider for themselves.

— The **PORTRAIT of Mr. THOMAS RIVERS**, of Sawbridgeworth, has been presented to the trustees of the LINDLEY Library by the subscribers, and it is understood that the portrait will be hung in the council-room of the Royal Horticultural Society. Certainly it is most fitting that one who has done so much for horticulture should meet with public recognition of his services. The portrait is a very pleasing one.

— In his criticism on a passage in "M. C. C.'s" article on **TUBERCULARIA vulgaris**, Mr. PHILIPS has rightly pointed out that the terms "conidia" and "gonidia" are not synonymous. He has, however, omitted to mention that the derivation of the two is quite different, the former being derived from *konos*, dust, and not from *gonos*, offspring. The term "conidia" is the better term of the two, as it states nothing about functions, which at the time the name was proposed were uncertain; though **TULASNE** has since shown that the conidia in *Nectria cinnabarina* germinate as well as the sporidia, so that their function cannot now be doubtful (*Tulasne Selecta Fungerum Carpologia*, vol. 3, tab. 12). The word gonidia is open to objection, especially since the observations of FAMINTZIN and BORANETZKY, who have shown that the gonidia in several genera of Lichens generate zoospores, which move about by the vibration of two lash-like threads, after the fashion of the zoospores of the Potato mould. *M. J. B.*

— A rather singular invention, says *Nature*, for remedying the actual want of fuel in private houses, became very popular in Paris during the siege. They prepared cylinders of clay impregnated with bituminous substances; these **COMBUSTIBLE CYLINDERS** were used like the ordinary charcoal which is necessary in Parisian cookery. The earthy matters, of which the proportion is not greater than necessary, remain in the furnaces like ashes left by the combustion of charcoal. It is stated that it is proposed to continue the use of this kind of artificial fuel. This reminds us of a kind of fuel which we saw used long ago for heating greenhouses. The "ashes" which remained after sifting house cinders—the latter a very common kind of fuel in country establishments—were well soaked with clay-water sufficiently thick to render the ashes adhesive. The clayey ashes were then moulded like bricks, and dried, and in this form made very good fuel for a WITT'S furnace, in which a considerable body of fuel was required. They were also used before banking up the ordinary furnaces.

— Alluding to the letter, published in our columns, describing the condition of many FRENCH NURSERYMEN and their nurseries, we have received the following, which we commend to the notice of our readers:

"What wretched accounts we are receiving from Mr. ANDRE, and others, of the utter ruin that has come upon some of our brother horticulturists in France! But may I ask, are we to be like the Priest and the Levite—who, I dare say, said to themselves, 'Ah, poor fellow, he's very much hurt'—or like the Samaritan, to pour in our oil and wine? Already the publishers have inaugurated a movement to help their brethren in Paris. The agriculturists are coming nobly forward to help the peasant-farmers. Cannot the horticulturists of Great Britain do something? Many of us have kindly recollections of pleasant hours spent with our French brethren; doubtless many of them can as well stand the rain of their establishments as some of our chief nurserymen could theirs, but there are others who must stand sorely in need of aid. I feel somewhat diffident in making any suggestion on this point, because the distance I live from London would preclude my taking an active part in any movement, and the *res angusta domi* would hinder me from contributing much; but I may suggest, in the hope that the suggestion may not fall uselessly to the ground. *D. Deal.*"

We think the suggestion an excellent one, and shall be happy to give what aid we can to the project. We have already pointed out a means by which help could be given even in cases where monetary aid could not be conveniently accorded—we mean by the forwarding



FIG. 43.—*GILIA* (§ *LEPTOSIPHON*) *MICRANTHA*.—(See p. 201.)

Glasgow) and 31°.8 (at Leith). The mean of the several stations in the two countries was 27°.3 and 32°.8 respectively. The **MEAN TEMPERATURE**: Although the days were warmer and the nights colder in England than in Scotland to the amounts of 21° and 51°, the mean temperature in the southern country was 1°.1 above that of the northern. In England the extremes were represented by 43°.4 (at Portsmouth) and 37°.8 (at Norwich), with a mean for the several stations of 41°.2; and in Scotland by 42°.4 (at Edinburgh) and 38°.2 (at Aberdeen), with a mean for all stations of 40°.1. The **RAINFALL** in England, although unusually large at most of the stations, was considerably in defect when compared with the amounts which were recorded at some of the stations in Scotland. In the southern country the largest amount for the week was 1.79 inch (at Salford), and the smallest 0.36 inch at Newcastle, with a mean for the different stations of 1 inch. In the northern country 3.75 inches, 2.60 inches, and 2.58 inches were the largest falls, recorded at Greenock, Paisley, and Aberdeen; and the least 1.12 inch (at Leith), and 1.30 inch (at Edinburgh). (See Mr. GLAISHER'S Tables in our present issue.)

— We extract the following from the *Echo of February 8*—

"In the interests of the public, it is our duty to draw the attention of the authorities at Kew Gardens to the fact that they are suffering from the depredations of a class of thieves whom we are sure they do not suspect. In a journal devoted to spiritualism, we read an account of a séance at which 'something was dropped on the table, and it rolled off'; it sounded like an Orange or an Apple, but Mrs. ALSOP said there was not any in the room; a light was brought in, and there was a Hyacinth bulb,

graffs, stocks, seeds, and scores of things likely to be useful. We would suggest that a committee of horticulturalists be immediately formed, to give effect to these or other suggestions.

New Garden Plants.

GILIA († LEPTOSIPHON) MICRANTHA, Stand.

Gracilis; corollæ tubo perianthi (subsepalliculari lobis lin. longis), multoties longiori; bracteis foliaceis floralibus mollioribus breviter pubescentibus.—*Leptosiphon parviflorus*, L. Intus, Benth. Bot. Reg.; *L. parviflorus* var. *roseaceus*, Hook. f. Bot. Mag., t. 3853; *Gilia longicaulis*, Benth. Fl. Hartweg; *Gilia spectabilis*, corollæ majusculæ late rosæ. Corollæ luteæ, albidæ, nunc lilacine, nunc alacæ, nunc auræ (var. *auræa*, Benth. l. c.). A. Gray, Proc. Amer. Acad. Arts and Sc., 1870, p. 266, t. 11.

Under the name of *Leptosiphon roseus*, plants of this very beautiful but seemingly most variable annual were exhibited last season before the Royal Horticultural Society, by Mr. Thompson, of Ipswich. The same plant was figured in the "Botanical Magazine" as *Leptosiphon parviflorus* var. *roseaceus*, while Dr. Gray, in a recent monograph of the group, has placed the plant under the name above given. In truth, the plant varies so extremely that it is difficult to assign its exact position and name. The plant is a low-growing annual, more or less clothed with longish, weak hairs; the leaves are 5–7-parted, with linear acute divisions. The flowers are of a rosy colour, produced in greatest abundance, as seen in our illustration (fig. 43), and have a long slender tube, about an inch and a-half in length, supporting a flat, 5-lobed limb, whose segments are not more than a fifth of the length of the tube. The plant is a native of California, and may be grown in this country as an annual. It is certainly one of the handsomest of its class.

ON THE MANAGEMENT OF HEDGES.

THE Whetstone or Quick still holds its own before all comers as one of the best plants for hedge-making. It may be grown to any size or substance—strong enough to resist the largest animals, and close enough to keep back rabbits; but to attain such satisfactory results, an amount of care and attention is required in the planting and after-management which is not usually bestowed upon it. Having had extensive experience in making new hedges, I have thought that a short account of the different operations connected therewith might not be unacceptable to some of your readers. I may therefore state that I prefer planting a single row of plants, as it makes the neatest fence, and is kept clean much more easily. I also cut the young Quick down before planting; when planted the full length they blow about and get out of shape; and as they naturally grow from the leading shoots, the first year's growth is all cut away, and by these means the young hedge is kept close to the ground just where it should be to insure a good fence.

When a new hedge has to be planted, the first requirement is a dead fence of some kind to protect it until it is strong enough to take care of itself. The distance that this fence should be from the young hedge depends a good deal upon the situation of the hedge and the height to which the protecting fence can be made. It should, however, be at the least 3 feet from the line of hedge, and high enough to keep cattle from eating the young tops. I prefer to plant hedges on the flat, trenching the ground 3 feet wide, and breaking it up in the trench to the same depth. This is done by taking out two spits of the soil and breaking up the bottom with a pickaxe, we then put in a layer of manure, and throw over it two more spits of soil. By thus picking and digging we keep the good soil near to the surface, and put the manure where the roots can get to it. After trenching we allow the ground to settle for a short time, to make sure that when the Quicks are planted the hedge will not sink into holes. While the ground is settling, we prepare the plants by cutting off the strong and injured roots, and head the plant down, so that from the root to the top it is from 9 to 10 inches in length. Having the plants thus prepared beforehand, we put the line down and take out a rather wide trench, so as not to double up the roots, and plant the Quick 3 inches apart. We leave them just about an inch above the ground, and have them well trodden into the ground with the foot, taking care to keep them straight and upright.

We do not then cut the young hedge in the spring for the first two years, as hares and rabbits are apt to nibble at the shoots, and by leaving them unpruned for the first time, all the injured stems can be removed. We then cut them down to within 4 or 6 inches of the first cut. Nothing spoils a hedge more than allowing it to increase in height very much at a time for the first few years. The second season we prune them conditionally: if they have made a good growth we leave them 15 inches high, if weak, 1 foot only. After the second season we side-prune at midsummer, leaving them the full height until spring, when they are cut down, close to them from 10 to 9 inches higher than at the previous pruning. After this time they are pruned at midsummer and autumn in the usual way, always taking care to keep them well down. Great attention is paid in keeping the young hedges free from weeds during summer, and after they are pruned the ground on either side is well forked up. We never put a

spade near them. The practice I have endeavoured to describe may be found destitute of novelty, but the results, if the instructions given are attended to, will be eminently satisfactory. *George Thompson, Stansted, Sussex.* [To have a hedge well-furnished, it should always be kept narrower at the top than at the base. Eds.]

THE SPANGLE OF THE MANGO LEAF

(NEUROTERUS MANGIFERÆ.)

THE various kinds of Oak spangles are well known to our constant readers by sundry papers, illustrated with cuts, which have from time to time appeared in these pages. We may in particular refer to the volumes for 1842, p. 852; 1843, p. 52, and to figures given in a recent issue (1870, No. 40, p. 1312) for the benefit of those who require information on the subject. These spangles or galls are produced by minute cynipideous female flies, and form the cradle and feeding place of

the solitary grub, hatched from the egg deposited by the mother insect. Except in very mild and damp seasons, no trace of the grub can be detected in the spangles before the leaves, to the underside of which they are attached by a short pedicel, have dropped to the ground in autumn. This circumstance, and the shape of the spangles, has formerly given rise to the error of considering and naming them as Fungi, but long ago Réaumur indicated their nature by naming them "galles en Champignon;" and since his time the investigations of Olivier and Hartig agreed, of Professor Westwood, Mr. J. Curtis and Mr. F. Smith in this country, have revealed their true natural history by teaching us to find the full-grown grubs and perfect insects in spring in the soaked galls, which had remained protected by layers of the dead leaves during the winter.

Hitherto such spangles have only been found on several species of Oak, and hence it has been a current notion that the genus *Neuroterus*, to which these insects belong, was exclusively attached to the bota-

nical genus *Quercus*. But this must now be considered as an error, which the following kind of Mr. F. Moore enables us to correct. This gentleman has submitted to our inspection a partly coloured sketch of a Mango leaf (*Mangifera indica*), gathered at Calcutta on July 24, 1863 (and sent home by Mr. Arthur Grote), the underside of which exhibits a considerable number of spangles, most of which are close to or on the side ribs of the leaf, and therefore located like our European Oak spangles. Our figure is a slightly reduced copy of the original drawing, and A represents the magnified vertical section of the gall.

In size and general aspect, and in their ferruginous colour, these Mango spangles are exceedingly like those of the European *Neuroterus Malpighii*, Hartig; while their vertical section shows them to be closely allied to the silky button galls (see p. 1312, 1870) of *Neuroterus Réaumurii*, Hartig, which same name, having been given in 1840, has precedence over Curtis's name of *Cynips Quercus tiaræ*, bestowed upon the same insect in 1843.

Although, as a rule, it is most reprehensible practice to name an insect when only its architecture is known, we think that, considering the peculiar family likeness which this gall bears to our Oak spangles, we may safely give the stranger "a local habitation and a name," by calling it *Neuroterus Mangiferae*.

It now rests with Indian observers to test the truth of our comparative observations, and to work out the life-history of this gall-maker on the spot. There will be little difficulty in doing so with the hints afforded by the economy of the European species. *Alberti Müller.*

A NEW SYNOPSIS OF ALL THE KNOWN LILIES.—II.

Subgenus I. *NOTHOLIRION* (Himalayan Lilies).—Bulbs unicated; stigma cleft into three subulate hooked divisions.

Key to the Species.

Stem stout, 1½–3 feet high, with 20–30 leaves crowded near the base. 1. *RO-ECUM.*
Stem slender, 8–12 inches high, with 6–8 loosely scattered leaves. 2. *HOOKERI.*

1. *Lilium roseum*, Wallich, Cat. No. 5077 (year 1832), Hook. in Bot. Mag. t. 4725; *Lilium Thomsonianum*, Lindl. Bot. Reg. 1845, t. 1; Spag. Mon. p. 9; *Fritillaria Thomsoniana*, D. Don, in Royle Ill. Him. p. 388, t. 92 (year 1839), Kunth, Enum. iv. p. 672.—Root a unicated bulb, 1½–2 inches thick and 1½–2 inches long, with many loose grey or brownish glabrous scarious coats, reaching up to its neck. Stem 1½–3 feet high, stiff, erect, 3–4 lines thick at the base, quite glabrous, like the rest of the plant. Leaves 20–30, crowded near the base of the stem, lax upwards, moderately thick in texture, linear, flat, the lower ones reaching a foot or more long, 4–6 lines broad after they leave the stem, with 10–12 subequal not very conspicuous ribs, often gemmiferous in the lower part on the face, the upper ones growing gradually shorter and passing into the lower ones without any abrupt transition. Flowers 12–18 in wild specimens, in a raceme sometimes a foot long, not more than 3–4 inches broad when fully expanded. Pedicels rigidly erecto-patent, the lower ones 6–9 lines long. Bracts linear, longer than the pedicels. Perianth 1½–2 inches long, the lower flowers slightly drooping, the upper ones erecto-patent, often appreciably smaller; colour rose-lilac; divisions oblongate, bluish, 3–4 lines broad two-thirds of the way up, narrowed gradually to a base a line broad, recurved only in the outer quarter when fully expanded, the nectary a dark glabrous groove extending down the lowest quarter. Ovary 4–5 lines long; style filiform, very slender, 15–18 lines long; stigmatic lobes linear, recurved, a line long. Capsule obovoid, 6–9 lines long, bluntly 6-lobed. Filaments as long as the perianth, nearly straight; anthers linear-oblong, purple, 3–4 lines long.

A native of the Western Himalayas, extending from Afghanistan eastwards by way of Mussorie and Kumaon to Nepal. It has been gathered by nearly all the collectors who have visited those regions. In the eastern part of its range the height which it attains above the sea-level appears to be from 5000 to 8000 feet. Figures will be found in the three publications quoted; that in the "Botanical Magazine" being the most recent and with the most satisfactory, both botanically and artistically.

2. *Lilium hookeri*, Wallich, Cat. No. 5078 (year 1832), Hook. in Bot. Mag. t. 4725; *Lilium Thomsonianum*, Lindl. Bot. Reg. 1845, t. 1; Spag. Mon. p. 9; *Fritillaria Thomsoniana*, D. Don, in Royle Ill. Him. p. 388, t. 92 (year 1839), Kunth, Enum. iv. p. 672.—Root a unicated bulb, 1½–2 inches thick and 1½–2 inches long, with many loose grey or brownish glabrous scarious coats, reaching up to its neck. Stem 1½–3 feet high, stiff, erect, 3–4 lines thick at the base, quite glabrous, like the rest of the plant. Leaves 20–30, crowded near the base of the stem, lax upwards, moderately thick in texture, linear, flat, the lower ones reaching a foot or more long, 4–6 lines broad after they leave the stem, with 10–12 subequal not very conspicuous ribs, often gemmiferous in the lower part on the face, the upper ones growing gradually shorter and passing into the lower ones without any abrupt transition. Flowers 12–18 in wild specimens, in a raceme sometimes a foot long, not more than 3–4 inches broad when fully expanded. Pedicels rigidly erecto-patent, the lower ones 6–9 lines long. Bracts linear, longer than the pedicels. Perianth 1½–2 inches long, the lower flowers slightly drooping, the upper ones erecto-patent, often appreciably smaller; colour rose-lilac; divisions oblongate, bluish, 3–4 lines broad two-thirds of the way up, narrowed gradually to a base a line broad, recurved only in the outer quarter when fully expanded, the nectary a dark glabrous groove extending down the lowest quarter. Ovary 4–5 lines long; style filiform, very slender, 15–18 lines long; stigmatic lobes linear, recurved, a line long. Capsule obovoid, 6–9 lines long, bluntly 6-lobed. Filaments as long as the perianth, nearly straight; anthers linear-oblong, purple, 3–4 lines long.

2. *L. hookeri*, Baker, n. sp.—Closely allied to the last, but clearly distinct from it especially. Bulb quite similar in shape and vestiture, but considerably smaller. Stem more flexuous, at most only a foot long, much more slender, not more than a line thick at the base, quite glabrous, like the rest of the plant. Leaves similar in shape and texture, but much fewer, not more than 6–9,

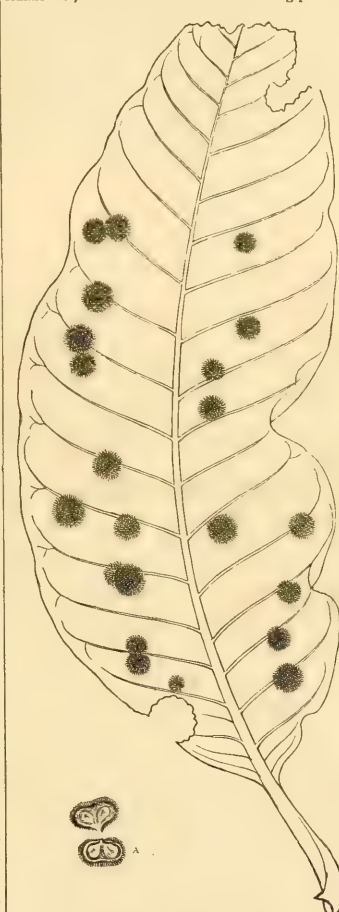


FIG. 44.—SPANGLE OF THE MANGO LEAF.

group so much in want of a name, but the difficulty lies in getting any unfamiliar name adopted generally. Those who cling to *Geranium* have of course the strong arguments of popularity and common use in their favour, but if this name is thus appropriated, no one has yet told us what the real *Geranium* can be called. To those who cling to *Crocus* there is no possible objection, except that it is unfamiliar. Eds.]

Flower Gardening in 1871.—What is the flower gardening of 1871 to be like? Is it to be a repetition of 1870? Is not that system growing sick? One hears a sigh now and then, a wish expressed that the old flowers were in their old places. Its ardent promoters are now sickening. After puzzling for a month or two about colours and foliage, they are still in a fix, and secretly wish General Leafcutter would resign. I think so too, or else in a few years the commonest of our old favourites will become out of the reach of many, and but few gardeners will exist to know how to cultivate them. I believe I owe to learning the names of plants the getting of a tolerable memory.

What has the young gardener now to learn in the flower garden? Simply Jack, Tom, and Bill; and Bill, Tom, and Jack. What has flower gardening been of late? There is John, with his little greenhouse stove full of bedding stuff; above all are the leaves of huge Castor-oil plants. John has orders, and gets those on for the flower garden. His Vines, and everything else in his house, suffers on their account. These and other foliage plants are planted into beds full of herbaceous plants, bulbs, &c. What is to come of them? "Oh, they can't stay about them now," this said; "throw them in a corner." Ah! the poor things in the corner are soon forgotten, John's son's son will probably never see the like of them together again in one spot. We hear of a new nomenclature being wanted for different things, surely we want one for gardens. There are so many non-naturals finding their way into the present ones that they are yearly coming to destruction. By all means have subtopical gardening, but let it be in a separate garden, and let flower gardens be flower gardens. If any will have leaf-gardens, why let them have them.

A Lover of Flowers.

Fruit Trees and Rabbits.—If your correspondent, "C. C.," will take a gallon of train oil, and a handful of common glue, dissolve it in a quart or two of water, and stir them up with sufficient clay to form a moderately thick paint, adding soot and lime to give it the colour he prefers, he will have a dressing which, applied with a brush in dry weather, will effectually guard the bark of trees or shrubs from the attacks of hares and rabbits. As there is some difficulty in mixing the oil and clay, &c., I always have them put over the fire in an iron pot, and well stirred together. In very cold or frosty weather, it is necessary to warm the paint before using, and will last several years, and, I need not add, will not in the slightest degree injure the most delicate tree or shrub. *A Gardener.*

Callicarpa purpurea.—Noticing "M. T. M.'s" interesting remarks on the above plant, at p. 173, I beg to add my testimony to its good qualities as a most useful and beautiful decorative plant for autumn and winter. The few plants that we have here were very much admired by all who saw them. Many of the shoots on a plant are over 18 inches long, studded their entire length with beautiful purple berries. My manner of treatment is to cut the plant back every spring, leaving three or four eyes on a shoot. Introduce into heat early in March, syringe, and keep close until they break, when they may be potted and grown on in heat through the spring and early summer, giving them a light situation and plenty of water. Their shoots should not be stopped, but by every means encouraged to grow, for the longer they are the better they will be. When the plants have done flowering, and the berries are properly set, the best place to ripen them I have found to be the warmest end of a greenhouse, or the stage of a lightinery. It is a deciduous plant, losing its leaves late in the autumn—a circumstance which, to my mind, adds much to its beauty; for to those who know the plant only by its leaves and flowers it will not appear worthy of much consideration, as "M. T. M." remarked. The plant is easily propagated from cuttings, which may be had by thinning the shoots early in spring; and, if grown in heat, without being stopped, they will make very interesting objects in small pots by the autumn. I enclose portrait of a shoot, and would be glad to hear of the true *Callicarpa purpurea*. *O. Thomas, The Gardens, Drayton Manor, Tamworth.* [We cannot be sure without the leaf, but we believe your plant is *C. rubella*. Eds.]

The White Cedar used for fencing in Canada is the wood of *Thuja occidentalis*, which grows in great abundance in swampy ground, and is the true punky ground, such as the sides of the great gorge below the Falls of Niagara, where it becomes an exceedingly picturesque little tree. It is considered the most durable wood that can be used for fencing purposes in the northern parts of America. I do not know what is the quality of the wood of what we call the White Cedar (*Cupressus thyoides*). I have often thought the *Thuja* might with advantage be planted, on ground that would suit it, in England. Steep, stony, rather dry soils, would be the most likely to suit it, but it does not grow fast when

young, and rabbits are particularly fond of it. I think that in most soils the common Yew tree would beat it in producing fencing stuff, and the latter is not much liable to injury by rabbits. *C. W. Strickland.*

Crocus Imperatorius.—When inspecting my bulb garden a few days ago I came upon *Crocus Imperatorius* in full flower. It had been out for some days, and I thought what an advantage it would be if this very early flowering *Crocus* was more extensively grown. The Dutch varieties and species imported from Holland, although established for three years, had not the least sign of blooming, and, from its appearance, would be quite a fortnight after *Imperatorius*. This variety may be easily increased in number, and, as you are aware, it is comparatively unknown, having been last season exhibited by Major Clarke at the Horticultural Gardens. *P. Barr.*

Williams' d'Hiver Pear.—I send you a sketch (fig. 45) and slight description of this Pear, which may, perhaps, interest some of your readers. It is of first size and quality, and comes into use from December to February. The fruit is blunt, pyriform, but variable in outline, much swollen at the base, and drawn in near the top and somewhat bossed. Skin clear yellow, finely dotted and veined with the same in the basin of the eye, with lightish grey about the stalk and on the face exposed to the sun. Stalk short, strong, and thick, set rather obliquely and often to one side of the axis. Eye medium sized, half-closed and

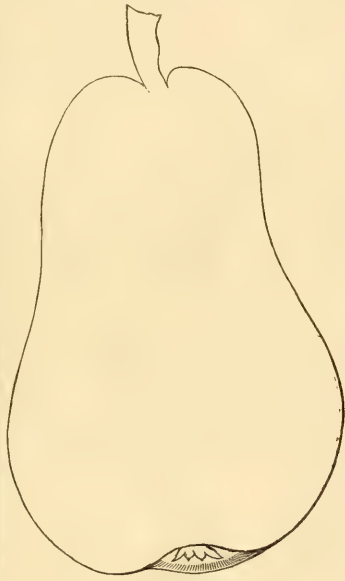


FIG. 45.—WILLIAMS' D'HIVER PEAR.

slightly sunk. Flesh white, very fine and very melting; juice excessively abundant, sugary, acidulated, with a fine, fresh, and savoury perfume. The tree is a strong grower, and it succeeds well upon the Quince. It was raised by M. Leroy, of Angers, from whom I received it in 1869; it fruited here this season (1870), and the accompanying sketch was made from one of the fruit, which ripened Dec. 30. The tree bears abundantly, and deserves to be much cultivated; it fruited for the first time at Angers in 1862. *J. S. Merriott.*

Special Prizes.—I see by the schedule just issued by the Royal Horticultural Society that Messrs. Carter & Co. offer prizes for vegetables at most of the summer meetings. While entirely approving of this movement, two questions arise in my mind, to which perhaps Messrs. Carter will reply—1st, What quantities must be exhibited—say, Carrots, Onions, &c., how many of each? and 2d, How are the judges to verify the different kinds of Peas, Cauliflowers, and other specialities mentioned? An answer will oblige one who is glad to say he cannot be a Judge.

Orchid Cultivation.—I propose in this letter to offer a few remarks upon the means of supplying to our Orchids their two great wants—food and water. These two desiderata of Orchid life are nearly inseparable; by this I mean that their food must be to a great extent conveyed to them by the water. I am now only considering such Orchids as in their native habitat grow upon trees, and therefore support themselves by their roots, or by such pascuous food as their leaves can obtain. This class of plants does not root, in the general acceptance of that term; and,

though planted in sphagnum and broken crocks, will always prefer to feed by means of air-roots if the atmospheric conditions are favourable. There is no question but that gardeners as a class believe in manuring, and we are continually asked to put any in with the moss upon this being denied; they ask, Then which of the patent manures do you water them with? We say, none of them; which is immediately followed by an incredulous look, a wink of one eye, or some other mode of saying, "none of that." So we, who are perhaps more firmly convinced than they are, that Orchids cannot live without manure, are put down as trying in some way to humbug, when we say we follow Nature. But we repeat the words, and get the same answer. Orchids come from the arid wastes in all the world, that is, not only have the greatest rainfall, but also enjoy the heaviest dews—I think it will be accepted. What we want to consider, is the means of supplying the moisture, and along with it the food, in a manner according to Nature, who works in no mysterious way. The first mode, imitation of tropical rain, does not suit our houses, but let me describe it in the language of the Rev. C. Kingsley, at p. 382, "Good Words" for 1870, in his "Letters from the Tropics":

"But soon we were reminded again that we were not in the Tropics, but in England. A window in heaven above was suddenly opened, and out of it, without the warning cry of 'Gardlooy,'—well known in Edinburgh of old—a bucket of warm water, happily clean, was emptied on each of our heads, and the next moment all was bright again; a thunder shower, without warning, without clap, was a new phenomenon, which was repeated several times that day. The suddenness and the heaviness of the tropic showers at this season are as amusing as they are trying. The umbrella or the macintosh must be always ready, or you will get wet through, and getting wet here is a much more serious matter than in a temperate climate, where you may ride or walk all day in wet clothes and take no harm, for the rapid radiation produced by the intense sunshine causes a chill which may beget, only too easily, fever and ague not to be easily shaken off."

The total annual rainfall he gives, at p. 388, as "80 inches; 6 feet 8 inches." Let us then consider if we can obtain our requirements by means of dew, which is produced in two ways; first, it is deposited on plants when by means of radiation they are made colder than the air, and thus condense the moisture in the air—a process not often taking place in our houses that contain a humid atmosphere, as nothing is so likely to stop radiation as the moisture in the air so contained. We are therefore driven to supply our dew in the warmer season in autumn, when the dew is warmer than the air, which condenses the vapour they give off. Should we, then, obtain this result by putting some nasty smelling stuff into the evaporating-pans? I say no, certainly not; trust to fermenting material, which, if nicely handled, carries with it no such annoyance to those who, either as visitors or workers, are obliged to remain within its influence, and by so doing you will feed your plants in a natural way. There is not the risk of over-watering them that attends feeding them with a watering-pot, watering them with manure water a little diluted, instead of water a little strengthened, as is too often the case; and I advise tanners' refuse bark, with a little stable manure added. Let me quote again from Professor C. Kingsley, at p. 388:—

"They must decay, very quickly, these roots, to leave their quite fresh graves thus empty; and, now one thinks of it, how few fallen trees, or even dead sticks, there are about. An English wood, if left to itself, would be covered with fallen timber; and one has heard of forests in North America through which it is almost impossible to make way, so high are piled up among the still growing trees dead logs in every stage of decay; nay, one has seen such a sight oneself in the high Silver Fir forests of the Pyrenees. How it is not the case here, I do not know, and how comes it, if you will look again, that there are few or no fallen leaves, and actually no leaf-mould? In an English wood you would have a foot—perhaps 2 feet—of black soil, renewed every autumn leaf-fall, and two or three inches of leaf-mould, so full of poison hunting in Himalayan forests among Deodars 150 feet high, and scarlet Rhododendrons 30 feet high, growing in 15 or 20 feet of leaf-and-timber mould. And here, in a forest equally ancient, every plant is growing out of the bare yellow loam as it might be, and so full of poison hunting in Himalayan forests among Deodars 150 feet high, and scarlet Rhododendrons 30 feet high, growing in 15 or 20 feet of leaf-and-timber mould. And here, in a forest equally ancient, every plant is growing out of the bare yellow loam as it might be, and so full of poison hunting in Himalayan forests among Deodars 150 feet high, and scarlet Rhododendrons 30 feet high, growing in 15 or 20 feet of leaf-and-timber mould. And here, in a forest equally ancient, every plant is growing out of the bare yellow loam as it might be, and so full of poison hunting in Himalayan forests among Deodars 150 feet high, and scarlet Rhododendrons 30 feet high, growing in 15 or 20 feet of leaf-and-timber mould. 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they tell us they are sure, from the appearance of our plants, that they get good nourishment somewhere, we feel pleased that they are so kind as to testify to the success of our system of growing them. Our experience of Orchid growing is that of all plants they are the easiest to grow; as they need only one treatment the year round; it is the clever people that kill them. The other day we were asked our opinion thus:—"A friend of mine has imported some Vandas and Phalenopsis from Borneo, and his gardener has hung them up in a cool, dry house. I said an Orchid-house should be moist and warm, but he said he was not going to kill them that way; what would you do?" We said, "How do they look?"—"Oh, like dry sticks."—"Then," we said, "they must have suffered from the voyage. Well, we should not think there was much advantage in prolonging that suffering after they are landed." I will try on a future occasion to write a few observations upon the question that, because some one has found an Orchid growing under certain difficult conditions, should we jump to the conclusion those conditions are an advantage to it? *G. H. [Pny do. Eus.]*

Hotwater Boilers.—For the information of your correspondent, "H. W. C." (p. 172), we beg to state that although our Patent Duxel Boilers are in operation at numerous private establishments in various parts of the country, the only public places where they have at present been adopted and can be seen at work are Canterbury Cathedral, the annual International Exhibition, South Kensington, and Miss Burdett Coutts' Columbia Market. Bethnal Green, either of which we would advise "H. W. C." to visit, and judge for himself. At the cathedral upwards of three miles of piping are in operation, and at the Exhibition over 10,000 feet of piping in one arcade. We have no desire to sing the praises of our own boiler, preferring that its merits should speak for themselves; at the same time we would recommend all who are interested, to see it and judge for themselves. *J. Weeks & Co.*

Draining Orchid Pots.—I have proved the following plan of draining Orchid pots (more especially for epiphytal species) to have a decided advantage over the ordinary method of filling the pots two-thirds or more with crocks, with a small pot at the bottom. I have made a narrow bottomless pot in the form of a circular drain pipe, which is perforated with holes at the top, and to which the drainage tubes are fixed. I have made of various sizes to suit the different sizes of pots. In using them I place one in each pot, and this usually reaches up to the bottom of the root-system, and forms, as it were, a seat for the plant. If the open space at the top is too wide for the plant, a convex piece of charcoal or crock is put across as an auxiliary or assistant rest; I then fill in around the drainer with broken crocks or charcoal, putting in as much as is necessary, and which amounts to barely one-half of what is used in the ordinary way. The pots when finished are consequently only about one-half their usual weight, and are much handier to move about. The advantages which I claim for this method of draining are—1, a greater number of healthy roots, produced all over the ball; 2, the compost used remains sweet for double the length of time; 3, water is applied with greater freedom; and 4, the tendency of the compost to become sour is all but obviated. The pots are stood upon the top of common flower-pot saucers, made without the bottoms, and with the half-circular pieces cut from the sides, which admits a gentle flow of air to the inside of the pots. These saucers also prevent the damp from the shelves from rising up and covering the pots with that unenviable green slime. *S. Mayfield.*

Mulberries for Orchard Houses (see p. 143).—Some years ago I potted a good sized tree, but it would not fruit; subsequently I procured from Mr. Rivers one of his well educated trees, which has borne so abundantly that I am obliged to thin out. Though the tree has the advantage of a little warmth, it is only the first ripened fruits that are good. The remainder have always been flavoured. Even the best, though more juicy, are less highly flavoured than those grown on S. W. wall. Where, however, a wall cannot be had, orchard-house culture is interesting. *Psidium Cattleianum* can be grown with very little heat. My plant on two occasions stood 36° without injury. I consider it inferior to the tropical Guavas. *S. B.*

Boilers and the Frost.—Living in a country in which the thermometer sinks sometimes as low as 20° below zero Fahr., I think it my duty to say, that the welded wrought-iron saddle boilers, manufactured by Jones & Sons, have proved very efficient. We have no less than seven of them here, and none under 5 feet long; one of these has stood a very hard trial this winter, inasmuch as it effectually heated a lean-to stove, 130 feet long, 24 feet wide, and 45 feet high, with 100 feet of piping. The boiler did the work so well that the person who has to attend to the fires never need retire to rest later than 11 o'clock at night. *G. Fox, Neudeck, Upper Silesia, February 7.*

Water Tank.—We have a cistern for soft water, which has been made for six years, but the water is very hard, so much so that we can scarcely wash clothes in it. The water runs off six cottages, which are slated.

Can anything be done to make it soft? *W. W. [What is the cistern constructed of? Does the water get sooty? Eds.]*

The Proposed Challenge Cup.—Mr. Marshall's explanation at p. 138 throws a great deal more light upon the subject than could be learnt from the first notice. Instead of a challenge cup, would it not be better to give a cup of, say, a third the proposed value in addition to the first prize each year? Then each successful exhibitor would reap in full the reward of his success as he went on. The great objection to challenge cups is that the thing goes on for an indefinite period without any one being able to secure it. (See p. 206.) The subject will require a good deal of ventilation before it will be got into working shape. Is it proposed to use a fresh lot of plants for every exhibition? or is there to be a fresh 20 procured by each exhibitor each year, and a portion of them used along with his older lot as he may require? To buy 20 plants and grow them on for three years, after deducting those that will die, does not leave a great margin to select 12 from a given class. And if the plants are to be used only once, what are exhibitors to do with them after, as they would soon be crowded up? Although I advocate mixed collections of large foliage and blooming plants as producing a more artistic effect, still, as this is to be a trial of skillful culture, only hard-wooded, stove, and greenhouse blooming plants ought to be admitted; and the numbers to be exhibited should not exceed 10 or 12, otherwise those who already have collections of plants in all sizes could not find room for those required for this class. Those who are willing to enter the lists should, as far as practicable, meet and arrange the conditions, as by that means it can be done much better than exclusively by correspondence. I can assure Mr. Marshall that I am not afraid of competing, and will at once enter if rules can be framed that will give a reasonable assurance of fair dealing. *T. Baines, The Gardens, Southgate House, Southgate, N.*

From the explanation which Mr. Marshall has given at p. 138, it appears that we have been at sea respecting the proposed prize, and I must confess that further explanation does not convince me, either of the propriety or desirability of the "challenge cup." On the contrary, I believe the money expended directly in prizes would do more good and produce a finer exhibition. For example: if A., B., and C., at the first exhibition go on and take a decided lead, it is more than likely that the seven tail-enders, seeing their chances of success gone, would decline further competition, and save their money. If the Council really wish to encourage the rising generation of plantmen, they must do so without bringing them into direct competition with established growers, and they must also open a wider field of competition. Collections of ten plants as examples of representative gardening are beneath the notice of a Royal Society; if this new feature is to be a telling one, collections of not less than 25 to 40 plants must be staged. Remaining easily enough the first catalogue that comes to hand, confine yourself to the best tribes of exhibition plants in the stove and greenhouse classes, and avoiding soft-wooded things and bulbs, what do we find?

Stove Plants.

Allamanda.	Eucharis.	Ixora.
Camellia.	Hebe.	Myrica.
Clerodendron.	Gardenia.	Rondeletia.
Combreton.	Gloriosa.	Tabernaemontana.
Dipladenia.	Hoya.	

None of these can be done without if collections are to be shown, and all are very desirable. Well, then, take greenhouse plants, selecting the most popular genera. These will be the following:—

Greenhouse Plants.

Acacia.	Dillwynia.	Lisianthus.
Acrophyllum.	Dracophyllum.	Oxylobium.
Adenandra.	Eriosema.	Pimelea.
Ardisia.	Episcia.	Podolobium.
Azalea.	Episcia.	Podolobium.
Boronia.	Genetlyth.	Roealia.
Burtonia.	Hebe.	Saxifraga.
Canthia.	Hebe.	Statice.
Chorizanthe.	Kalanchoe.	Tetranthera.
Cleomea.	Lagerflora.	Tropeolum.
Crocosmia.	Lecheanthia.	Zichia.
Daviesia.		

Here, then, we have 34 genera of greenhouse plants, and just that number of stove plants. It is not too much to say the whole of these families have been, and could be, represented again during the exhibition season, and why they should not be so, I know. Therefore, there is a field open for 25 or 30 stove and greenhouse plants—12 or 20 Heaths, and 12 Azaleas; and for smaller classes also, if we like to introduce them. Now, as an old plant grower, who has stood out of the competition ranks for many years, I must say I should feel ashamed to enter into competition with young hands. Therefore, for the promotion of superior cultivation among young exhibitors, I am sure it will be better that the old hands should compete by themselves; and I would call every man an old hand who has taken two first prizes in the class of stove and greenhouse plants. The private marking may well be abandoned. It would be an insult to the honest man, and no check to the dishonest one. I care not what the mark may be, it will be evaded. Every restriction of this kind, for upwards of 30 years, has failed, to my knowledge;

in fact you cannot make men honest by compulsion. Many, many years ago it was shown to exhibitors, that a certain man left his employer's residence in Hertfordshire with three plants in the van, but on the road he bought and borrowed up by the time he got to the show-ground in London, he was able to put up 20 decent plants and get a prize for them. He may exclaim, "Where are the police?" But in a case of this kind the police would be powerless. I therefore think Mr. Marshall's object will be best attained, and a new phase of competition be best served, by limiting the size of the pots. Thus, for the first season of competition, say the summer of 1873, the pots shall not be more than 12 inches in diameter; in 1874, 15 inches; in 1875, 18 inches; and at what time I will say that class of competition, but would be eligible for the senior class. It may seem strange that one who was the champion of the "one shift" system nearly 30 years ago should now counsel restriction. The fact is, we have seen what could be done with the large pot; I now want to see what can be achieved with pots of a limited size. *W. P. Ayres, Feb. 4.*

Raising Vines from Eyes.—I was particularly pleased on reading the short article on this topic (p. 138), from the pen of Mr. Simpson, to note that the *modus operandi* of propagation that he there recommends was not the result of just a year's experience, but presented the results of four years' labour. Singularly enough, a great Vine authority from beyond the Tweed has first recently put forth the system that Mr. Simpson has been in operation so long, as one of his own originations, having tried it one season. To gardeners in England it is therefore satisfactory to know that there are as able and expert cultivators of the Vine in the old country as there are in canny Scotland, and Mr. Simpson's short paper has appeared at a moment sufficiently opportune to enable impartial readers to judge for themselves as to whether propagating Vines by the aid of turves is or is not to be classed among the things that are not "new under the sun." *A. D.*

Lilies.—Amongst a fine collection of Lilies sent home from Japan, by Captain Suttie, of which several have flowered, are those three which I named at p. 77. It may be that the *L. Thunbergianum punctatum* is not correctly named by me, but being so different from the type, and moreover distinct from any of the drawings sent with the collection from Japan, I concluded that it was a new variety. I send a first year seedling which I think will be the *L. Thunbergianum punctatum* at any rate it answers in character to the name. I could not say if it has a synonym, and regret that I cannot satisfy Mr. Wilson's wish. I am quite familiar with the *L. Thunbergianum* of gardens. At the old towns of Dreux, Houdan, and others south-west of Versailles, I have seen it in quantity. At the first-named town, an old favourite place of Louis Philippe's, in whose private chapel wall it seen, to all appearance, the model of the tomb of Napoleon, in the old-fashioned garden of the chateau there were to be seen clump upon clump of the fine old *L. candidum*, and a very small upright yellow Lily, which I took to be croceum. *L. tigrinum*, too, was in great quantity. In this region of France Lilies are to be seen in every bit of garden, ever so small, and extraordinarily fine and sweet they are when in flower. I should like to see our flower borders with a few more of these fine Lilies, and fewer of our coarse, straggling types. I am sure I am much obliged to Mr. Wilson for his confirmation of what I anticipate the Double Tiger Lily will be namely, a first-class border flower. *H. Knight, Floors.*

Leptosyne maritima.—This plant is the old Tuckermanna, of Nuttall. It is very showy, free, and sweet-scented, and will continue to bloom for a long time. It is perennial with protection, but will be grown here only as a half-hardy annual. *W. T.*

Late-Keeping Grapes.—I was very much impressed with the leading article at p. 135, on late-keeping Grapes. In many points I entirely agree, but how you are to get late-keeping Grapes, I do not know. I saw late Vines early in February, and a problem which I am at present unable to solve. Supposing such to be the case, the Vines would have to be pruned at least early in January, at which period they can scarcely be called late; and I for one do not believe in either Lady Downe's or Barbossa all the time a good Black Hamburgh is to be had, and with very little trouble it may be had in good condition later than the first week in January. Will I call late, as the Grapes are those which hang sound and plump till March and April; if these late Grapes have to be cut early in January it entirely destroys the only quality they have to recommend them, viz., late keeping. For the last four years I have been enabled to belt the whole year round with good plump Grapes, and two years ago I exhibited some Lady Downe's at Bath, at the May show, which bore favourable comparison with the Black Hamburgh. I am sure that if I had my experience goes, Lady Downe's is the best late-keeping Grape yet before the public, and I am bound also to say that the best bunches I ever saw were at Combe Abbey, in the autumn of 1869; perhaps Mr. Miller will be kind enough to enlighten a few of us with his experience, about what time he considers they ought to be started. I have never been able to say anything in favour of Barbossa; I always found it

bad, and the longer it was kept, the worse I found it: no doubt if started early its flavour would be improved to some extent, but to start it at the time you recommend, I maintain that for practical purposes it cannot be called a good late-keeping Grape; perhaps others with greater experience may think differently. I will therefore conclude, and class myself with the uninitiated. *A. Johnson, Saverne.*

Plants on Lawns.—I can fully confirm Mr. Gardiner's views respecting the inadvisability of using oil of vitriol to destroy Plants on lawns. I, too, tried it some 12 or 14 years ago, and, armed with a bottle of the acid, poured it through a quill in the cork on the noxious weeds. After a short "fizz," the leaves curled up and withered, and the plant was, to all appearance, dead. The only drawback to my satisfaction was, that in a very short period, I forgot exactly how long—at least, I forgot how long Plants appeared in the place of the one destroyed. I soon gave up the use of vitriol, and reverted to the spud. *W. V. Spicer, Devizes.*

Potatoes.—I deem this by much the most important produce of our gardens, more especially of those of the poor. I can remember the remarks of Mr. Wynne, at p. 173, on the excellence, both as regards crop and quality, of Paterson's Victoria. I was induced, on good authority, to purchase some at a high figure for planting when first introduced about five years ago, and I have continued the same stock to the present time, as far as the best and most reliable Potato from October up to July that I have ever met with. It has hitherto resisted disease with me; and although my present stock is as fine as ever, and on an occasional change of seed from different soils desirable, and I have recently obtained seed for planting this season from Mrs. Paterson, at a very moderate price per cwt. *Charles Lawrence, The Queens, Cirencester.*

Societies.

ROYAL HORTICULTURAL: February 14.—Anniversary.—H.S.H. Prince Teck, in the chair. After the minutes of the last annual meeting had been read and signed, Dr. Masters and Mr. Booth were appointed the members of the Council for the ensuing year, and officers for the ensuing year. These gentlemen subsequently reported that the nominees of the Council had been elected by a large majority of votes, namely, James Bateman, Esq., F.R.S., E. J. Lowe, Esq., F.R.S., and John Kell, Esq., in the Duke of Andrew's Park, Esq., Sir Edmund Rucker, Esq., F.R.S., and A. T. Thomson, F.R.S.; while the Duke of Buccleuch, John Clutton, Esq., and Lieut.-Colonel Scott, R.E., were respectively re-elected as President, Treasurer, and Secretary; W. S. Saunders, Esq., F.R.S., S. Rucker, Esq., F.L.S., and John Clutton, Esq., being appointed Expenses Committee.

His Serene Highness, before calling upon the Assistant-Secretary to read the annual Report, said that the work which the members of the Council and office-bearers undertook last year, and the manner in which they had performed their duty, was so well set forth in the Report, that he would not intrude upon the time of those present by referring to the subject. He could not, however, refrain from expressing his gratification at presiding there for the first time, especially as he saw that the future of the Society will undoubtedly be bright. The finances are increasing, and there has been, and is, a continuous progress in that work which is the special mission of the Society. This year, besides, brings us all into one of those international contests which lead, not to the destruction of the precious, but to the nurture of the good; the protection of that life which is based upon fruits and flowers for the sustenance, the delight, and the enjoyment of mankind.

After Mr. S. H. Godson had directed the attention of the Council to a little irregularity in the election, as a member of the Expenses Committee, of a gentleman who was not on the Council; the Assistant-Secretary read the Report of the Council, from which we make the following extracts:—

"The Council have the satisfaction of announcing to the Fellows that a considerable improvement has been effected in the financial position of the Society since the last annual general meeting. They can also give you the satisfaction of the horticultural work of the past year and of the promise of the present one; they have again to report an increase in the number of Fellows.

The actual amount of subscriptions received is about the same as in 1869 and 1868, the former year being £713; in 1869, £7193; and in 1870, £7177. The receipts from exhibitions during the past year were higher than in 1868 or 1869, and the Council have the pleasure of reporting that, notwithstanding the greatly increased amount of show and display, the Society has not only been said to be self-supporting. After a trial of two years the Council see no room for improvement in their established arrangements, excepting in matters of detail. These arrangements appear to be satisfactory, both to the Fellows and to the public, since the Society has been financially successful, and are adapted to the exhibition of the progress of horticulture throughout all the seasons of the year, it may be safely assumed that they are more conducive to the advancement of the objects of the Society than those which they have supplanted.

The country show at Oxford was the least successful, from a financial point of view, of those hitherto held. The Council are, however, not discouraged by this solitary instance of a slight loss on these valuable endeavours to increase the Society's usefulness and popularity. It is this show is at Nottingham, and if any opinion can be formed from the interest there felt in the visit of the Horticultural Society, the Nottingham Show will mark

a new step in the career of usefulness, on which the Society entered when it undertook the system of holding annual country shows. This, too, is the first instance in which the Society, accepting the invitation of a locality, has ventured to leave the support which the presence of the Royal Agricultural Society was supposed to give, and to trust to its own efforts and attractions for securing a sufficient number of visitors to render the exhibition self-supporting. The Council are happy to report that the zeal of the horticulturists of Nottingham, and that strong feeling of local culture which has rendered this town so celebrated, has already raised the special prize fund to no less a sum than £500.

"The bequest of £2000 left to the Society by the late Mr. Alfred Davis, has been invested in consols. One of the conditions of the gift was that the proceeds of the sale of the consols should be applied to the use of the Society. In accordance with this condition the Council have determined to apply the first proceeds from the interest of the bequest to the purchase of a challenge cup, to be called the Davis Challenge Cup, to be won for a certain number of years as a stimulus to culture. The terms of competition will be published shortly.

"The Scientific, Fruit and Floral Committees continue to do good service to horticulture, and that of the most valuable kind. The Council much regret that the accounts published of their proceedings are so few, and that the Society seem to be little appreciated by the great body of the Fellows. This is doubtless in some measure due to the fact that their contents are necessarily anticipated by the horticultural journals, but whatever cause, the Council are desirous to remedy. It is justified, entering upon additional expenditure, in order to secure a more rapid publication of information, which can readily be obtained at a trifling cost by those who watch the proceedings of the committee with interest. The publications of the Society prove to be chiefly valuable also to communicators and exchange with societies and individuals abroad. The Council fear that, having regard to the interests of the large majority of the Fellows and the limited means of the Society, they have not yet found the best mode of employing the funds which can be devoted to the publication of their proceedings. The subject will occupy their earnest attention during the present year.

"The collection of Economic Entomology continues to make progress, and the thanks of the Society are due to the Fellows and friends who have contributed to it. One of the latter (who desires to be anonymous) has offered a sum of money in prizes for the best collection of entomological objects. The nature and arrangement of the objects to be submitted in competition are to be defined by the Council, and they now have the pleasure of justifying their confidence in Mr. Andrew Murray, who has also undertaken to give six lectures during the coming season on Economic and Forest Entomology. Due notice will be given both of the dates of these lectures and of the terms on which the prizes are offered.

"The most important question which is treated in the Report of the Council to the last annual general meeting was that of the Chiswick Garden. In this case also the increase of rates and taxes pressed very heavily, and these, coupled with a large rental and the working expenses of keeping up a garden far more extensive than that which the present requirements of the Society, had, indeed, become so heavy as seriously to cripple its resources. The Council, therefore, distasteful as they knew such a step would be to many of the Fellows, whose wishes and opinions they had to treat, and that the wisest plan would be to endeavour to obtain a small working garden in a purer atmosphere than that of Chiswick, at some distance from London. The annual general meeting having left the question to the decision of the Council, they proceeded to prepare a plan, and whilst engaged upon them his Grace the Duke of Devonshire, in a most liberal spirit, expressed his readiness, if the Society chose to remain at Chiswick, to accede to an arrangement for the renunciation of the lease of a portion of the garden, and accordingly a new agreement was entered into with his Grace, by which the garden is reduced from 32 acres to less than 12, and the rent has sustained a corresponding reduction. The Council are of opinion that the thanks of the Society are due to the Duke for his liberality in this respect, and to the Duke both in respect of rent, and the terms on which the renewed lease is granted. These terms leave to the Society the option of relinquishing Chiswick whenever they shall judge it conducive to the success of its operations to seek another garden. The Council are indebted to the Duke for the receipt of thanks to his Grace.

"An immediate consequence of the reduction of the space under cultivation at Chiswick, has been a reconsideration of the principle on which the collections of fruit trees should be maintained. The original idea was to keep up a collection of all the kinds of fruit trees admitted of cultivation in the English climate, and it is believed that at one time it was nearly, if not quite, a perfect one. Of late years, however, the increase of varieties has been so rapid, especially on the Continent, that it has for some time been impossible to preserve the collection in its presentness, and a very large proportion consisted of inferior kinds rarely or never cultivated. The advisability of keeping worthless kinds had been often questioned, and the moment the collection ceased to have pretensions to completeness, the Council determined to preserve the condemned kinds vanished. The Council believe that their action in having weeded out, under the advice of the Horticultural Directors, all those varieties which were unworthy of cultivation, will meet with the general approval of the Society. The proportion of the preservation of the best kinds has been effected, partly by transplanting and partly by grafting, with the success which usually attends the skill of the superintendent, Mr. Barron. Similar success has attended the removal of the hardy perennials, and the plants of the garden have been so arranged that some new borders flanking the great conservatory are devoted to them, and new varieties are solicited from the Fellows. The exten-

sive collections of bedding Pelargoniums has also been preserved.

"In accordance with arrangements which have been contemplated since Mr. Eyles has, with a degree of success highly commensurate with his own position, the profession of a practising landscape gardener, that office of will this year cease to be the superintendent of the Kensington Garden, but he will still remain with the Society as the superintendent of exhibitions, a duty which is quite compatible with the progress of the profession, and which will still remain at a resident, the grounds of the Society, and exercise a general supervision over them in the absence of Mr. Barron, who will continue to reside at Chiswick, and undertake the superintendence of both gardens.

"The Council cannot omit from their Report the expression of their expectation that the Annual International Exhibition, to be opened on May 1 next, under the direction of Her Majesty's Exhibition Commissioners, will tend greatly to the progress of the Society's operations. The unfortunate circumstances which have attended the present moment must necessarily interfere materially with the horticultural competition which might otherwise have been expected from that nation, but both Holland and Belgium intend to do their best to contest the prize for successful culture with the British nation, notwithstanding the disadvantage which they must labour from the difficulties of transit to this country.

"It is perhaps unnecessary to remind the Society that its Fellows, by the arrangements entered into with the Commissioners, have the privilege of visiting the Exhibition for nothing, and that the price charged to the public. These tickets will admit both to the Fine Art and Industrial Galleries on each side of the gardens, and to the daily musical performances in the hall during the continuance of the Exhibition. The following mention in the terms of arrangement with the Commissioners respecting the use of the arcades, being more favourable to the Society than the original propositions, the Council had no hesitation in concurring in it.

"Her Majesty's Government now propose that the Society should retain the North Arcades, thus preserving their present and more convenient means of access to the conservatory, and should give to the Commissioners instead the exclusive use of the Eastern and Western Arcades, which would be covered by the expense of the erection of a light trellis-work fence. The covered communication over the North Arcades, which has been erected by the Commissioners, in compliance with Article 1, would then be used by them as a means of access to the Royal Albert Hall, and to the wings of the Exhibition, and the communication being completed by means of a passage along the back part of the gallery of the conservatory.

"As the Commissioners have acquired from Her Majesty's Government the temporary use of the South Arcades, they also propose, as a part of this new arrangement, to construct a passage beneath the council-room of the Society, and thus to complete the circuit of the gardens.

"With reference to Article 8 of the terms of arrangement, securing to the Fellows of the Society the exclusive use of the portions of the annexes as are not required by Her Majesty's Commissioners, the development of the Exhibition will necessitate the occupation of the whole, or nearly the whole, of the annexes, and that, consequently, the Commissioners would be enabled to grant to the Society, to the extent, the privilege originally contemplated. On the other hand, Her Majesty's Commissioners propose (but without binding themselves to a course which might prove very detrimental to the success of the Exhibitions) to make the experiment of curtailing the use of the annexes, and the development of the Exhibition was provided for in the original arrangement, by making an extra charge for admission thereto. The effect of this measure would obviously be to secure to the Fellows of the Society a much greater degree of the quiet which they have hitherto enjoyed, than they would retain if the gardens were to be thrown open to every visitor to the Exhibition.

"The Council desire, in conclusion, to record their satisfaction at the successful completion of the Royal Albert Hall, in which a large number of the Fellows of the Society are shareholders. They are informed that Her Majesty has announced her intention of opening it on the 26th March next."

In the discussion which ensued upon the reading of the Report, the following speakers took part:—Col. Chalon, who, after having observed that on the whole, the Report was satisfactory, but the Fellows ought to know a little more about the finances of the Society; and he would therefore ask those gentlemen who had charge of the finance department what was the real position of the Society? In 1869, he said, £723,271 was the balance against them, and at the present moment they had nearly the same amount of liability. He also wished to know whether the account from January to December included the ordinary expenditure of the Society, and the account showed the absolute expenditure during the year, and that the item of £1502 for liabilities on current account showed the liabilities at the present time.

Colonel Chalon said he should like to see the finances of the Society in the same appearance as his banker's book—assets on one side, and liability on the other, and asked if the expenses for the year of the Society, including those of Chiswick garden, amounted to £12,189? Upon being informed by Col. Scott that such was the case, [less £1331 balance of 1869] he would be said he felt that the Council would carry out the wishes of the Fellows in the best and most economic way, and he had, therefore, much pleasure in moving the adoption of the Report, which was seconded by Mr. G. F. Blenkins.

Mr. Bateman said he could not but feel that the platform was in the room that in addressing the few remarks he was about to make, he was influenced by no hostile spirit. Referring to the bargain they had made, and the terms they had received from Her Majesty's Com-

reported on at a future time. From E. J. Lowe, Esq., came some very curious varieties of Ferns, and from Messrs. Lucking Brothers, a series of bouquets.

Fruit Committee.—G. F. Wilson, Esq., F.R.S., in the chair. Mr. Gilbert, gr. to the Marquis of Exeter, Burchleigh, Stamford, sent a specimen of the Montserrat Pine-apple, and Mr. Chilmann, gr. to Earl of Northampton, Sovereign Garden, Kingston, forwarded small examples of the Black Jamaica, to ascertain if they were identical. Mr. Gilbert's specimen weighed 5 lb., but the Committee did not consider that it was the true Montserrat, and only one of Mr. Chilmann's examples was recognised as the true Black Jamaica. The Committee decided to offer prizes for Pine-apples at a future meeting, for the purpose of bringing the different varieties before them, so that the nomenclature, which was at present very faulty, could be definitely settled. From T. Laish, Esq., Stamford, came six dishes of Apples in excellent preservation. They had been kept singly on deal shelves in a cellar, eye downwards, and covered with newspapers, which goes to prove that fruit could be kept for a considerable time in underground places where very little air is admitted. Mr. Laxton also sent a seedling Apple, raised from Stamford Pippin crossed with Golden Noble, which was commended. Messrs. Backhouse & Son, York, again sent examples of the Galloway Pippin, which, upon being reported favourably upon by the sub-committee, appeared to try its merits as a culinary Apple, was awarded a First-class Certificate. E. J. Lowe, Esq., Nottingham, also sent a seedling Apple raised from Bess Poul, bearing a strong resemblance to its parent, and said to be a better keeper, but it was not considered superior to the older and better known kind. Signor Donato Piccitello sent dishes of Bergamo, Limeau, and Naples Lemons grown at Portici, and received a Special Certificate. The same award was also made to Mr. Gilbert for a good collection of well-grown Potatoes. Prizes were offered for competition for the best three dishes of Dessert Apples, and the following were the winners: Mr. Garland, gr. to Sir T. Dyke Acland, Bart., Killerton, Devon, took the 1st prize with finely flavoured examples of Cox's Orange Pippin, Cornish Gillyflower, and Ribston Pippin; Mr. Parsons, Danesbury, coming with Cox's Orange Pippin, Ribston Pippin, and a variety bearing considerable resemblance to the Canada Reinette. Mr. Cox, Redleaf, sent four very good collections, comprising the best of the well-known kinds; and Mr. Parsons, Fairlawn, Acton sent: Mr. Saul, Stourton; Mr. Smees, Carnarvon; Mr. Miles, Wycombe; Mr. G. W. Welford, Fairlawn; Mr. Earley, Valentines; and Mr. Stevenson, Leigh Hill, Essex, also competed with very meritorious exhibits. In the class for Pears, Mr. Garland was again placed 1st; Mr. Miles, gr. to Lord Carrington, receiving second honour. The 1st prize dishes coming the Colmar, Bergamotte d'Esperen, and Easter Beurre; Mr. Miles had the latter variety, Beurre Rane, and Knight's Monarch. Mr. Sage, gr. to Earl Brownlow, Ashridge, also competed, showing in his collection the best dish of Easter Beurre that has ever been brought before the Committee. Unfortunately his other dishes were past their best, or the former would have carried him through successful.

Miscellaneous.

DURATION OF PEARS ON THE QUINCE STOCK.—Whenever I have seen Pear trees of a mature age, and I have looked to the stock to ascertain its nature, and whether it was Pear or Quince or Whitehorn, for I have known some healthy free-bearing Pears grafted on to the latter. It happened lately to pay a visit to the beautiful grounds of the Deepdene, near Dorking, and in the kitchen garden I observed a number of fine pyramidal Pear trees; these I soon found to be worked on the Quince, and Mr. Whiting, the experienced gardener there, informed me that they had been planted about thirty-four years; they are very healthy, and are growing in a soil of the driest and lightest description, being nearly pure sand; the trees were imported from France. Now, presuming them to have been three years (the usual age) when planted, they are now nearly forty years old, and most certainly appear as if they would live and grow and bear fruit for twenty years to come. In the gardens of the Horticultural Society at Chiswick, there are fine healthy trees more than forty years old. A light porous soil resting on a cool subsoil is, I have reason to believe, the most favourable for Pears on the Quince stock, so that, if the soil of a garden which the gardener wishes to be heavy and stiff, they should be planted in a light compost.

SELECT DESSERT PLUMS.—Plums may be cultivated as standards in orchards, as trees trained to espaliers, as espaliers trained to rails, as pyramids or dwarf bushes, and in pots in the orchard-house. The Damsons and hardy varieties succeed well as standards. Some of the finer varieties require a wall, even in the southern counties of England; but their fruit is generally of a finer character from trees in the open borders. N.W. or W. S.E. or E. aspects are very well suited. For very early Plums, a tree or two of the earliest kinds, such as Early Favourite, should be planted against S. or S.W. walls; they will give ripe fruit early in July. When cultivated as a pyramid, the Plum tree is a beautiful tree. In small gardens, pyramids should be lifted biennially; this gives them a proper check, and makes the trees abundantly fruitful; but this is not so much the case, even for large gardens much exposed to the sun, growing on a gravelly soil, of cultivating the Plum than as a bush. The biennial removal recommended for pyramids should be adopted; and they then soon become pictures of fertility. For pot culture in orchard-houses, Plums succeed admirably; and late sorts, that ripen with difficulty in cool

climates, arrive at great perfection, hanging on the trees till November, and shrivelling so as to become like a sweetmeat. *Rivers' Fruit Catalogue.*

THE WEATHER.

STATE OF THE WEATHER AT BLACKHEATH, LONDON, FOR THE WEEK ENDING WEDNESDAY, FEBRUARY 15, 1871.

1871. MONTH AND DAY.	AT 9 A.M.						
	Reading of			Hyrometrical Deduction from Glaisher's Tables, 5th edition.			
February.	Barometer reduced to 32° Fahr.	Dry Ther- mometer.	Wet Ther- mometer.	Dew Point.	Degree of Humidity.	Weight of Vapour in a Cubic Foot.	
9 Thurs.	30.77	41.3	38.0	35.8	82	7.4	9.4
10 Friday	29.99	39.0	36.0	33.0	85	6.0	7.2
11 Satur.	29.95	38.7	35.6	32.6	86	5.9	7.1
12 Sunday.	29.95	36.8	35.0	32.0	86	5.0	7.1
13 Monday.	29.99	36.7	34.0	31.0	85	5.0	7.1
14 Tues.	29.99	42.8	40.3	37.3	92	9.2	11.0
15 Wednes.	29.99	43.3	42.5	41.5	94	9.4	11.0

1871. MONTH AND DAY.	TEMPERATURE OF THE AIR.					WIND.		RAIN. In Inches.
	Highest.	Lowest.	Range in Day.	Mean.	Direction of Wind.	Force.	Horizontal Motion.	
9 Thurs.	47.3	38.4	8.9	42.7	+ 3.3	N.W.	420	0.00
10 Friday	46.0	35.5	10.5	40.7	+ 1.1	variable	305	0.00
11 Satur.	46.0	35.5	10.5	40.7	+ 1.1	E.N.E.	290	0.00
12 Sunday.	46.3	35.1	11.2	40.7	+ 1.1	S.W.	250	0.01
13 Monday.	46.7	35.1	11.6	40.9	+ 1.1	N.W.	250	0.01
14 Tues.	46.2	34.8	11.4	40.5	+ 1.1	S.W.	250	0.00
15 Wednes.	47.5	38.1	9.4	42.4	+ 4.3	SSW:	300	0.00

Feb. 9.—Generally cloudy till night; then cloudless. A fine day.
 10.—Overcast till noon; then cloudless. Very fine.
 11.—Overcast throughout. Thin rain fell occasionally.
 12.—Variable till the afternoon; then cloudless. A very fine day. This rain fell in the morning.
 13.—Generally cloudy till night; then cloudless. Generally fine.
 14.—Cloudy till night; then very fine. A little rain fell in the morning.

TEMPERATURE OF THE AIR AND FALL OF RAIN AT DIFFERENT STATIONS, DURING THE WEEK ENDING SATURDAY, FEBRUARY 11, 1871.

NAMES OF STATIONS.	TEMPERATURE OF THE AIR.									
	Highest.	Lowest.	Range of Week.	Mean of all High- est.	Mean of all Low- est.	Mean Daily.	Mean Daily.	Mean.	FALL OF RAIN.	Inches.
Portsmouth	55.2	24.7	31.0	53.4	34.4	43.9	18.7	43.4	0.58	0.72
Bristol	55.1	25.0	30.7	49.0	37.5	43.3	18.7	43.4	0.58	0.72
Birmingham	55.8	24.8	31.0	53.4	34.4	43.9	18.7	43.4	0.58	0.72
Wolverhampton	55.8	24.8	31.0	53.4	34.4	43.9	18.7	43.4	0.58	0.72
Leicester	55.8	24.8	31.0	53.4	34.4	43.9	18.7	43.4	0.58	0.72
Nottingham	55.8	24.8	31.0	53.4	34.4	43.9	18.7	43.4	0.58	0.72
Sheffield	55.8	24.8	31.0	53.4	34.4	43.9	18.7	43.4	0.58	0.72
Salisbury	55.8	24.8	31.0	53.4	34.4	43.9	18.7	43.4	0.58	0.72
Bradford	55.8	24.8	31.0	53.4	34.4	43.9	18.7	43.4	0.58	0.72
Leeds	55.8	24.8	31.0	53.4	34.4	43.9	18.7	43.4	0.58	0.72
Hull	55.8	24.8	31.0	53.4	34.4	43.9	18.7	43.4	0.58	0.72
Newcastle	55.8	24.8	31.0	53.4	34.4	43.9	18.7	43.4	0.58	0.72
Edinburgh	50.7	35.0	15.7	42.8	35.3	39.1	18.7	43.4	0.58	0.72
Glasgow	50.7	35.0	15.7	42.8	35.3	39.1	18.7	43.4	0.58	0.72
Dundee	50.7	35.0	15.7	42.8	35.3	39.1	18.7	43.4	0.58	0.72
Aberdeen	46.2	32.9	13.3	40.1	32.9	36.5	18.7	43.4	0.58	0.72
Fairley	46.2	32.9	13.3	40.1	32.9	36.5	18.7	43.4	0.58	0.72
Greenock	46.2	32.9	13.3	40.1	32.9	36.5	18.7	43.4	0.58	0.72
Leith	46.2	32.9	13.3	40.1	32.9	36.5	18.7	43.4	0.58	0.72
Dublin	46.2	32.9	13.3	40.1	32.9	36.5	18.7	43.4	0.58	0.72

JAMES GLAISHER.

Garden Operations.

(FOR THE ENSUING WEEK.)

PLANT HOUSES.

Orange trees should now, in all instances where they have not been recently potted, have the old soil removed from the surface of the old balls, and replaced by a good surfacing of thoroughly enriched compost in its place. Where stores of the best materials for potting, &c., are kept in stock, as they always should be, use should be made in this instance of thoroughly decayed coddling and decomposed fibrous peat, beaten very small and well mixed together. If any delay has occurred in the matter of cleansing the foliage of all such subjects, let this be undertaken and brought to a close at once, for already there is some risk of injuring the embryo buds, which are assuming a state of activity. Though we are merging into a somewhat warmer period, when more uniform waterings and air in more abundance are required in glass structures, we must not permit ourselves to believe that we are free from frost, and get careless in the matter of watchfulness and attention regarding the fires. Frequently during the latter portion of this month and throughout the next, a bright cloudless sky is the harbinger of a severe frost by night. Therefore keep the fires always laid ready with combustible material of the most active kind, so that the moderate amount of artificial warmth required may be expeditiously afforded should appearances denote frost. I refer specially to these matters,

because I know that in a majority of instances when the frost most successfully assails us, it is either in the late autumn or early spring months that it so happens. *Camellias*, which have ceased to flower, or such as have not yet expanded their blooms, should receive periodical dampings overhead with the hand-syringe early in the day. Look carefully through all stocks of *Zedding Plants*, taking cuttings where an increase is required, and simply pinch back the joints of all those which are likely to be improved by assuming a more bushy habit. Continue to remove all casually decaying leaves or branchlets, keeping all internal surfaces as fresh and neat as possible.

FORCING HOUSES.

In the hope of soon having brighter weather, a slight advance of heat may again be made in *Vineries* in proportion to the now increasing daylight. Those who have *Vines* in flower must maintain as rarified and buoyant an atmosphere as possible at the time of the expansion of the flowers, and when the subtle pollen is ripe for the process of fertilisation. Apply superficial sprinklings, and where an amount of moisture according to the brightness of the weather, taking care, now that the sun has attained to goodly power, not to cause too much moisture to pervade the structure, without a commensurate amount of air at the time when the sun is at its height, as real injury often accrues from this cause without its being seen at the time. *Pines* which are now fruiting will grow on rapidly if a good amount of bottom-heat and a moderate amount of rapid water are afforded, which may now be done more safely in connection therewith. Bear in mind, however, that what would be considered very moderate waterings for most other plants may prove an excess for *Pines*, even at such a stage of activity. The Pine-apple habitually thrives in an open, fibrous, moderately dry soil. To afford an excess of water at this particular season, which is so fluctuating in character, would most assuredly not be good treatment. Besides, in watering the whole tree, at whatever stage they may be in the matter of growth, it is necessary to reflect that as the pots are plunged in damp tan so are they capable of absorbing moisture through the sides of the highly porous pots. Moreover the grower possesses a complete antidote against any unlooked for dryness by his power of recharging the air with humidity. Slide the back lights down moderately on all forcing-houses at any time now should the sun shine brightly, and during the whole of the day, during sunless intervals, and at an early hour in the morning, remove successional batches of *Strawberry plants* into the forcing-pit, and other preliminary structures every 20 days or so; give to these a most liberal regimen when once the flowers are set and the fruit swells perceptibly.

HARDY FRUIT GARDEN.

Make preparations for grafting any special varieties of fruits, as the sap will quickly begin to flow actively, when the operation should be performed at once. Though March is the month when it is recommended that this kind of work should be done, it is often preferable to do it soon after the 20th of the present month. This when mild periods follow severe frosts, and kinds of early spring is anticipated. Cuttings of the kinds of buds which may now be secured, and dibbled into any vacant piece of ground. Choose straight long shoots, of last year's growth, of all sorts of *Gosberries* and *Currants*, whether black, white, or red varieties, each having a small base composed of older wood neatly and smoothly trimmed off. Cut them to something like 15 or 18 inches in length, placing them in rows moderately deep, or one-third their length into the ground; here they will soon root in pure bushy young plants. Finish all pruning work in connection with hardy shrubs, and it is time that all *Hedger*, such as *Hornbeam*, *Beech*, *Privet*, *Whithorn*, &c., should be finally put in order.

KITCHEN GARDEN.

Now that better weather may be looked for, bring up all arrears in this department with despatch. Sow small quantities of *Radish*, *Turnips*, *Carrots* (French Horn), *Leeks*, &c., on a warm sunny aspect. Plant succession *Pas* and *Broad Beans*, and the main crop of early *Potatoes* in gardens. Well manure and fork deeply around crowns of *Globe Artichokes*. *W. E.*

Notices to Correspondents.

ADVERTISEMENT: J. W. Send name and address to the publisher.
 ASTELMA EXIMUM.—A lady is desirous of obtaining seed of this very handsome Everlasting. Can any one inform us where it can be obtained?
 CAMELLIAS: J. S. Camellia buds are exceedingly sensitive. No doubt "nauseous smoke from a fire," which damages the leaves of Primulas, would very much affect the buds of the Camellias. The buds often fall from dryness at the root, or indeed from almost any sudden change.
 EDGING PLANTS: S. M. Cerastium tomentosum. You can increase it to any extent, by cuttings, in any cool place, or, if you have it to divide, by division, much better than from seed, even if the latter is procurable.
 INSECTS: J. E. H. Your Beans are infested with the *Eruchus flavimanus*, the eggs of which are deposited in the Bean when very young; the beetles will gnaw a round hole as soon as warm weather comes, and make

Society, Farmers' Club, and Chamber of Agriculture, have been communicated with so far as they were known. The members of the principal agricultural bodies have also been written to, and the Chairmen of Boards of Guardians have, in a large number of cases, at the request of the committee, undertaken to distribute collecting books to the members of the several boards. A committee of the Mark Lane corn-merchants has been formed to co-operate with the Central Committee, and it is hoped this example will be followed on most Corn Exchanges of the kingdom.

The Great Western and the Great Eastern Railway Companies have very liberally offered to convey gratis over their lines, *en route* to Mr. ODAMS' wharf, all donations in corn and seeds, bearing the official labels of the French Peasant-farmers' Seed Fund, which labels will be forwarded on application to the honorary secretaries. The South-Western, South-Eastern, and the London, Chatham, and Dover Railway Companies, have undertaken to convey, carriage-free, specified quantities of grain and seeds to certain French ports; and the Great Eastern Railway Company has granted free transit to Antwerp *via* Harwich.

The committee have received valuable information as to the urgent wants of several of the districts of France most devastated by the war. The quarter the nearest, and which can be most promptly succoured, is the Department of the Somme, of which Amiens is the centre, and round which, with varying success, the contending armies have been engaged. The country has been cleared of corn and fodder, and the small farmers have no seed left to sow, and many of them no means to purchase it. A depot has been formed at Boulogne, under the charge of General Sir VINCENT EYRE, K.C.B., who has the charge of the Sick and Wounded Fund in the north-west of France. Through Sir VINCENT EYRE the committee have been placed in direct communication with the President of the Chamber of Agriculture at Amiens, who has furnished the most ample details of the extent of land in that district requiring seed, and the kinds of seed immediately needed. The extent is far beyond the present means of the fund, but the committee have resolved at once to make a beginning; and as spring Wheat is the kind of corn most anxiously desired, and is still in time for the present season, they have made arrangements for forwarding in the present week 1200 bags of that seed, which they trust will be in course of distribution in the next ten days. A corresponding assignment of the like quantity has also been ordered, and will doubtless arrive at Boulogne in time to keep the establishment well supplied. Mr. SARTORIS, who has already had experience in the distribution of the Sick and Wounded Fund, has most kindly placed his services at the disposal of the committee, and has already proceeded to France, where, in conjunction with Sir VINCENT EYRE, he is making arrangements for personal examination of the districts and due verification of the claims of the peasant-farmers, the means to be adopted for this purpose being as follows:—

On arriving at Amiens, Mr. SARTORIS will communicate with M. DE CHASSEPORT, the President of the Amiens Chamber of Agriculture, with whose assistance he will form committees in each commune, consisting of (1) the Mayor, (2) the Curé or the Schoolmaster, (3) the Président du Comice Agricole, or the Président de la Société des Agriculteurs of the district, and (4) such other persons as may be deemed desirable.

Each committee will be furnished with tabular forms, to enable them to show, (1) the name of the peasant, (2) his total acreage, (3) his requirements for each crop that he usually cultivates. This return will be certified by each member of the committee, and Mr. SARTORIS will further check it by taking a name here and there, thus verifying the return.

Mr. SARTORIS is also in personal communication with General VON GOEBEN, the Commander of the German army in the North of France, who has given orders to his officers to ensure the safety of the grain in the district around Amiens during the Prussian occupation of that part of France.

Up to the present time the committee have limited their consignments to spring Wheat, that being the kind of seed most requisite at the present time, as its seed-time is earlier than that of any other spring crop, while the value of its harvest as food for the people cannot be overrated. The committee hope to follow with Oats and Barley, Clovers and Grasses, Potatoes and

Turnips, in the order in which they require to be sown. It is particularly desirable not to lose sight of the desirability of supplying the peasant farmers with means of obtaining forage crops, which will enable them to maintain a cow, and, by selling butter in the neighbouring towns, to provide themselves with food until their harvest can be reaped. Buckwheat and garden seeds will also be sent in due season, if funds will permit.

The committee have determined that seed shall be given in comparatively small quantities to each applicant for assistance, as the object for which the fund has been raised is to keep impending starvation from the door of the peasant-farmer who has no other means of obtaining seed for his land. As regards the spring Wheat seed it is at present being distributed, the maximum quantity has been fixed at 8 bush, and Mr. SARTORIS has been instructed to impress upon the recipients the fact that this quantity is sufficient to sow 4 English acres.

Should the funds at the disposal of the committee be sufficiently large, this scheme of distribution will be pursued in other districts than the Somme; but as the time of spring sowing is now close at hand, it is of the utmost importance that the relief given should be immediate; and the committee therefore appeal to all who are interested in the movement to forward their subscriptions without delay.

It has been left for one of the oldest farmers in the country, and President of the oldest Agricultural Society in the island, to make the freshest and most life-like proposition with reference to AGRICULTURAL IMPROVEMENT that we have for a long time had to place on record. The Marquis of TWEEDEDALE, President of the Highland and Agricultural Society of Scotland, submits to the directors of the Society that the improvement in breeding cattle, sheep, and pigs, has reached its climax of perfection; and, though he does not desire to press prizes for stock discontinued, it appears to him that there is a question of greater importance to the public which should occupy the attention of the Highland Society, viz., the improvement of the cultivation of land, so as to increase the produce of human as well as of animal food. Lord TWEEDEDALE believes that land of second and third quality is capable of very great improvement, at a much less expense than farmers imagine, were they possessed of the means applied by the most experienced in carrying out successfully the contemplated improvement. It is in the hope of accomplishing this object that he proposes to the board to form a committee in order to report how they would recommend it to be accomplished.

It is from experience in the work of improving a second-rate soil that Lord TWEEDEDALE speaks; and we are glad to see that, with himself, Messrs. DICKSON of Corstorphine, SMITH of Whittingham, HENRY STEPHENS of Redbrae, HUNTER of Thurston, and other well known and distinguished Scottish agriculturists, are associated.

What will come of this committee? Shall we have recommendations of steam cultivation, or of game destruction—of plant improvement, or of agricultural education—of long leases, or of tenant-right legislation—as its fruit? The field is large enough, and on any one of these propositions it would be easy to prove that agricultural progress hinges at least as directly and efficiently as it does the pedigree stock or good implements, to the improvement of which our societies restrict themselves. Anyhow we add the appointment of this committee to the long list of Lord TWEEDEDALE'S previous agricultural services, with cordial admiration of the evergreen freshness of his interest in agricultural improvement.

On the publication of some remarks, some weeks ago, in this journal, drawing a comparison between the SUSSEX and the SHORTHORN BREEDS of CATTLE, as they had been shown at Islington, we received a letter from a well-known Sussex landowner, suggesting that an attempt should be made to compare the animals exhibited, not as they weighed down the scales alive, but as the butcher reported on them after slaughter. A circular, addressed to all the exhibitors in Classes 11, 12, and 13 of the one breed, and 16 and 17 of the other, by which we hoped to have obtained the information thus desired, has, however, obtained for us the weights of only four of the cattle shown—two Sussex oxen and two Shorthorns respectively:—and the following are the particulars:—

The Shorthorn ox, No. 97, shown by Mr. WALTER, M.P., 3 years and 8 months old, weighed alive 19 cwt. 3 qr. 20 lb., and its carcass weight was 12 cwt. 3 qr. 12 lb.

Mr. STRATTON'S Shorthorn ox, No. 91, 3 years and 8 months old, weighed alive 17 cwt. 3 qr. 4 lb., and its carcass weight was 12 cwt. exactly.

Mr. WILLIAM STURT'S Sussex ox, No. 126, 2 years and 8 months old, weighed alive 17 cwt. 1 qr. 20 lb., and its carcass weight was 11 cwt. 1 qr. 2 lb.

Mr. WILLIAM STURT'S Sussex ox, No. 133, 3 years and 11 months old, weighed alive 19 cwt. 0 qr. 1 lb., and its carcass weight was 12 cwt. 1 qr. 24 lb.

If we may average the ages and the weights thus given, we find the Shorthorn breed, represented by an ox 3 years and 8 months old, weighing 18 cwt. 3 qr. 12 lb. alive, and 12 cwt. 2 qr. butcher's weight. The Sussex breed, again, is represented by an average ox 3 years and 3 months old, weighing 18 cwt. 0 qr. 24 lb. alive, with a carcass weight of 11 cwt. 3 qr. 13 lb. The Sussex, 4½ months younger, is within 72 lb. of the live weight and within 83 lb. of the carcass weight of the Shorthorn.

—At Mark Lane, on Monday, there was a short supply, of poor English Wheat, which sold at last week's prices, but flour was 1s. dearer. On Wednesday trade was heavy, and a reduction had to be submitted to in American flour.—At the Metropolitan Cattle Market on Monday choicest kinds sold readily—sheep rather dearer than last week; on Wednesday trade was dull, and prices barely maintained.

—We are delighted, in the interests of many deserving applicants, and not less, we are sure, in the interests of the Benevolent Institution itself, to learn that at the monthly meeting of the Council of the ROYAL AGRICULTURAL BENEVOLENT INSTITUTION on Tuesday, Feb. 7 (present Messrs. C. S. Cantrell (in the chair), J. J. Mechi, Thos. Scott, Chas. Shaw, Thos. Beddall, A. Garrett, Hy. Corbet, J. W. Brown, J. Naish, J. Collins, Hanslip Long, and F. Battock), it was resolved, on the motion of Mr. MECHI, seconded by Mr. BATTOCK, that, at the forthcoming election, 80 names be added to the present list of pensioners, viz., 20 male, 30 female, 20 married, and 10 orphan candidates, thus raising the total number of pensioners to 273, at an annual expenditure of about £5500. The Anniversary Festival was fixed for May 31.

—The Spring Session of the ROYAL AGRICULTURAL COLLEGE has commenced, with a large body of students this year on its rolls. A full hall, besides a large number of out students, ensures for it a prosperous and useful term. The only difficulty it has to fear is the temporary but serious illness—from which we and our readers also suffer—of Mr. WRIGHTSON, M.R.A.C., the Professor of Agriculture. The College, has, however, now so large a body of graduates on whom it can depend for help, that when it claims it can command efficient aid of such a kind as this difficulty requires. And we understand that G. W. GILBERT, M.R.A.C., of Gorton, Rotherham, will undertake the duties of the Professorship during Professor WRIGHTSON'S illness.

—The following are among the TOPICS of AGRICULTURAL INTEREST to which reference has been made in Parliament during the past week.—Mr. W. E. FORSTER, having seen a statement in the *Times* "that a cargo of beasts from Holland landed at Thames Haven last week was passed by the inspectors there as sound, and that these animals were taken thence to the Maiden Lane station, Holloway, and thence to the market lairs, where, on close inspection, several of the beasts were found to be affected with pleuro-pneumonia," had caused inquiry to be made, and the statement appeared to be without foundation. No case of pleuro-pneumonia was detected in the lairs after careful examination, and no notice had been given of such a case, as was required by the Act, on the existence of any disease being discovered.—Mr. BRUCE promised to do all in his power, to introduce a measure for the prevention of the pollution of rivers by sewage, but, apart from the pressure of time and the want of opportunity, the report on the subject had not been completed, although the greater part of the inquiry was concluded. Mr. SRAVE LEVY introduced a Bill to amend the law relating to Enclosure of Commons and to provide for the Management of Commons situate near towns, in most respects the same as the Bill which was introduced last year. The Enclosure Act of 1845 was passed with the double object of facilitating the enclosure of those lands which were better suited for cultivation and of providing that the interests of the public and of the labouring poor should be more carefully looked after than they had been during 100 years previously. Since 1845 about half a million acres had been enclosed under that Act, of which 364,000 acres were subject to common rights and 367,100 acres had been allotted to the labouring poor. It was found very difficult, however, to lay down any general rule with regard to recreation grounds and allotments. The rules in the existing Act had, to a

certain extent, failed already, and it was extremely difficult to frame any rule which would not be harsh in certain cases. By the present Bill he proposed to enact that one-tenth should be appropriated, according to the decision of the Commissioners, either for public recreation or allotments for the labouring poor, subject to the restriction that the amount so allotted should in no case exceed 50 acres. With regard to the quantity of land likely to become subject to enclosure or to be converted into allotments, no certain data were procurable; but from estimates made in 1845 it appeared that about 8,000,000 acres of land in this country were unenclosed, and subject to common rights. Since that about 1,000,000 acres have been enclosed, so that would leave about 7,500,000 acres at the present time; but it should be borne in mind that a considerable number of these were situate in mountainous districts. Still there was in the cultivated districts a considerable quantity of land which might be enclosed. When those lands were in the vicinity of large towns there was a general feeling that it was desirable to leave them open instead of subjecting them to enclosure and cultivation.

It was, however, in this Bill that it was proposed by this Bill that enclosures should not be more than one mile from the centre of a town of 5000 inhabitants up to five miles for a town of 100,000 inhabitants. There would be no invasion of rights already possessed, but simply a restriction of the facilities for enclosure which had been granted by Parliament in the belief that enclosure was to the interest of the public.

— Mr. WREN-HOSKINS has given notice that on Tuesday, March 14, he will call attention to the injurious effects of the existing system of entail in diminishing the investment of capital in, and obstructing the freedom of, the soil.

— Sir MASSEY LOPES, M.P., has given notice that on Tuesday, the 28th, he will move that it is neither just nor politic that TAXATION for LOCAL or NATIONAL purposes should be levied upon one description of property, namely, houses and land; and that it is the duty of Government to institute an inquiry into imperial as well as local taxation.

— Reference was made some weeks ago to the almost whimsical character of the subjects one sometimes finds on the "agenda" of the Central Chamber of Agriculture. It is fair to say that the local and provincial Chambers have been the example of thoroughness, practicality, and useful series of discussions. During the past year there were, for example, five general meetings of the ESSEX CHAMBER of AGRICULTURE, — February 5, at Saffron Walden; subject of discussion, "Adulterated manures and cattle food," introduced by Mr. A. JOHNSTON, M.P.—February 25, at Chelmsford; subject of discussion, "Corn buyers' deductions on payments to farmers," introduced by Mr. W. BROWN; "The corn returns as they affect the tithe average," "The desirability of selling all kinds of grain by weight instead of by measure," introduced by Mr. J. S. GARDINER; and "The best mode of providing for the education of the industrial classes," introduced by Mr. JAMES ROUND, M.P.—March 26, at Colchester; adjourned discussion upon the best mode of providing for the education of the industrial classes.

—April 29, at Chelmsford; subjects of discussion, "The desirability of making tithe rentcharge a fixed instead of a fluctuating rate," introduced by Mr. A. HEMPSON; and the "Game Laws," introduced by Mr. W. BROWN.—June 3, Chelmsford; adjourned debate on the "Game Laws," discussion on "Tenant-right," introduced by Mr. J. S. GARDINER; and on "The constitution of the Central Chamber," introduced by Mr. SMITH.

— The following is an item from the NORTH of IRELAND.—On February 8, at a numerously-attended meeting at Tandragee, a deputation was received from the Ulster Land Occupiers' Association, for the purpose of organising a local society to assist in the working of the new Land Act, so as to secure to the tenants the benefits of the Act, and to secure the reform of the present grand jury system upon the principles of local self-government and representation by taxation. It was resolved "That a Society, to be called the Tandragee Tenant Farmers' Defence Society, be formed," and a committee was accordingly appointed to arrange the necessary details. Twenty years ago butter was sold in Belfast at 6d. a pound, and eggs 4d. a dozen. Butter is now 18. 6d. per lb., eggs 11. 4d. per dozen.

— The report in another page of the discussion on CHEESE FACTORIES will be read with interest. The rapid maturing of young cheese made on a large scale, and therefore under the best circumstances, on the Cheddar system, is a point of great importance. Mr. COLEMAN states that last October he had sold at Leicester, at 8d. per cwt., two tons of cheese, which was at the time only eight weeks old. It was made in August and sold on October 4; and on June 21 last year he had purchased cheese made in America on May 7, and took it home for his own consumption. That was only six weeks from the time of its being made. As to the difference between Lord VERNON and Sir G. JENKINSON, who can be little doubt to whom belongs the credit of the larger and the wiser view. Mr. SIDNEY, who always defends the common sense and business-like opinion, pointed out that the

question of cheese-making necessarily depended entirely on profit. If the farmer found that, by sending his cheese to Leicester, he could make more money than by keeping it at home all the sensational and sentimental arguments of Sir GEORGE JENKINSON would go for nothing. No doubt it would be a very sorrowful thing if farmers' wives, like ladies of fashion, had nothing to do with cheese-making, but felt sure that they would be able to console themselves under such a dispensation. And with regard to the exhaustion of the land, to which Sir G. JENKINSON has also referred as a possible result of the cheese factory, he thought that agricultural chemistry and all the studies which they have been pursuing for years in reference to the manufacture of manures would have done very little for them if, when, for the sake of profit, they had made a vacuum with one hand they could not fill it with the other.

— The certified WEIGHTS of the SWEDISH CROPS competing for the prizes offered by and through the Breconshire Agricultural Society throws some light on the question, Meat or corn?—discussed last week by "G. A. H.," in its bearings on the best style of agriculture for the watery climate of South Wales. In all the following cases prizes were awarded, the unsuccessful competitors—five or six in every case—falling short of the winner often by a difference of only a few cwt. per acre:—

SWEDISH TURNIPS.

Mr. J. Handley, Pontewill, 1st prize: width of drill, 24 inches; roots on 10 lineal yards, 36; weight in do., 98 lb.; weight per acre, 34 tons 12 cwt. 2 cwt. Manure used: Farmyard, and 5 cwt. of artificial to the acre.

Mr. Jones, Calcutt, 1st prize: width of drill, 26 inches; roots on 10 lineal yards, 39; weight in do., 103 lb.; weight per acre, 30 tons 9 cwt. 2 cwt. Manure used: Farmyard, and 4 cwt. of artificial to the acre.

Mr. Price, the Court, Llanthw, 1st prize: width of drill, 22 inches; roots on 10 lineal yards, 40; weight in do., 89 lb. 12 oz.; weight per acre, 31 tons 7 cwt. 2 cwt. Manure used: 5 cwt. of artificial to the acre.

Mr. Williams, Troedyrhan, 1st prize: width of drill, 20 inches; roots on 10 lineal yards, 36; weight in do., 114 lb.; weight per acre, 30 tons 4 cwt. 2 cwt. Manure used: 4 cwt. of artificial to the acre.

Mr. D. Downes, Maesgarw, 1st prize: width of drill, 24 inches; roots on 10 lineal yards, 37; weight in do., 91 lb.; weight per acre, 29 tons 7 cwt. 1 cwt. Manure used: 5 cwt. of artificial to the acre.

COMMON TURNIPS.

Mr. Wm. Hall, Tynwydd, 1st prize: width of drill, 24 inches; roots on 10 lineal yards, 37; weight in do., 114 lb.; weight per acre, 30 tons 12 cwt. 1 cwt. Manure used: 5 cwt. of artificial to the acre.

Mr. Hall, Penelli Court, 1st prize: width of drill, 24 inches; roots on 10 lineal yards, 36; weight in do., 93 lb.; weight per acre, 29 tons 19 cwt. 2 cwt. Manure used: Farmyard, and 3 cwt. of artificial per acre.

The report of the Committee of the Central Chamber of Agriculture on the subject of the premium paid on FIRE INSURANCES by farmers, states as the result of a conference with the authorities of several fire insurance companies:—

1. That the associated offices cannot depart from the regulation for taking three-fourths of the value at the time of a fire as the basis of the amount upon which premium should have been paid, and do not agree to an amount based upon an average of price and of produce extending over a number of years.

2. The offices decline to vary the rates of premium upon produce stacked separately and produce stacked together.

4. The offices will take into consideration separate policies for Hops placed in a separate building, and for a period that year, but if placed in a warehouse or other building, then the average clause must apply.

5. The offices will allow wool to be insured under a separate policy if placed in a specified building.

6. The offices insure steam-engines and machinery worked by steam, at special rates, according to risk and position.

The Committee recommend farmers in all cases to insure hay, corn, straw, and similar agricultural produce, in a separate amount from other property. It appears that, on the principle of ascertaining the value of insured property at the time of a fire, there is serious liability of misunderstandings arising between insurers and insured, likely to lead to litigation and the danger of the sum recoverable being less than the actual amount of the property at the time of the fire. It would be the practice of all (as it already is of some) offices to inquire into and decide upon the sufficiency of the amount insured at the time of insuring.

— Our excellent contemporary, the *Field*, describes the SUMMER MANAGEMENT of DAIRY COWS upon a DANISH FARM. Mr. SCHWARTZ, holding 1300 acres of land, and managing a dairy of 170 cows, feeds his cattle in the pasture field during day, driving them to cover at night:—"To the green food rations a somewhat curious addition is made, viz., horse-dung and split peas. Mr. SCHWARTZ, it appears, had read years ago, in some old Swedish muck-manual, that horse-dung, mixed with other provender, might be advantageously used as a feeding material for cows, and, noticing that a certain Shorthorn bull, even after a hearty meal, would frequently eat the horse-dung collected in a corner of the farmyard, it struck him that it might be as well to give so palatable an article of dessert a systematic trial as a condiment, if not *pice de resistance*. He accordingly instituted a series of experiments with the new food, and so satisfactory was the result that he ended by giving his cow a daily ration of as much as 8 lb. per head of it along with their split peas." He found the dung had a favourable effect on the amount of butter in the milk, and peas on

that of casein. That cattle, after luxuriating all day on good pasture, should fall upon the above compound with avidity, has surprised more than one visitor to Hofgarten. Facts, however, are stubborn things, and Mr. SCHWARTZ, thanks to the introduction of the new feeding material, has even found it possible, on the same acreage, to keep 20 to 30 more cows than he was formerly able to do, and still adhere to his rule of giving them all through the year as much food as they will eat. The loss which the land sustains in the way of horse-dung is more than compensated for by greatly increased dressings of manure from the cow stables. It is probable that an even larger addition to his herd might be made by a still larger use of the new provender—horse-dung and peas!

— The use of the ROUGH-LEAVED COMFREY has been often recommended as a forage crop for cattle, and especially milk cows. It has latterly been supposed to be a useful forage crop for sewage farming; and as its bulky succulent growth is likely to be promoted in this way, we extract the following particulars regarding its cultivation from the *Irish Sportsman*:—

"It is easily propagated by offsets, or cuttings of the roots, and, being a perennial plant, when once established produces enormous crops, without renewal for many years, even after it has been cut down several times. It is not devour it ravenously, and it does not produce hoar in either, like Clover or other succulent food; and does not communicate any bad flavour to cows' milk or butter. The plant will thrive in any poor, dry, exposed soils; but, to gain the most profit from it, it should be planted in deep, rich, and friable soil, and will well repay a liberal manuring; and it yields an abundant and constant produce for a long series of years, if liberally treated. It grows, when let alone, to several feet in height, but should be cut for use before it flowers. Although at Carnew Castle it was cut in the season, we have cut it four times, with the best results, as green fodder. In making plantations of the Rough Comfrey, the roots may be taken up any time from October to April (but February and March is the best time), cut into small pieces, as the seeds, but will produce a plant, and planted in clean, deep rich soil, in rows 2 feet to 2½ feet apart, and 15 to 18 inches apart in the rows. The after culture consists in keeping the crop clean with the horse or hand hoe. If the plantation is made early, before the dry and cutting winds of April come on, so that the cuttings may begin to strike before they get established, and the roots rich enough, it will yield two good cuttings the first season; and every year after, by manuring and grubbing between the rows in the latter end of October, it will yield three to four cuttings, according to the quality of the ground, and the care bestowed on it. Its ordinary produce has been estimated by practical farmers at 30 tons per acre, but in experiments made on Carnew Castle Farm it amounted to 82 tons per Irish acre, in three separate cuttings of 28½ tons in the middle of April, 31 tons in the middle of July, and 22½ tons in the middle of September."

— We cite the following to show the very loose evidence that is considered sufficient to prove that SMUTTY BARLEY has been the CAUSE of DEATH. All that is really shown is, that the man died after the introduction of the smut.

"At Burley-on-the-Hill, about a fortnight ago, as Mr. Smith, labourer, was employed in threshing some corn he became poisoned. It appears that he was employed in assisting, along with other men, in threshing barley, which contained a quantity of what is commonly known by the name of 'green bug,' and that he had eaten some of the grain and then he had been drinking. He went home and lay ill for a space of 11 or 12 days, when death put an end to his existence on Saturday last. The deceased was interred in the churchyard of Burley, on Monday."

— The sale of a considerable number of Colonel KINGSCOTE'S SHORTHORNS at Kingscote, near Wotton-under-Edge, Gloucestershire, on March 8, includes no fewer than 43 cows and heifers, and 19 bulls. There are among them representatives of no fewer than 10 or 12 originally distinct bloods (and a first-rate list is given below of the same bulls (and a first-rate list is given over all. Among them are 10 descendants of *Serenade* by CHARLES I. (8947), bred by Mr. Ladds. She is a daughter of Mr. Lawford's *Scraphina*, two of whose daughters sold for 200s. each to Lord Sudely. A son of one of them—HEIR OF ENGLISHMAN—the property of Mr. BARCLAY, of Keevil, has been one of the best and most successful show bulls of his day. On *Serenade* and her descendants have beenusd such famous CHAMPION TITLES, viz., 25,724, a Topleigh daughter, the property of Mr. SLADE'S care, several daughters, viz., DUDDING'S *Calcutta*, the solitary heifer *Cuckoo*, has for his successive sires 2d BARON WETHERBY (21,243), SIR JAMES (16,980), DUKE OF CAMBRIDGE (12,742), EARL OF DUBLIN (10,178), GREY FRIAR (9172) FAWLEY (6004), and so on. Surely such a combination of BATES, BOOTH, and KNIGHTLY ought to command competition. There are several (bulls only) offered of a retained family—viz., King and his sons, and among the list of bulls are several of pure-bred Kirkcaldy family. On the following day there is a sale of pure-bred stock at Berkeley Castle, to which we shall refer next week.

CULTIVATION OF THE HOP.

[We continue our extracts from Mr. Whitehead's article in the Journal of the English Agricultural Society.]

Tillage during Growth. After tying, the ground is dug close round the hills, about a foot and a half from their centres, to loosen the soil which cannot be touched by the nidgets—implements something like horse-hoes, only wider, and having more tines, which are drawn by one or two horses in the alleys between the rows of plants, to pulverize the soil and to kill the weeds. The first nidgetting is generally done with two horses, to get the soil deeply moved, afterwards one horse will suffice. Deep nidgetting is continued at intervals until the middle of June or the end of July, when the "fibres" begin to "work" and run all over the ground. After this time it is a huge mistake, as a rule, to nidget deep. To kill seedling weeds, and to break the crust formed by the beating of rain and the baking of the sun, a much more shallow nidgetting is performed, or a hop-harrow, a nidget with shorter pointed tines, is used. The form and make of nidgets have been much improved, many planters have iron ones, which are better and more workmanlike looking implements, as may be seen from a comparison of an old with a new nidget (figs. 46 and 47).

Very late deep nidgetting is much discontinued, as well as late digging. In blighting years these operations are occasionally resorted to, to let the draught into the ground, thereby to check the flow of sap and starve the aphides and green lice. If proper weather follows, the results of these processes have been traditionally known to prove successful; but experience has shown that the chances are quite against a favourable issue, and that if the besiegers are starved away by these *derniers resorts*, the fortress itself will be so much reduced as to be practically useless. The ancient Chinese mode of obtaining roast pig, according to Charles Lamb, is almost as defensible as these roundabout practices. Earthing, or putting a few shovelful of earth on each hill to keep it from wet, and to get strong sets for bedding, is done about the end of June; but the operation is not performed so usually, nor so much as a matter of regular routine as it used to be; Hop plants that have not been earthed always come stronger and more forward than those that have been earthed, and if it were not for the necessity of saving sets, and the untidy appearance caused by the bines running all over the ground, it is questionable whether earthing would not be a custom "more honoured in the breach than in the observance."

In July and August, the space round the hill which was dug in May is chopped round with that most excellent tool, which "Talpa" would fully appreciate, known in Kent as the "Canterbury Hoe" (fig. 48). This operation breaks the hard crust and admits the air, at the same time displacing the weeds. No leaves should on any account be stripped from the bine; whether blight or mould appears, the leaves should be left on. It was an old custom to strip the leaves off the bine four or five or even six feet up the poles, thus in the first place bleeding the plant according to the most obsolete Sangrado doctrines, and limiting its capacity to receive and assimilate those gases from the air which are congenial,* and to exhale those which are uncongenial to its nature, or are in excess of its requirements. By lessening the leaf area of the plant, the wonderful action of light upon it in the decomposition of carbonic acid is proportionately diminished,† and it is a question whether the growth of mould Fungi may not be thus encouraged, by causing an abnormal or diseased condition, or in other words by the retention of an excess of carbonic acid.

Attacks of Mould.—Looking at all the revelation of science, it is wonderful that mould is not more prevalent in Hops; and it is fortunate that an almost certain preventive against, and destroyer of, these fungoid growths has been discovered in

sulphur, which has been largely and most successfully used on the Continent, since 1857, to prevent and check the fearful ravages of mould—vulgarily called oïdium—in the vineyards. M. Vialles, in 1857, in a clever pamphlet upon sulphuring Vines,* remarks:—"Si cette méthode eût été connue en 1853 ou 1854, la viticulture universelle aurait évité une perte de plus d'un milliard de francs qu'elle a subie seulement dans les trois dernières

whether mould has or has not appeared, again in about a fortnight or three weeks, and still again in ten days if requisite, have experienced the best results. Too frequently sulphuring is not resorted to until mould is fairly established, or when the Hop is in full flower; so that, as in the case of ripening Grapes, the flavour of sulphur is imparted to it. This practice of late sulphuring, which, besides checking the mould, also makes the Hops keep their colour, is wrong,

and has made the brewers take a not unreasonable objection to all sulphuring whatever, although it is certain that sulphuring before the flower is fully formed does not injure the flavour of the Hops. Growers who have used sulphur legitimately, and who in some seasons would not have grown a sound Hop if they had not so sulphured, are gravely asked to give guarantee that they have not used sulphur.‡ A guarantee might in justice to the brewer be required that sulphur had not been used after the Hop was in flower, but should not in common justice to the grower be extended over the whole season. It has been demonstrated over and over again that sulphur does stop the mould if it is properly applied, and there are many theories as to its action. One is that it acts as an escharotic, and that other fine powder, such as road-dust, would have a like effect of absorbing moisture from the mould-germ, and so causing its destruction; or by chemically uniting with and absorbing its oxygen.† M. Vialles holds this former opinion, and believes that the theory of volatilisation is a deplorable error. It must be confessed, however, that it does seem more feasible that the sulphur, combining with moisture and oxygen, gives off fumes and vapours of sulphurous acid, which are prejudicial to the development of Fungi, at the same time being so gradually evolved as not to injure the other vegetation. And this is probably why it acts more quickly in damp weather.

The sulphur is thrown up evenly over the plants by the revolving fan of the sulphurator, as here illustrated (fig. 50). The quantity thrown up is regulated by a screw, so that from 40 lb. to 2 cwt. can be put on per acre. From 50 to 80 lb. suffice for each application. The weather should be calm, and night is the better time for the operation, as the moisture fixes the sulphur on the plant. Great quantities were showered down when sulphuring was first introduced, from large dredges, like those which are used in the vineyards. The cost of each horse with a man and boy are required. The best, or sublimated, sulphur is usually preferred, but some growers who have watched and carefully compared the action of this with what is called sulphur vivum, or black sulphur, much prefer the latter. This, as M. Vialles terms it, *Soufre brut*, or the crude sulphur merely melted by heat, and the stones and foreign matters disengaged, allowed to cool and then broken up for sale, is more highly esteemed for Vines than the refined or the sublimated sulphur.

BEET-SUGAR MANUFACTURE IN AMERICA.

FROM reports, recently published by the Department of Agriculture, we learn that the manufacture of beet-sugar is occupying considerable attention in the States. At Chatsworth, Illinois, in consequence of the collapse of a firm for want of capital, a concern came into new hands, when efforts were made to redeem the enterprise, and to test the practicability of making beet-sugar in competition with cane-sugar. The services of a native of Saxony were secured, who had for 20 years worked in European factories. The works were remodelled, and the crop of 1868 worked up into 600 barrels of granulated sugar. The next year 1200 acres were planted with Beets, but the season was unfavourable, and only about 250 tons of Beet were saved, the young plants having been swept away by the deluging rains. Preparations were made for 1869 in 1870. An excess of nitrates in the prairie soils of the West is complained of, and it is thought that, in the absence of these it would only be necessary to wash the Beets, and reduce them to pulp, press out the juice, and boil it down to the point of crystallisation. The Beets are said to be rich in sugar, but contain an excess

* In the code of regulations of 1860, decreed by the pundits of the little town of Spalt, sulphur is forbidden to be used.

† Professor Brazier, Professor of Chemistry at Aberdeen University, holds this opinion from having noticed the effect of road-dust upon mould in the parts of gardens adjoining roads.

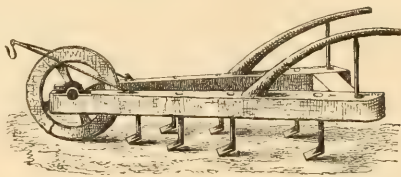


FIG. 46.—THE OLD WOODEN NIDGET.

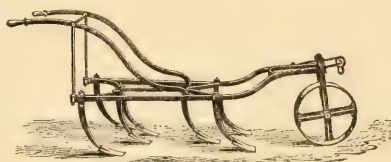


FIG. 47.—THE NEW IRON NIDGET.



FIG. 48.—THE CANTERBURY HOE.

années;" and from this work generally much useful information may be gathered as to this process, which is performed systematically at regular times, and not in the haphazard way in which it is done in England. In France the Vines are sulphured three times: there is the "Premier soufrage avant la floraison; second soufrage pendant la floraison; troisième soufrage après la floraison." In Spain, where sulphur has been used

sulphuring ranges from 110 to 150 per acre. One horse with a man and boy are required. The best, or sublimated, sulphur is usually preferred, but some growers who have watched and carefully compared the action of this with what is called sulphur vivum, or black sulphur, much prefer the latter. This, as M. Vialles terms it, *Soufre brut*, or the crude sulphur merely melted by heat, and the stones and foreign

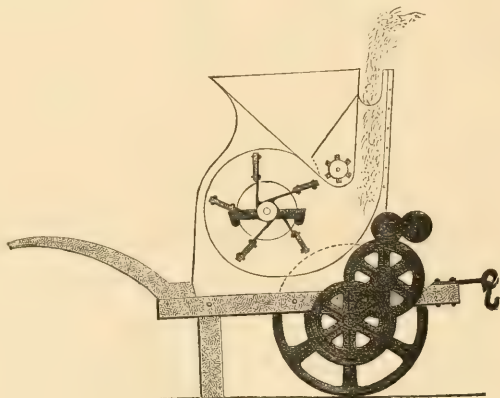


FIG. 49.—THE SULPHURATOR.

for seven years, the process is performed twice, but neither in France nor Spain is it ever done after the Grape has commenced to ripen, as the sulphur would then impregnate the wine with a nasty flavour.

Those Hop growers who have sulphured upon a similar principle, looking upon sulphuring as an essential part of cultivation, and have first sulphured when the bine is just up the poles, about midsummer,

— Guide pour la Prévention des Vignes par la Méthode Préventive. Beiers, 1857. Paul Libraire.

* "If the experiments on the functions of the leaves be duly considered, it seems difficult to arrive at the conclusion that the greatest addition to the materials for the formation of the solid tissues of plants is made through their agency."—Dr. Carpenter's "Principles of Physiology," par. 558.

† "The heat of the sun by the decomposition of carbonic acid is the most essentially dependent of all the processes of the vegetable economy upon the influence of light."—(Dr. Carpenter's "Principles of Physiology.")

of nitrates. All that is required is a cheap and sure method of separating the nitrates, other difficulties could soon be overcome.

At Fond du Lac, Wisconsin, a German sugar-maker planted 4 acres of Beet in 1868, and fitted up simple apparatus for manufacture. The experiment was successful. In 1869, 80 acres were planted, and notwithstanding the unfavourable season there was a good crop. More machinery was obtained, and the manufacture is now successfully prosecuted, about 1000 lb. of good sugar being turned out every 24 hours. The crop was sufficient for four-and-a-half months' work, representing an aggregate of 125,000 to 135,000 lb. of sugar.

In California, the Sacramento Valley Company established a sugar-mill of small dimensions, and commenced work on 150 tons of Beet. Cheered by the prospect the company were last year enlarging their works.

A more extended and detailed report is given from Colorado by Dr. G. W. Hulse. He writes—

"Since my arrival in this territory, my attention has been attracted to the large, apparently sound, and perfect growth of the Beetroot of the country. Specimens of 20 lb. and 15 lb. weight are no uncommon sight, and I have been told by reliable farmers that roots are occasionally found of even 20 lb. in weight. Both soil and climate seem well adapted to the perfection of growth, and in many localities they attain great size without irrigation. Many of the farmers say that the Beet requires, on the bottom lands, little or no irrigation after being well started in growth.

Among those grown here I do not recognise any of the true white Silesian varieties, nor any of those that are cultivated for sugar-making purposes in Europe. Still such as are grown here are generally very sweet and good flavoured, when prepared in the ordinary way for table use. This induced me to make a trial to ascertain if any contained sugar equivalent to cane-sugar; and from the short red Turnip (garden variety), which I found very juicy, but loaded with colouring matter, I had no difficulty in obtaining true sugar, well granulated rhomboidal crystals of good size, and identical with cane-sugar in every physical aspect.

With 12 lb. of juice from a large white variety (not the Silesian), I obtained over 25 lb. heavy syrup, but did not succeed in obtaining good crystals, as the appliances for boiling the juice were ill suited to the process of evaporation, and no lime was used (as none was at hand) for defecating or cleansing the juice. Consider for one moment the advantages of such products for purposes of alcohol and potash, in sound and sugar products. The production of alcohol from the refuse of beet-sugar works, and from the inferior qualities of Beet, would naturally interfere with the distillation of grain, as few could afford to cultivate grain for purposes of distillation in competition with Beet.

"Before our late unfortunate and desolating war, I had long been engaged in cane culture and sugar making in the State of Louisiana, and had also improved opportunities of examining into the process of beet-sugar making as well as the processes of alcohol and sugar making in different places in Europe. I do not hesitate to say that I saw no place in France, Belgium, or Germany, where Beetroots grew to such seeming perfection as they do in this territory; nor do I know any portion of the United States (unless it be Oregon) where they will in any way compare with those found in Colorado.

"When our soil is carefully examined in reference to its elementary constituents, one is struck with the amount of its saline contents, especially with its large amounts of potash and soda. Potash is the glory of Beetroot food, where sugar is an inorganic compound or organic product, the result or phenomena of vital functions. A glance at those immense mountain barriers will explain the source of those inexhaustible supplies of potash and soda, the aluminiferous (decomposing) rocks characterise much of the mountainous upheaval on the surface of the globe, consequently the waters incessantly descending from the sides are the grand transporting agents, heavily freighted with both of these substances, potash and soda, in some of their various forms, and perpetually renewing the supplies of sugar so congenial to the taste and growth of the Beetroot.

"Farmers have already done much in the way of constructing ditches for the purpose of irrigation, and I believe no country on earth has advantages like this if a proper system of irrigation be adopted equal to its capabilities and requirements. The streams descending from the mountains of almost perpetual snow are numerous, and may be conducted over a vast extent of rich upland soil. The expense of turning all the mountain streams into their natural beds and conducting them by ditches or canals over the main average hills of the plains, will be a mere drop in the bucket. Vegetables, excellent in quality, will soon be so abundant that the supply will exceed the demand; and even Wheat, though excellent in quality, will only bear transposition to the market when railroads become more moderate in charges. But sugar, alcohol, and potash, may be produced almost beyond competition for the eastern or foreign market. Fuel, of course, is an important matter, especially in a country that has no

timber (wood) or forest growth. But for her immense forests, Louisiana never could have engaged in cane-sugar production. The forests here have been wisely preserved, they are all safely stored in the earth, and easily accessible. Coal is abundant in the country of the kind known as dry coal, a species of lignite, and of a superior quality—I believe I am safe in saying the best of the kind known on earth. I consider it as good, if not better, for generating steam and for evaporating purposes than even bituminous or anthracite coal. The formation is evidently extensive, and though it has been subject to great disturbances, and may in many places have been destroyed or moved away, enough has been discovered to prove that it still exists in great quantities. I am firmly of the belief that Beets may be produced here from 20 to 25 tons per acre; some farmers of experience say 50, and some say even 100 tons per acre. If such immense yields can be obtained anywhere on earth, I believe it may be done here."

Such, then, is the prospect for beet-sugar manufacture in some of the States of the Union, and this account may serve to indicate the interest evinced upon the subject. M. C. C.

ROAD STEAMERS.

In Thompson's road steamers the boiler is on the vertical principle, by which means a nearly uniform water level is maintained when either ascents or descents are being made, a thing in itself of great importance. The wheels are encircled with indiarubber tires, about 4½ inches thick, which flatten with the weight of the engine, and thus give great adhesion and elasticity on bad roads. The engine runs on three wheels only, and in this way a small wheel base is obtained, and great facility given for steering.

The Indian Government has lately given orders to

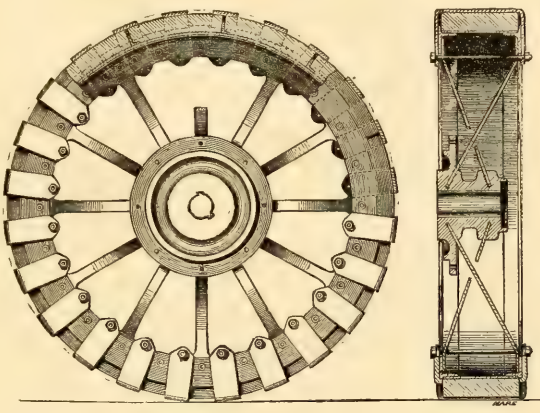


FIG. 50.—ELASTIC WHEEL OF MESSRS. FOWLER'S ROAD-STEAMER.

purchase in England four engines, with indiarubber tires, of great power, and capable of attaining an average speed of ten miles per hour. Their manufacture has been intrusted by the Indian Government to Messrs. Ransome, Sims & Head, of Ipswich. It is intended to run them between the two stations in the Punjab—viz., Rawul Pindie and Jhelum, 68½ miles apart.

In the wheel in the drawing (fig. 50) the indiarubber tire, instead of being a continuous band, which is wholly destroyed by an injury to any one part of it, consists of a series of elastic bricks placed in a cellular wheel rim, any one of which, being injured, can be replaced by another. The advantage of the elastic pad is retained, and the mischief done by local injury is reduced to a minimum. This is the subject of a patent held by Messrs. J. Fowler & Co., of Leeds.

WHAT IS GOOD CULTIVATION?

The following quotation, referring to Mr. Prout's farm at Sawbridge, is to be seen in the *Field*, January 21, 1871:—"Mr. Lawes' most valuable researches have come to our aid; they prove that, for a period of nearly 30 years, good cultivation alone ensures a certain yield, hence this can be taken as the natural produce, on which we can depend as a basis for our crops. His experiments further demonstrate that the addition of a liberal dose of artificial manure greatly increases the produce, and brings it up to a remunerable point, and that for the period stated (nearly 30 years) there appears to be no lessening of the yield, save only as affected by varying seasons."

Now, "What is good cultivation?" We are told good cultivation "alone" ensures certain yield. In the *Agricultural Gazette*, April 9, 1870, will be found Mr. Lawes' paper, read before the London Farmers' Club. Alluding to the cultivation of the soil during the period of the experiments, he says:—"It should be

stated, however, that in no case has any attempt been made to increase the productiveness, by either sub-soiling or deeper ploughing than usual, though great care has been taken to keep the land as free from weeds as possible, without injury to the crop by treading." It is not noted what depth was considered "usual," but, assuming that 7 inches would represent the "good cultivation" that "ensures a certain yield"—to be "taken as the natural produce on which we can depend as a basis for our crops,"—then such a hypothesis will follow, that we may expect a larger yield in Mr. Prout's case, moving his land to the depth of 14 or 16 inches, bringing into existence that foot-thick staple referred to "as his bank, in which lies an unutilised fortune in the shape of mineral food for plants." In other words, with an assumed depth of 7 inches Mr. Lawes having obtained an average yield of 15½ bush. of dressed corn and 14 cwt. of straw per acre, growing the same crop (Wheat) continuously for 26 years, had the good cultivation reached a depth of 14 inches would it follow as a matter of course that the yield would increase according to depth? The result obtained on Blount's Farm cannot be quoted as an answer to this, artificial manures having been used; but let agriculturists giving the matter a thought, both from a practical and scientific point of view, decide what proportion of such splendid results (the raising of the yield from 14 or 2 qr. per acre to 6 qr., *Field*, May 23, 1868) are attributable to the artificial manures and what to "the good cultivation."

The term "good cultivation," as used in these remarks, must be understood to imply those mechanical operations of agriculture which remove all obstacles that hinder the spreading of the roots of the plants, thus assisting in the assimilation and conversion

of substances hitherto inimical to their growth.

The effect resulting from these mechanical operations upon the fertility of the soil is wonderful, in some instances bordering on the marvellous, and that the successful cultivation of his farm shall be a matter of certainty it behoves the practical farmer to make himself acquainted with, and able to discriminate rightly between the appliances requisite to make effective the nutritive elements already in his fields, and those which keep up the lasting productiveness of his land. It is a fact beyond dispute, that mechanical operations do not add to the existing, though undeveloped, fertility of a soil, but are necessary in the preparation of food for the tender roots from substances which, though now dormant in the soil, may be rendered powerful fertilisers by the free admission of air.

The land being free of all weeds, and pulverised to the depth of 14 or 16 inches, the farmer may claim to have his land in a state of good cultivation; but can a satisfactory yield be obtained without extraneous aid? On some, indeed the greater proportion of soils must be in the negative, in so far as continuing to crop the land with the same plant for an unlimited number of years. Still, if we read the teachings of science correctly, it will be freely admitted that any soil which will repay the expenses of cultivation will be found to contain large supplies of all the mineral constituents requisite for the successful growth of plants. Clayey soils, as in Mr. Frouth's, Mr. Smith's (of Woolton), and many other cases, are rendered highly fertile when thoroughly cultivated. Their physical condition is of such a nature as to prevent the plant from availing itself of the food unquestionably present; it is not the lack of food constituents—to get at them to render them available, is the problem to be solved. Good cultivation opens up the soil, admits the carbonic acid and ammonia of the air, and hastens the decomposition of animal matter unproductive, or natural poor, as it is generally termed, is owing to this mechanical stirring of the soil, and not to the paucity of fertilising, though dormant, constituents in its chemical composition.

We cannot but admit our shortsightedness, when, having such a store of all that is requisite for the growth of our crops, we leave them unavailable, untouched, because the item of "expense" shows more heavily in working such soils to the depth we have quoted, viz., 14 to 16 inches, preferring by a constant subdivision of the soil, and by abundant cultivation at all possible seasons, to increase our food-yielding surface, providing, as Jethro Tull expressed it, "pastures" for the roots of plants, cultivated in large crops, and not in small ones. In agriculture, "effects" are readily seen, though it is difficult to assign their exact "causes." By deep cultivation we are but following in the footsteps of the ancients. The Romans tilled their ground 2 feet deep ("Columella," lib. ii., cap. 2). The wonderful effects produced on certain soils may be explained by the

light of chemistry. Air is freely admitted, and with it that powerful chemical agency in the formation of soils—the carbonic acid and oxygen of the atmosphere—and Mr. Smith, of Woolston, has practically shown that all weeds, and other troublesome smothering plants, can be effectively worn out by his long-continued system of steam cultivation—the non-inversion of the soil.

Now, how are these wonderful workings of Nature's laws to be explained, and controlled, but by the aid of science—chemistry? It is by her teaching alone we can with any degree of certainty give a reason why one plant is a failure in a field, when another is successful. We may grope in the dark, trying experiments, but the same method does not in every case succeed—our safe path will be found in her teaching. If the soil is wanting in those elements necessary to any particular vegetable life, science will discover it, and at the same time point out to us how they may be increased proportionately, according to the requirements of the plant we desire to grow. To ensure our success, we must inquire into the nature of soils, and of the plants we desire to grow, with a view to ascertain whether the constituents which are necessary to render a soil productive are present in it, or in the manure intended to be applied. It is the province of chemical science, by the aid of analysis, to lay bare, if the expression is allowable, the untouched store of agricultural riches in the soil, explaining the art of agriculture, showing what ingredients are taken from the soil in the crop we grow, how far the soil has been exhausted by it, and what manual application is necessary to keep up fertility. By analysis we learn the mineral constituents of the soil, which the plant has abstracted for the use of its several parts.

In Wilson's "Our Farm Crops," quoting Way, the mineral constituents of an average crop of Wheat to be returned to the soil is given with wonderful correctness. With such powerful aid, it must be allowed that three points would strike the progressing farmer as being requisite to enable him to turn to good account the land he holds,—good deep cultivation, a thorough disintegration of the soil and subsoil—a acquaintance with the chemical as well as physical properties of his land—and an equal knowledge of the structure of his plants, their inorganic requirements; these men can to a certain extent control, making them comestible, for (again quoting from Wilson's "Our Farm Crops") "If we reduce the business of farming—agriculture—to the simplest formula, we should define it as the conversion of inorganic matter into organic structures through the agency of vegetable life—the plants we cultivate." Knowing that plants possess this power, the farmer will at once recognise it to his own profit, placing before them a certain quantity of food necessary to life, health, and general well-being; and for that purpose the food must be of the right kind, not placing potash before a plant requiring lime; for, chemically, this would be considered as absurd as giving to cattle meat instead of cake or hay. The farmer who will recognise these facts will not require to be urged to keep his land clean, free from weeds; his greatest care will be to keep his ground well fed by manures, drawing from the heavens, through the agency of the rain, on a well-pulverised soil, that never-failing supply of organic food which an All-wise Creator, in His merciful bounty, upholds for the use of His dependent creatures. *West Indian.*

RECORD BOOK OF CULTIVATION.

IN reply to the query by "An Irish Landowner" in the *Agricultural Gazette* of the 4th inst., I do not know of such books being kept in England, but they are kept on some estates in Scotland. I enclose a sketch of their form, which you can send to him or publish in your journal if you think proper. A very few days each year will suffice to view and fill up the record for a medium-sized estate, say of 5000 to 10,000 acres.

ASHFIELD FARM.

No. in Phn.	Names of Fields.	Crop.—1867.	1868.	1869.	1870.
1	Silverhill	Mangels and Turnips	Barley	Seeds	Wheat
2	Pigeoncote	Barley	Seeds	Wheat	Swedes and Potatoes
3	Long Meadow	Hay	Hay and Mangels	Hay	Hay and Mangels
4	North Close	Seeds	Wheat	Swedes	Barley
5	South Close	Wheat	Turnips and Potatoes	Barley	Seeds
6	East Close.	Hay and Mangels	Hay	Hay and Mangels	Hay
7	Horse Pasture	Pasture	Pasture	Pasture	Pasture
8	West Close.	Beans	Oats, and autumn fallowed	Oats	Seeds
9	Long Close.	Oats, and autumn fallowed	Oats	Seeds	Beans
10	Well Close.	Seeds	Swedes	Wheat	Beans
11	New Close.	Seeds	Swedes	Wheat	Beans
12	Far Pasture	Pasture	Pasture	Pasture	Pasture

James M'Kelvie, Soudron, Ayr.

— You permitted me to draw a comparison (June 20, 1868, p. 669) between my system of "Farm Book-keeping and Records," and "An Annual Digest of Accounts, showing Balance of Profit or Loss, under each Crop, per acre, reduced from Day-book," as put forward by your correspondent, "J. B. M." (May 30, 1868). On that occasion I showed the manner the account is worked out against a field, as taken from "The Annual Farm Account Book." Should you think it a matter deserving of space in the *Agricultural Gazette*, perhaps you will kindly allow the following accounts to appear, giving the yearly account and record of a field for four years, cultivated on the four-course system. "An Irish Landowner," in a recent *Agricultural Gazette*, asks for a book which he believes to be kept by estate agents in England, "in which,

under the heading of each farm, there is an account of cropping from year to year of each field on the farm, so as to form a complete record of the farm at the end of a lease, or any given period." Though my system will not quite meet his wishes, a sheet ruled in duplicate, giving the number or name of a field, acreage, crop grown, hay and straw sold or bought, cake and manure purchased, would be found of considerable importance, either in his case or wherever leases exist, as regulating the sale of hay or straw by the quantity of manure or cake returned to the farm. Or for the tenant to be compensated for unexhausted manures, the form would remain in the book, which itself gives a correct detailed account of all the operations of the farm, and the duplicate might be left with the landowner or agent. *Alex. Jemmett, Murrell Hill Farm, Binfield, Berks.*

FIRST YEAR.

No. 1. (13a., 2r., 6p.).—ROOTS AND GREEN CROPS FOR YEAR ENDING SEPTEMBER 30, 1867.

		£	s.	d.		£	s.	d.
Oct.	Ploughing, 20s. 6d.; harrow, 3s. 5d.; drill, 4s.	1	7	11				
Nov.	Cleaning up corn, 3s. 9d.	0	3	9				
Dec.	Threshing Wheat	1	14	10				
Jan.	Roller	0	10	2				
April	Ploughing, 7s. 2d.; harrow, 2s.; drill, 2s. 7d.; superphosphate, 2s.	0	13	9				
June	Ploughing, 1s. 7d.; scarifier, 8s. 2d.; harrow, 1s. 7d.; drill, 2s.; roller, 2s. 7d.; couch, 5s.; drays, 4s. 8d.; superphosphate, 2s. 5d.	1	8	0				
July	Ploughing, 19s. 8d.; harrow, 12s. 7d.; drill, 2s.; superphosphate, 1s. 2d.; couching, 20s.; hedges, 6s.; hoeing roots, 4s. 3d.	5	7	11				
Aug.	Ploughing, 3s. 7d.; harrow, 1s. 7d.; roller, 1s. 7d.; drill, 1s. 8d.; superphosphate, 2s.; couching, 7s. 6d.; hoeing, 25s. 7d.	2	3	6				
Sept.	Hoeing, 50s. 1d.	2	10	1				
	Hoeing	0	0	0				
	Reaping or mowing	0	0	0				
	Proportion of sundries	1	17	3				
	Proportion of Michaelmas money	2	1	0				
	Seeds	20	7	4				
	Manures (purchased)	14	0	4				
	Implements, repairs, &c.	4	8	6				
	Rent, tithes, rates, taxes, &c.	20	9	0				
	Threshing (hired)	3	10	0				
	Proportion of stock expenses	71	10	7	From stock account	0	0	0
	Total expenses	93	7	4	By stock account, 1867-8	53	7	4

SECOND YEAR.

No. 1. (13a., 2r., 6p.).—BARLEY, WITH CLOVER SEED, FOR YEAR ENDING SEPTEMBER 30, 1868.

		£	s.	d.		£	s.	d.
Oct.	Taking up Wurzel	0	6	4				
Nov.	Drawing and carting Wurzel, 50s. 6d.; ditto Swedes, 37s. 10d.; thatching Mangels heaps, 7s. 2d.	4	15	6				
Jan.	Ploughing, 6s. 8d.	0	8	8				
Feb.	Ditto, 13s. 10d.	0	13	10				
Mar.	Ditto, 16s.; harrow, 1s. 2d.; draining pipes, 5s.	1	12	5				
April	Ploughing, 4s. 2d.; harrow, 6s. 11d.; drill, 8s. 4d.; roller, 2s.; superphosphate, 10s.	1	2	5				
	Hoeing	0	0	0				
	Reaping or mowing	2	18	6				
	Proportion of sundries	1	16	0				
	Proportion of Michaelmas money	2	1	0				
	Seeds	15	11	5				
	Manures purchased	14	5	3				
	Implements, repairs, &c.	19	14	0				
	Threshing (hired)	2	5	4				
	Rent, tithes, rates, taxes, &c.	20	9	0				
	Proportion of stock expenses	72	5	0	58 qr. of good sound Barley, at 36s. per qr., from cash account, 1868-9	104	8	0
	Total expenses	187	13	5	Barley-straw, valued at	20	0	0
		91	2	3	From stock account	0	0	0
						124	8	0

THIRD YEAR.

No. 1. (13a., 2r., 6p.).—CLOVER, FOR YEAR ENDING SEPTEMBER 30, 1869.

		£	s.	d.		£	s.	d.
Oct.	Threshing Barley, 12s. 9d.	0	12	9				
Nov.	Ditto, 8s.	0	8	0				
Dec.	Taking in, threshing, and cleaning up Barley, 55s.	1	5	0				
Jan.	Ditto, 65s.; carting and spreading manure, 65s.	4	11	0				
Feb.	Threshing Barley, 8s.	0	8	0				
Mar.	Ditto, 21s.; digging ground, and planting Potatoes, 10s.; hedges, 4s.	1	15	0				
April	Harrow, 3s.; roller, 2s.; hedge, 2s.; Potato ground, 21s.	1	8	0				
May	Threshing Barley, 10s.	0	10	0				
June	Mowing, 10s.; turning and taking up Clover, 33s.; hoeing Potatoes, 6s.	2	9	0				
July	Hedges, 6s. 3d.; turning and taking up Clover, 9s. 6d.; thatching ricks, 5s. 6d.	1	1	8				
Sept.	Cutting Clover, 14s. 6d.; carrying do., 9s. 10d.	1	1	4				
	Hoeing	0	0	0				
	Reaping or mowing	0	0	0				
	Proportion of sundries	7	7	10				
	Proportion of Michaelmas money	1	9	4	Twelve sacks of Potatoes, at 2s.	4	4	0
	Seeds	10	10	11				
	Manures purchased	0	0	0	Rick of clover hay, first cut, say 1½ tons, at 100s.	57	10	0
	Implements, repairs, &c.	0	0	0				
	Threshing (hired)	0	12	10	Rick of clover hay, second cut, say 8½ tons, at 80s.	34	0	0
	Rents, rates, taxes, &c.	21	8	9				
	Proportion stock expenses	49	18	6	From stock account	0	0	0
	Total expenses	78	15	6	Total produce	95	14	0

FOURTH YEAR.

No. 1 (13 a., 2 r., 6 p.)—WHEAT, FOR YEAR ENDING SEPTEMBER 30, 1870.

		£	s.	d.		£	s.	d.
Oct.	Ploughing, 32; carting and spreading manure, 25; 6d.; digging Potatoes, 14d. 6d.	1	19	2				
Nov.	Ploughing, 20; 2d.; harrow, 4d. 6d.; drill, 7d.; couching, 12; digging old roots, headlands, &c., 25d. 4d.		3	1	0			
Mar.	Artificial manures		0	2	10			
April	Harrow, 32		1	15	0			
May	Artificial manures, 32; hoeing, 16s.		0	19	0			
	Hoeing		0	0	0			
	Reaping or mowing		7	9	6			
	Proportion of sundries		2	0	8			
	Proportion of Michaelmas money		1	9	4			
	Seeds		17	4	0			
	Manures (purchased)		13	5	0			
	Implements, repairs, &c.		1	19	4			
	Threshing (hired)		0	0	0			
	Rent, tithes, rates, taxes, &c.		71	6	5			
	Proportion of stock expenses		20	10	3			
	Total expenses		84	3	9			
			22	14	0			

43 qr., 6 bush., Red Wheat, at 54s. 6d.;
from cash account, 1870-1 119 14 6

Wheat straw, valued at 38 0 0
From stock account 0 0 0

Total produce 147 14 6

Home Correspondence.

The Market Gardeners of Paris.—An appeal has been made to the tenant-farmers of England on behalf of the French peasants whose fields have been trampled bare by the devastating foot of war. But there is another class, who have also suffered keenly, who have seen the industry of years disappear, and the fruits of their labour gone, never perhaps to be restored. Around Paris, where the armies of the German conqueror now are, were many small gardens, and the larger nurseries, which supplied Paris with its fruits, flowers, and vegetables. These must now be almost completely destroyed. Some months ago you published an account of the state of one of the principal horticultural establishments near Paris. The large conservatory was a stable, the rare trees were cut down, and the fruit trees rooted up. And in your impression of last week it is stated that the florists of Nancy, Rendatler, &c., are ruined; that at Sceaux and Versailles the proprietors of nurseries not long ago flourishing have suffered the cruellest losses—some are dead on the field of battle, and of others the future is rendered hopeless. England is remarkable, both for the richness of its gardens and for the skill of the many men who make gardening a profession. If an appeal was made not only to the owners of private gardens, but to the nurserymen, who are to France many a beautiful flower and delicious fruit, I am sure it would not be in vain. A branch might be added to the committee over which Lord Vernon presides, and arrangements might be made to send to France seeds, plants, cuttings, or whatever else would assist French nurserymen to repair their losses. Your superior judgment will know how far this project is feasible, or if a better plan can be adapted. I only make the suggestion in case it might be of benefit to those for whom I feel great sympathy. It is now the time that we who love gardens are looking forward to the enjoyment of their beauty, and to the result which crowns the success of labour and of forethought. Let us not forget the gardens in which this year no flower will bloom, no fruit will ripen—where the ruined homestead is a memorial of the penalty of war. *Brintley Marlay, Buxton, February 14.*—[See p. 200.]

Co-operative Societies.—In the *Agricultural Gazette* of February 4, a writer, signing himself simply "A Member," is pleased to attack a letter which I had occasion to write a short time since, referring to the above societies. When an anonymous writer attacks another whose name is given he should take care to be correct in his statements, however illlogical he may be in his inferences. The letter referred to was originally written to a local paper, on a local incident; it makes no mention of the trades of the manure and cake dealers, and it insinuated nothing, but plainly stated its case. The incident that gave origin to the letter was the following:—In a country town, in December last, an agricultural show was held, and it was very successful. Besides fat cattle, sheep, and pigs, there was an excellent display of roots, the size and shape of which were much admired. The names of the growers were exhibited, and also the names of the various seedsmen who supplied the seed, the good quality of which was pretty well attested by the roots exhibited—many of which earned prizes for the growers. The usual dinner followed, and the company consisted perhaps to the extent of one-half of practical farmers, the remainder being merchants, manufacturers, and tradesmen of various kinds, all of whom were members of the society, or contributed to its funds, and were thus instrumental in providing the means which rendered the show successful. In the course of the evening the chairman, rather to the surprise of some who were present, recommended the farmers present to purchase their manures and feeding stuffs through a co-operative society in London, of which it appears he was a member. The next speaker, in giving the toast assigned to him, "The Managing Committee," in

the exercise of that freedom of debate which ought always to be used on such occasions, attacked the doctrine enunciated by the chairman, and showed to the meeting that it could not be limited to one or two particular trades: the tendency of these co-operative societies must be, if fully carried out, to destroy the trade of the town they were located in, deprive societies like that assembled of half their support, and agriculturists of that capital which, under the name of credit, is invested in their business but of which, it seems "A Member" would deprive them, because he does not need it himself. Well, the farmers present, as well as the tradesmen, approved of the sentiments expressed, and of the motto, "Live and let live;" for they did not belong to that cold-blooded race, to which it is to be hoped that "A Member" does not really belong. I decline to argue the question on such a very narrow basis as that indicated, as to whether I or any single manufacturer can offer "A Member" better terms and surer ties than his co-operative society, but I have no objection to do so on much broader principles, such as the following:—1. Can a thing which is wrong in principle be right in practice? 2. Should a system which, if thoroughly carried out, is destructive to trade, commerce, and industry, be encouraged, on the ground that its operations are limited, and will benefit a few? I fully concede that "A Member" has a perfect right as an individual to purchase his manures or his machines, his sugar or his cigars, his boots or his breeches, wherever he pleases, or to make them at home if he prefers it; but an injury to the public should not be paraded as a *public good*, at any rate, not without a challenge. *W. C. Spooner.*

To Cure Hams.—In the "Cyclopedia of Agriculture" I see a short statement of the bacon fly, *Phophila*. I have suffered a great loss from the ravages of the maggot among some hams. They were well cured in good season, and put in bags the early part of April. How the maggots got there is a mystery to me. These hams were hung in a bakehouse during the winter to dry. I have cured hams for 40 years, and never had anything the matter before, but they were always dried in a farm kitchen. *T. Stanley.* (The above note having been placed in the hands of our correspondent, "C. C. M." (see p. 182), she has obligingly sent us the following memorandum on this subject:—The reason why your correspondent has suffered by the ravages of maggot is, no doubt, that the hams were too long exposed to dry, and not secured against the possibility of the fly depositing eggs in them. He says they were hung during the winter in a bakehouse to dry. The eggs of the fly might have been deposited as soon as hung there. He will always find flies in a bakehouse more full of life later in the year, and again earlier in the spring, than at any other time. And I can say from experience that early in April is too late to secure them from the fly, even if hung in a cool place. Hams should be cured, dried, and secured from flies not later than February. Get them the first or second week in December, cure them six weeks, allow a week to dry, or smoke, or both; then at once put them in calico bags, and brown paper over that; or, if you prefer, wash them over with thick lime whitewash, repeating this after each layer is dried three or four times, till it makes a thick coat all over, and this secures the ham against flies. Look occasionally to see that no crack has by an accident happened in the whitewash covering. Bags are, perhaps, the safest. If this is done there is no fear of loss from flies. Keeping hams in a bakehouse during the winter is a bad plan, and gives them a dry rancidness, and not a good flavour. A cool dry place is best at all times, after a week's drying or smoking, as soon as they come out of the pickle. Having thus given the reason which, I believe, has caused your correspondent his loss, I will give you a good

recipe for curing. I get hams from well-fattened pigs early in December, from 14 lb. to 16 lb. weight. I salt them, well rubbing in and leaving salt on them for three days; then brush it off, and put half a pound of powdered saltpetre and 1 lb. of treacle on each. This will run down and form liquor in the pores with the salt already there. The hams should be dipped with this liquor three or four times a-day for the first week or two, and then twice a-day till they have been six weeks in pickle. Then take them out, wash the outside well with cold water, hang them in the air to dry for a day, then take them to a drying or smoking house—the latter is far the best; a week is quite enough, and then immediately bag or secure them as I have stated above. They should be kept a year before use. Hams are always good & safely secured when cured and dried in this way. *C. C. M.*

Kill-calf.—I think a "Devon Breeder." I cannot say whether the oaklake is pure. Since I last wrote on the above subject, I learnt from Mr. Stickland, formerly of Shillingstone, near here, and now renting under Lord Rivers in this parish, that "everproof" is the cause of quater-evel, and that some years ago he saw two calves of Mr. Sidling's, of Shillingstone, die of it, when sucking their mothers. Mr. Stickland is a farmer and experienced cattle dealer. The young weanlings of last year are eating, with hay twice a day, oaklake and cracked Beans, half-and-half, and do much better than when eating oaklake without the Beans. For weanling calves just taken from the mother, a warmed milk (cold milk will make them sick) of milk, barley or bean meal mixed with the milk, is good for them. I think the American plan of mixing treacle with milk is a good hint. *W. F. Radcliffe, Oxford Fitzpaine.*

Farmers' Clubs.

LONDON.

The Cheese Factory System.—At the close of Mr. Coleman's paper last week a discussion took place, of which we gave (p. 178) an epitome. We now reproduce more perfectly the speeches of Dr. Voelcker, Lord Vernon, and Sir G. Jenkinson.

DR. VOELCKER said: The great secret of sending milk any considerable distance during hot weather consisted in taking out the animal heat, as dairymen called it, to cool it; and if kept down to 60° or 65°, it might be sent almost any distance without being spoiled. He did not apprehend, therefore, that anything of that kind would stand in the way of the establishment of cheese factories. One gentleman had alluded to elaborate and expensive buildings which he considered necessary; but the factory at Longford in Derbyshire was, in fact, too economical to please him. He should like to see the introduction of hot-water apparatus in the ripening-room. He did not see how the temperature could be kept so low without hot-water pipes, and inasmuch as hot water and steam were required for the ordinary operations of the dairy, with very little additional expense pipes might be introduced into the ripening-room. One of the speakers had expressed doubts whether, under the factory system, money could be returned to the farmer for his milk within two months. His reply was, that that was being done at present by some dairy farmers in Somersetshire; and one of the recommendations of the factory system was that, whereas under the ordinary plan in some of the Derbyshire and in parts of Wiltshire, Gloucestershire, and Leicestershire, cheese was not fit for market until after the lapse of five or six months, by adopting the Cheddar plan and carrying it out in all its details, farmers could obtain a very good price for cheese which was not more than six weeks old. The Americans had the great merit of having established a factory system, and of having adopted and carried out all that had been taught in scientific books by practical chemists, and through the scientific investigations which had been made with regard to the manufacture of cheese. They had adopted scientific principles which, unless the managers were very careless, could not fail to secure the production of good cheese in factories. The Cheddar system, properly carried out, must produce good cheese under all circumstances, no matter from what kinds of pasture the milk came, in what part of England the cheese was made, or what part of England the factory was situated. Those were three very great advantages; and if a factory-manager could produce good cheese at all times of the year, in every locality, and from every description of land, he could easily compete with individual dairy-farmers, who were far more dependent upon local circumstances over which they had no control. He was almost afraid to detain them on matters of detail, but almost every step in the management of cheese had to be carefully considered beforehand. It might seem a very simple matter to add rennet to milk, but if a single bad vell were used in making rennet the whole cheese would be spoilt. A bad vell was like the fly in the apothecary's ointment, and it was the business of the manager to guard against it. Then, again, in adding rennet it was necessary to be very careful as regards the temperature. If the temperature were too high the rennet was apt to get hard; if it were too low the cheese was apt to get soft.

Under the Cheddar system rennet ought to be added at a temperature of about 80°, and a manager had to see that that precise temperature was secured. Then in breaking-up the curd they had to be very careful not to hasten the operation too rapidly. Then, again, if the temperature of the vat in which the curd, partly broken up, was placed was raised too suddenly the curd became unequally scaled: whereas if they raised the temperature gradually to about 100°, taking care that it did not exceed that, the result would be uniform. Then, again, in ripening cheese they gained a great advantage by putting a large quantity of cheese in a properly-constructed ripening room. In many farmhouses the ripening-rooms were badly ventilated, and in such places it was impossible to make good cheese. In a small dairy it was impossible to pay proper attention to such particulars, but in a factory there was no difficulty whatever. With hot-water pipes they could maintain a uniform temperature of about 75°—the proper temperature for the ripening-room—for weeks together. There were some of the advantages to be secured in dairies in which large quantities of milk were operated upon; and as large quantities of milk were not always attainable, the sensible plan for farmers to join together to establish a factory either on the co-operative or on the co-ownership plan which might be found most advantageous in practice. He could not help adding that he thought it would be well if in the immediate neighbourhood of cheese factories piggeries were provided. He thought the wares ought to be consumed near the factory, pigs being fed with whey mixed with barley meal or something of that kind.

Lord VERNON said that was the first occasion on which he had been present at a meeting of the Farmers' Club, and he said that he had never heard a discussion which had interested him more than that to which he had listened that evening. He felt special pleasure in hearing a paper from Mr. Coleman, whose assistance had been so invaluable in Derbyshire in promoting the success of the movement there. That gentleman had very correctly stated the manner in which the movement originated. He said it was suggested in some after-dinner speeches; and he referred to him (Lord Vernon) that some of the friends might think that they arrived at such a pitch of wisdom in these after-dinner speeches, they must be wonderfully clever when they were sober. (Laughter.) Mr. Crompton, Mr. Coke, and some other members of the committee, by the energy and close attention which they had devoted daily and almost hourly to the work, had contributed much to the placing the movement on a sound and secure footing. The difficulties of arriving at anything like a correct judgment as to how they should proceed were in this country exactly the written opinions of Dr. Voelcker, with regard to the composition of milk and the manufacture of cheese. And here he (Lord Vernon) maintained that the improvement in the manufacture of cheese originated with Dr. Voelcker's writings in England, the Americans having been wise enough to profit by them, when the English farmers would not take the trouble of examining what Dr. Voelcker had said. That there was a necessity for retail dealers, who could tell them that, for 1 ton of Derbyshire cheese which they sold in that county, they sold 8 or 9 tons of American. When he was in Cheshire the other day, he was told, in a general sort of way, that the case was the same in Cheshire; and, that there was a much larger sale of American cheese in that county than of Cheshire. He could quite confirm what Mr. Coleman said with regard to the assistance which had been rendered in this matter by Mr. Hayes, the eminent Llan-cho cheese-factory. Mr. Hayes assisted them in getting an American over for a moment's notice; and he certainly secured for them at the Longford factory a most respectable and excellent servant. A gentleman had made a remark with regard to the cost of buildings. Probably he was not aware that the cost was between 30s. and 40s. per cow. Taking the larger amount, the cost for 500 cows at the Longford factory was £1000, and he thought he might be surprised that that was the cost of a private dairy per cow was double that rate, or £4 per cow. Dr. Voelcker had referred to several advantages connected with the manufacture and ripening of cheese on a large scale, which could not be had in a private dairy. One of the greatest advantages, in his opinion, was the manner in which landlord and tenant were brought together to work out that great problem. He never could have anticipated that any committee, whose object was to be non-unionist, would be so harmonious so energetically, and so thoroughly to the point, as they did from first to last. That was not, however, confined to Derbyshire. There were movements of the same kind going on in different parts of the country for the manufacture of other kinds of agricultural produce, and whether they were carried on upon the co-operative system or on some other plan, they could not fail to foster good will in many important matters. Another advantage of the factory system was the total emancipation, if he might use that expression, of the farmer's family from the slavery and servitude of cheese-making. He trusted that the improvement among the dairy farmers would keep pace with that which was going on among other classes of

soxiety, and he believed that if that movement went on, its social effects would be quite as great as its financial ones, and he hoped that the improvement which had within his recollection—during the last 20 years—taken place in the character of the Derbyshire farmer, would be quite as much, if not more, marked in the next five years, if the factory movement went on.

Sir. GEORGE JENKINSON, M.P., said: It so happened that the farms which he possessed in Wiltshire and Gloucestershire were all dairy farms, and every shilling of his rent was paid by dairy farmers, and therefore the Club would easily understand that the subject was one in which he took considerable interest. There was one point which he was surprised had not been mentioned that evening, because it seemed to him most important. The gentleman who read the paper truly remarked that the process of cheese-making tended to exhaust the land. He quite agreed with him. No man who owned dairy land could do otherwise than feel that. But it must be remembered that under the present system, the restoration took place in the shape of whey and pig-feeding. But what would be the case when nothing of what was taken away was returned to the land, when every particle of whey was a distance of 20 or 25 miles? After the milk was gone the farmer and his wife would have nothing on earth to do, not a pig or a calf to feed with milk, and nothing to put in the land. Although that state of things might in the first instance affect only the landowner's pocket, they might depend upon it that it would ultimately affect the occupier's pocket as well. With regard to that item of pigs, what was a man to do if he could not keep a pig because all the whey went off the farm? He knew at least one large farmer in Wiltshire who kept 1000 pigs and 25 cows. If such a man sold all his milk to a factory, what was to become of his land? He thought the subject ought to be looked at in a practical way, for it was only through that that any good could arise from the discussion of it. The factory system had been tried at Swindon, but it was found not to answer. It was important to consider how far the factory system was applicable to different localities. It might very well be that, in a new county like the United States, where all the farms might be of a very great degree from those which existed in this country, where the distances travelled were to be immeasurably greater than here, where everything was on a large scale, and where labour was difficult to secure, the factory system was the best; but it did not follow that it would be the best for England. A great deal had been said about the slavery of farmers' wives under the present dairy system, Lord Vernon having concurred in that view of the system. Now, knowing as he did a great deal about farmers' wives, that kind of language seemed to him a little singular. If Lord Vernon were to go to a farmer's house in his (Sir G. Jenkinson's) part of England, in the afternoon he would see her as well dressed as any lady could desire to be, although she had been previously occupied in the dairy. On the great cheese-fair day at Chippenham, any one might see the farmers' wives come there to sell their cheeses as smartly dressed and as jolly as any body ever was at a fair. A cheese factory would take away from the dairy farmer the only thing that he had to do to make cheese to make they would have no enjoyment on the cheese-fair day. Living as he did in a dairy-farm country, he must say that the proposed change would make a great revolution in the system of farming. People had obtained a character for making a particular kind of cheese, and many farmers felt great pride in the fact that their farm was celebrated for its cheese. He knew two or three farmers who made famous cheese, and the factory system would tend to destroy the *amour propre* of such men. As regarded the question of statistics, they all knew that differences of pasture affected the quality of cheese; how would it be if the milk derived from a number of different pastures were mixed together? He asked that, in order to obtain information, imagining that a difference of pasture might spoil a cheese. In making these remarks his sole object was to promote the cause of agriculture by eliciting information; but he could not see how it could advance agriculture to do, with the old system of cheese-making, which supplied the great motive power to so many farmers' wives. Under the factory system farmers' wives would not care how the cows were milked, or whether the cows were clean or dirty.

HENHAM.

Local Legislation.—The following is the remainder of Mr. T. P. DOB's lecture on this subject (see p. 119):—

IV. *Valuations and Rate Collecting*.—1. Framing the assessment: The valuation lists, upon the basis of which the poor rates are levied, are made by the overseers of each township, and are revised and allowed by the assessment committees. These lists form the basis of assessment both for the poor rates (out of which are paid not only the maintenance of the poor, but also these items, the amount of which is given) and also for the most important local rates. The amount called for by the county finance committee is charged upon the various townships according to a basis of assessment framed by the county rate committee. This committee has not the means of making a uniform assessment. It may (A.) call before it the overseers with their assessments,

and frame from them a county rate basis, as the committee of this county did in 1862, and took a large amount of trouble in the matter, going from union to union and making inquiries of the various overseers; but they could have no check on the lists, and no assurance that the assessments in each township were correct. Any one who has been a member of an assessment committee knows the difficulty of obtaining correct information from the majority of the overseers, and of attaining uniformity even within the union where the townships are generally known to some member of the committee, how much more difficulty when the whole country is to be gone over;—or (B.) it may take the total amounts of the valuation lists as approved by the various union assessment committees, and make a county rate basis from them. This was the county rate basis in 1865, when it was proved, by unions appealing against the proposal, that the utmost disparity existed between the unions in the manner of framing the valuation lists, and that the proposal would involve an overcharge on some of the unions of 10 to 12 per cent.;—or (C.) the county rate committee may call for copies of all the lists *in extenso*, and go over them, and alter the lists according to the best information it can obtain, calling in professional aid when it sees fit; in this case the county rate basis would be framed in this county was framed, and is, perhaps, on the whole as satisfactory as the committee has in its power to make. The county rate committee of Durham have, I believe, employed a professional valuer, and carefully gone over each township, raising the county assessment from £1,529,829 in 1862 to £2,385,700 in 1868. This county has been raised from £1,270,051 to £1,394,280. The establishment of union assessment committees, though throwing a large amount of disagreeable and thankless work upon a few of the guardians, was a great step towards obtaining uniformity of assessment. It has to a large extent done this in each union, and has also been a means of bringing under assessment a large amount of property which had previously been omitted or but partially assessed. The rateable value of Hexham county, for instance, has been raised from £163,600 to over £300,000; that of Tynemouth from £246,522 to £307,908; that of Chester-le-foe from £159,000 to £200,000, and others in a like manner. If the maintenance of the poor is concerned, the working of the assessment committees has been most satisfactory, but where the highway districts are not co-terminous with the Poor-law unions (as is the case in Northumberland), there is no machinery by which the assessment in the portions of the different unions forming the district may be equalised. The work, too, of the assessment committees is greatly increased by the fact that the overseers (who may be, and sometimes are females) are generally changed every year; and as not unfrequently the ratepayers best fitted for the office manage to shirk the disagreeable duty, they require all the time they are in office to learn its duties. Any one who has been obliged month after month to sit on an assessment committee, striving to get at the truth regarding the overseers' valuation lists, and having the same process to go through year after year, must long ago be convinced of the necessity of the use of the county rate committee, surprising that overseers holding office but for a year should be ignorant of the law regarding rating, when we consider that to become acquainted with these laws he must make himself master not only of numerous Acts of Parliament, but with the still more numerous decisions of the superior courts—decisions which are not always consistent one with another. Machinery, for instance, for nearly a century was held by the courts to be rateable when affixed to freehold or merely attached, or whether it was real or personal property, or whether it would go to the heir or the executor, when in 1868 the Court of Queen's Bench in *R. v. The Overseers of Halstead*, held that looms and lathes were mere chattels and not rateable. Again, in reference to tithes, it used to be rated on its full amount, when in the case of *R. v. Goodchild* and others, certain deductions were ordered to be made, and among others curate's salary, but in a recent case (*R. v. Sherford, 31 J. F. 430*) the court has held that curate's salary is not to be deducted. Mellor J., saying, "The fallacy of the argument consists in confounding the rateable value to the poor with the remunerative value to the incumbent." It is, therefore, as I have said, not surprising that overseers are not acquainted with the law they have to put in force. The remedy for this want of uniformity appears to be:—

(1.) To abolish the office of overseer and appoint in his place a paid officer, for each union, who may be called the "rate officer." His duties would be (A.) to frame the valuation lists, duly publish, and bring them before the assessment committees, with all the information requisite for them to know in reference to the list, and to appear in appeals to the assessment committee, and in appeals from it to the county assessment board, to be after referred to; (B.) to make the rates as pointed out, and (C.) to collect the rates.

(2.) By continuing the assessment committees with additional powers, as to having valuations made, employing the county valuer, and examining witnesses on oath.

(3.) By the establishment of county assessment boards, with power to hear and dispose of all appeals from union assessment committees, or individual ratepayers. An assessor (who might with advantage ac-

FRENCH PEASANT-FARMERS' SEED FUND.

The Right Hon. LORD VERNON, Chairman.

President of the Royal Agricultural Society of England.

JAMES HOWARD, Esq., M.P., Treasurer.

A Committee has been formed for the purpose of Collecting Contributions of Corn and other Seeds, and Money Subscriptions for their purchase, to enable the Peasant-Farmers of France to Sow their Land and Save their next Harvest, thus averting an otherwise inevitable famine. The conclusion of an armistice between France and Germany, and the prospects of an early peace, induce the Committee to strenuously urge upon the Landlords and Farmers of England the necessity of sending Donations of Seeds and Money without delay, as the time of spring sowing is now fast approaching, and it is of the highest importance that the relief to be afforded to the French Peasant-Farmers should be immediate in order to be effectual.

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John Pichard, Esq.	1 0 0	Mr. J. M. R.	2 0 0	Mr. A. W. Breh, Esq.	0 10 0	Mr. A. Godfrey	1 0 0	Rev. J. Vanables	1 0 0	W. W. Smith & Co.	5 0 0
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John Pichard, Esq.	1 0 0	Mr. J. M. R.	2 0 0	Mr. A. W. Breh, Esq.	0 10 0	Mr. A. Godfrey	1 0 0	Rev. J. Vanables	1 0 0	W. W. Smith & Co.	5 0 0
John Pichard, Esq.	1 0 0	Mr. J. M. R.	2 0 0	Mr. A. W. Breh, Esq.	0 10 0	Mr. A. Godfrey	1 0 0	Rev. J. Vanables	1 0 0	W. W. Smith & Co.	5 0 0
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A. M. ..	2 0	Per J. N. Lee, Esq.	Mr. Chisour	0 10	S. C. ..	0 10	Madame Zib. Geneva	0 10	Part of Church of Thom-	0 0
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Gladium Turbute, Esq.	2 0	Mrs. Gale	Mr. Seakook	0 5	C. T. Macadam, Esq.	2 0	Collection at Heavre	0 10	per Rev. H. Hockin	0 0
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G. D. Baulham, Esq.	1 0	Mrs. Farr	Per John L. King, Esq.	10 0	J. G. Archer Houlton,	10 0	W. T. Garnett, Esq.	5 0	W. Wilson, Esq.	5 0
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Mr. D. A. Green	1 0	J. W. Sutherland	Per W. F. Bennett, Esq.	10 0	J. G. Archer Houlton,	10 0	W. T. Garnett, Esq.	5 0	W. Wilson, Esq.	5 0
Mr. Alfred Stannard	1 0	C. A. Man ..	Per W. F. Bennett, Esq.	10 0	J. G. Archer Houlton,	10 0	W. T. Garnett, Esq.	5 0	W. Wilson, Esq.	5 0
Mr. W. Richardson	0 10	R. Walton, Esq.	Per W. F. Bennett, Esq.	10 0	J. G. Archer Houlton,	10 0	W. T. Garnett, Esq.	5 0	W. Wilson, Esq.	5 0
Mr. John Green	1 0	Messrs. M. A. & F. J.	Per W. F. Bennett, Esq.	10 0	J. G. Archer Houlton,	10 0	W. T. Garnett, Esq.	5 0	W. Wilson, Esq.	5 0
Mr. Robt. Stannard	10 0	Sedgwick	Per W. F. Bennett, Esq.	10 0	J. G. Archer Houlton,	10 0	W. T. Garnett, Esq.	5 0	W. Wilson, Esq.	5 0
	£59 15	W. James, Esq.	Per W. F. Bennett, Esq.	10 0	J. G. Archer Houlton,	10 0	W. T. Garnett, Esq.	5 0	W. Wilson, Esq.	5 0
Collected by James Buckman,		W. H. Gaudin, Esq.	Per W. F. Bennett, Esq.	10 0	J. G. Archer Houlton,	10 0	W. T. Garnett, Esq.	5 0	W. Wilson, Esq.	5 0
Esq.		M. White, Esq.	Per W. F. Bennett, Esq.	10 0	J. G. Archer Houlton,	10 0	W. T. Garnett, Esq.	5 0	W. Wilson, Esq.	5 0
Bradford Abbas, Sher-	0 10	D. W. Hill, Esq.	Per W. F. Bennett, Esq.	10 0	J. G. Archer Houlton,	10 0	W. T. Garnett, Esq.	5 0	W. Wilson, Esq.	5 0
born	0 10	Thos. Blackwell, Esq.	Per W. F. Bennett, Esq.	10 0	J. G. Archer Houlton,	10 0	W. T. Garnett, Esq.	5 0	W. Wilson, Esq.	5 0
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Windsor	18 10	Messrs. Hodgson &	Per W. F. Bennett, Esq.	10 0	J. G. Archer Houlton,	10 0	W. T. Garnett, Esq.	5 0	W. Wilson, Esq.	5 0
Miss Brevoort	10 0	Jun. Messrs.	Per W. F. Bennett, Esq.	10 0	J. G. Archer Houlton,	10 0	W. T. Garnett, Esq.	5 0	W. Wilson, Esq.	5 0
	10 0	Thos. Dunke, Esq.	Per W. F. Bennett, Esq.	10 0	J. G. Archer Houlton,	10 0	W. T. Garnett, Esq.	5 0	W. Wilson, Esq.	5 0
	10 0	J. T. Danks, Esq.	Per W. F. Bennett, Esq.	10 0	J. G. Archer Houlton,	10 0	W. T. Garnett, Esq.	5 0	W. Wilson, Esq.	5 0

LIST OF DONATIONS IN KIND.

Robert Russell, Esq.	1 quarter of Wheat	Henry Webb, Esq.	2 pints of Swede Turnip Seed	S. Robinson, near Derby	1 sack of Barley
Nathaniel Sulgrave, Esq.	1 sack of White Wheat	The Earl of Faversham	2 pints of Kohl Rabi Seed	Matthew Nelson, Esq.	1 sack of Oats
Bradford Abbas, Esq.	1 lb. Mangel Wurzel Seed	W. Lawrence, Esq.	5 quarters of Barley	T. A. Sewall, Esq.	4 bushels of White Peas
Joseph Smith, Esq.	100 lbs. of White Flour	Alfred Perrey, Esq.	5 quarters of Oats	James Cutter, Esq.	2 sacks of Wheat
James Buckman, Esq.	1 sack Pedigree Barley	John F. Hodge, Esq.	5 sacks of Barley	James Pizar	1 sack of Barley
Wm. Sadler, Esq.	5 sacks Chevalier Barley	W. Leavitt, Esq.	2 sacks of Oats	John Fagar	5 sacks of Barley
Joseph Druce, Esq.	100 bushels Barley	H. Broughill, Esq.	4 bushels of Talavera Turnip Seed	Frederic Bentley, per H. T.	10 sacks of Barley
Messrs. Wolburton & Bowden	4 bushels of Oats	W. C. Ror, Esq.	4 bushels of Talavera Wheat	John Bargett	1 sack of Barley
Henry Nield, Esq.	100 lb. Seed Potatoes	Sir W. Capel de Broke, Bart.	1 quarter of Wheat	Robert Shuter	5 sacks of Chevalier Barley
J. Streeter, Esq.	1 quarter Barley	Christophor Rose, Esq.	1 quarter of Barley	Geo. Thunian	5 sacks of Barley
Mr. J. Green	2 sacks of Barley	Russell Swanwick, Esq.	1 sack of Barley	Geo. Hawkins	12 sacks of Wheat and Barley
Clare Sewell Read, Esq., M.P.	2 bushels Chevalier Barley	Richard Hall, Esq.	8 bushels of Barley	Gerard Barton, Esq.	12 sacks of Barley
E. T. Bennett, Esq.	2 bushels of Champion Swede	Charles Reynolds, Esq.	8 bushels of Barley	Harrison	1 sack of Seed Barley
W. Harper, Esq.	1 sack of Oats	Thomas Stubbs, Esq.	4 bushels of Spring Wheat	Geo. Carleton, Esq.	1 bag of Talavera Wheat
W. B. Jones, Esq.	1 sack of Oats	Messrs. Thomas Mackenzie and	1 barrel of Red Bearded Wheat	Jefferys Paul, Esq.	1 bag of Wheat
Wm. Sadler, Esq.	1 sack of Oats	W. Lawrence, Esq.	2 bushels of Black Tartarian Oats	Collected at Farmers' Market	10 quarters of Seed Barley
R. Pennington, Esq.	1 sack of Oats	Mrs. M. M. Finney and Co.	4 bushels of Talavera Wheat	Table, Fishers, Jun, Bishop	10 quarters of Chevalier seed
F. J. Turner, Esq.	4 bushels of White Oats	Wm. Brown, Esq.	4 bushels of Talavera Wheat	Stortford, Herts	10 quarters of White Dutch Oats
Marmaduke Walter, Esq.	5 quarters of Oats	Wm. Minfield, Esq.	4 bushels of Talavera Wheat	Matthew Savage	10 quarters of Hallett's Pedigree
From Parish of Quailford, Malvern	W. Cobley, Esq., Clevedon	Messrs. M. M. Finney and Co.	4 bushels of Talavera Wheat	Stephen Davis	4 quarters of Barley
W. Cobley, Esq.	1 bag of Wheat	Wm. Brown, Esq.	4 bushels of Talavera Wheat	Geo. King	1 quarter of Barley
A. Walker, Esq.	1 sack of Barley	Wm. Minfield, Esq.	4 bushels of Talavera Wheat	Rev. J. H. Horner Wells	60 to 80 sacks of Wheat, Barley,
W. Grundy, Esq.	1 sack of Barley	Wm. Brown, Esq.	4 bushels of Talavera Wheat	Fredk. Wm. Earle, Esq.	5 bushels of Black Oats
A. Osborne, Esq.	1 sack of Barley	Wm. Minfield, Esq.	4 bushels of Talavera Wheat		1 bushel of Potatoes
M. A. Miel, Esq.	1 sack of Barley	Wm. Brown, Esq.	4 bushels of Talavera Wheat		4 bushels of Mangel Seed
W. Bullock, Esq.	1 sack of Barley	Wm. Minfield, Esq.	4 bushels of Talavera Wheat		1 sack of Oats
J. Bullock, Jun., Esq.	1 sack of Barley	Wm. Brown, Esq.	4 bushels of Talavera Wheat		5 quarters of Oats
J. Lane, Esq.	1 sack of Barley	Wm. Minfield, Esq.	4 bushels of Talavera Wheat		5 sacks of Oats
T. Need, Esq.	1 sack of Barley	Wm. Brown, Esq.	4 bushels of Talavera Wheat		1 quarter of Barley
J. H. Arkwright, Esq.	1 sack of Barley	Wm. Minfield, Esq.	4 bushels of Talavera Wheat		40 lb. Mangel
W. Brown, Esq.	2 quarters of Barley	Wm. Brown, Esq.	4 bushels of Talavera Wheat		
E. J. Coleman, Esq.	20 sacks of Seed Oats	Wm. Minfield, Esq.	4 bushels of Talavera Wheat		
Henry Webb, Esq.	20 bushels of Blue Peas	Wm. Brown, Esq.	4 bushels of Talavera Wheat		
	20 bushels of Barley	Wm. Minfield, Esq.	4 bushels of Talavera Wheat		
	16 pints of Yellow Globe Mangel	Wm. Brown, Esq.	4 bushels of Talavera Wheat		
	1 sack of Barley	Wm. Minfield, Esq.	4 bushels of Talavera Wheat		
	16 pints of Green Round Turnip	Wm. Brown, Esq.	4 bushels of Talavera Wheat		
	Seed	Wm. Minfield, Esq.	4 bushels of Talavera Wheat		

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Subscriptions may also be remitted to the account of the "French Peasant-Farmers' Seed Fund," JAMES HOWARD, Esq., M.P., Treasurer, at the Head Office and Branches of the London and County Bank.

The Great Western and the Great Eastern Railway Companies have liberally promised to convey over their lines, en route to Plaistow Wharf, any donations in kind bearing the label of the French Peasant-Farmers' Seed Fund, which will be supplied upon application to the Honorary Secretaries, whilst a certain amount of tonnage will be carried free to a port in France by the South-Eastern, London, Chatham, and Dover, and London and South-Western Railway Companies.

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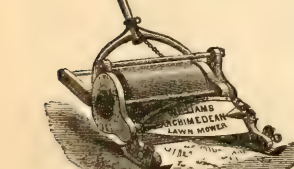
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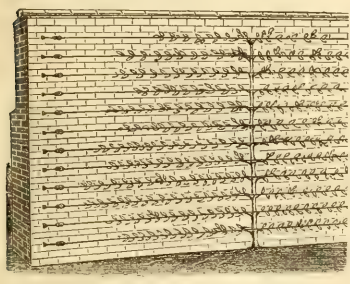
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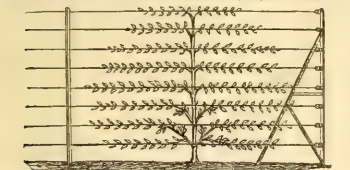
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IMPERISHABLE GARDEN EDGING, VASES, FLOWER POTS,

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2. CHATSWORTH CONDUIT.



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The Tiles will be found far preferable to Box and other
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21. 6d. each.

This Seed Sower will distribute, with equal regularity, Peas, or the
very smallest Flower Seeds, in any required quantity, either broad-
cast or in drills or pots. It has only to be seen to be appreciated. It
is specially applicable for Grass Seed on Lawns and Borders.
Sold wholesale and retail by Messrs. CARTER, DUNNETT, and
BEALL, Seed Merchants, 227, High Holborn, W.C.; and Messrs.
FOLLARD, JEPSON, and CO., Agricultural Engineers, Bear
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To be obtained of all Seedsmen and Ironmongers in town and country.
A liberal allowance to the Trade.

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New labour-saving machinery enables us to supply first-class CON-
SERVATORIES, VINERIES, ORCHARD HOUSES, FORCING
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Carriage paid to any station in the kingdom.
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These are strong and well-made Sliding Lights, glazed, and painted
three coats. Height of frame, 14 inches at front, 25 inches at back.
With handles complete.

Prices.—Height paid to any station within 200 miles of Norwich,
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8 feet long by 6 feet wide. £4 15s. 16 feet long by 6 feet wide. £5 0s.
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If prepared with wood clits, to build on brick wall, and lights to
slide, price, carriage paid as above—

108 feet long by 6 feet wide. £23 0s. 144 feet long by 6 feet wide. £29 0s.
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Other sizes at prices in proportion.

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Illustrated Catalogues free on application.
Rose Lane Works, Norwich.

Rosher's Garden Edging Tiles.



THE above and many other PATTERNS are made in
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suited for KITCHEN GARDENS, as they harbour no
Slugs or Insects, take up little
room, and, once put down,
incure no further labour or ex-
pense, as they "grow." Ed-
gings, consequently being much
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GARDEN VASES, FOUNTAINS, &c., in Artificial Stone, very
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COVERS and PROPAGATING BOXES; also for FOLLEYS
PATENT BEADED GARDEN WALL BRICKS.
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ORNAMENTAL PAVING TILES for Conservatories,
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durability. Wall Copings, Drain Pipes and Tiles of all kinds, Roofing
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SILVER SAND, fine or coarse grain as desired.
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RENDEL'S PATENT PORTABLE PLANT PROTECTORS AND GROUND VINERIES.

SECURED BY

Her Majesty's Royal Letters Patent
(Two Separate and Distinct Patents, 1869 and 1870).

Under the Distinguished Patronage of

H.R.H. the PRINCE OF WALES,
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His Grace the DUKE OF RUTLAND,
His Grace the DUKE of SUTHERLAND,
The Most Noble the MARCHIONESS of ANGLESEA,
The Rt. Hon. the EARL of STAMFORD and WARRINGTON.
The Right Hon. the EARL PORTMAN,
The Right Hon. the EARL of PORTSMOUTH, &c., &c.

Important Testimonial from Mr. Charles
EDWARDS, Gardener to Colonel Croyton, Pentliffe
Castle, Saltash, Cornwall.

"Pentliffe Castle, Feb. 1, 1871.

"I am delighted with the 'Protectors,' for if I had
not had them I should not have a single Lettuce in the
Garden. Every Lettuce unprotected has been killed
by the Frost. The plants under the 'Protectors' cannot
possibly be doing better under any circumstances. I
also find them very useful for Parsley, for I have been
enabled by your 'Protectors' to gather as good Parsley
all through the late severe weather as in October.

"P.S.—We have had for the coldest night 20° of Frost
(Fahrenheit). The Lettuces in the open ground were
killed by the freezing and thawing day after day. I never
uncovered the 'Protectors' for a fortnight except to
gather some Parsley or some of the Lettuces."

Copy of Letter from W. Ferrand, Esq., late
M.P. for Devonport.

"Belvoir Castle, Grantham, Jan. 24, 1870.

"Sir,—Mr. Ingram, of these Gardens, has shown me
your Patent Ground Vineries and Plant Protectors, which
'answer admirably.' Be so good as to send to my gar-
dener, Mr. Shoosmith, St. Ives, Bingley, Yorkshire, 500 feet
at once by Midland Railway.—Yours faithfully,
"Mr. Rendle."
"W. FERRAND."

Important Testimonial from the Rev. L.
MILES HALTON, The Shade, near Hinckley,
Leicestershire.

"I had from you some of your 'Portable Plant
Protectors' in the autumn, which I think will save all my
Lettuces. This speaks favourably of them, and I shall
hope in the spring to use them with other Crops."

Extract of Letter from Mr. Wm. Ingram,
Garden Superintendent to His Grace the Duke of
Rutland, Belvoir Castle, near Grantham, Leicestershire.

"Belvoir Castle Gardens, Jan. 19, 1871.

"I know but too well that all the Broccoli, and many
Winter Greens usually hardy, have been utterly destroyed.
I sincerely lament that your last consignment of Pro-
tectors did not arrive in time to employ them for these things."

The Hon. and Rev. H. W. Mostyn, Buck-
worth Rectory, Kimbolton, Huntingdonshire, says—
"The Protectors have been used during the late severe
winter, and all the Lettuces are in excellent condition,
whereas those in the open ground have been destroyed."
January 25, 1871.

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Now Ready, and can be had on application, Gratis.

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HOT-WATER PIPES, BOILERS, &c., of superior quality.

Hot-water Pipes, Nos. 6 and 7—per	1-inch	1 1/2-inch	2-inch	2 1/2-inch	3-inch	4-inch
Yard	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2
Elbows, No. 12	each	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2
T-Pipes, No. 33	each	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2
SYPHONS	each	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2
VALVES	each	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2

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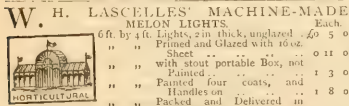
6 ft. by 8 ft. Lights, in bulk, unglazed	Each
" " " "	5 0
" " " " Sheet	0 11 0
" " " " with stout portable Box, not painted	1 10 0
" " " " Painted four coats, and Handles on	1 8 0
" " " " Packed and Delivered	1 10 0
" " " " Railway van	2 15 0

6 ft. by 8 ft., Double Lights, do. Per ft. super.

Woodwork only Prepared and Fitted

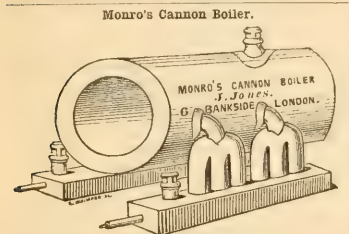
" " " " Painted and Glazed with 16oz. Sheet	0 0 0
" " " " Painted four coats, and Handles on	0 0 0
" " " " Painted four coats, two sides, ready for use	0 1 3

Finsbury Steam Joinery Works, 121, Bunhill Row, E.C.



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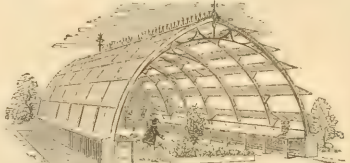
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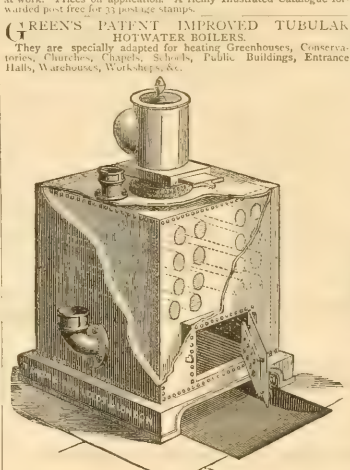
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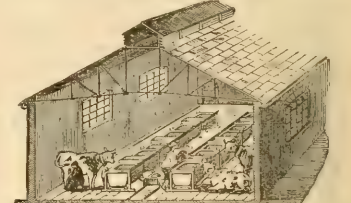
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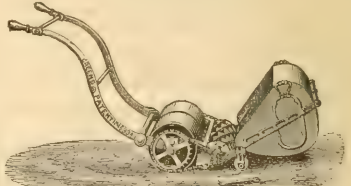
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30 inches	10 feet	10 0 0	30 inches	60 inches	13 10 0
30 inches	20 inches	10 15 0	30 inches	72 inches	17 10 0
30 inches	42 inches	11 15 0	30 inches	84 inches	19 10 0
30 inches	48 inches	13 10 0			

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Diameter.	Length.	£ s. d.	Diameter.	Length.	£ s. d.
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24 inches	26 inches	4 10 0	10 inches	17 inches	2 15 0

These ROLLERS possess many advantages over all others; they are made in two parts, and are free to revolve on the axle, affording greater facility for turning, and the outer edges are rounded off, or turned inward, thus avoiding the unsightly marks left by other rollers. They are manufactured of the best materials, and are got up in a manner surpassing any ever yet brought out.

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To Her Majesty the Queen.

AS SUPPLIED TO THE QUEEN
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Special Estimates given for Large Quantities.

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FOR THE KITCHEN GARDEN.

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This will become exceedingly popular as soon as its merits are known. It is of very dwarf habit, growing only from 12 to 18 inches high, the pods being from 2 to 3 inches in length, very closely set, while the beans are as large as small Lupins. It is very early, and may be cooked green, as French Beans; or the seed when ripe forms a delicate dish dressed as Haricot Blanc. Seed scarce at present, and can only be supplied in packets, 2s. 6d. each.

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A new Wrinkled variety from the Channel Islands, where it is held in great repute. Very prolific, the pods large and well filled with medium-sized Peas of delicious flavour. 3s. 6d. per quart.

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The best Potato for the Main Crop.

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The forwardest Potato in cultivation.

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Special Estimates given for large quantities of Potatoes.

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SAVED FROM CAREFULLY SELECTED TRANSPANTED BULBS.

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AND

THE LONDON GAZETTE.

No. 8.—1871.]

SATURDAY, FEBRUARY 25.

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ROYAL HORTICULTURAL SOCIETY, SOUTH KENSINGTON, W.

NOTICE.—FLOWER SHOW, FRUIT, AND FLORAL COMMITTEE MEETING, WEDNESDAY, NEXT, MARCH 1, at 10 o'clock. GENERAL MEETING at 3. Band of the Royal Society.

ROYAL HORTICULTURAL SOCIETY, SOUTH KENSINGTON, W.

A MEETING will be held in the Council Room, South Kensington, at 10 o'clock, on WEDNESDAY, March 1, at which all Exhibitors and others who are inclined to interest themselves in the proposed New Exhibition Scheme, are invited to attend, in order to discuss the name. Mr. MARSHALL will take the Chair.

CRYSTAL PALACE.—GREAT FLOWER SHOW, SATURDAY, May 20.

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The following is the report given by the *Gardeners' Chronicle* of Crown Prince, at the Floral Committee of the Royal Horticultural Society, August 19, 1870:—

"Mr. Cannell, of Woolwich, exhibited neatly grown plants of Crown Prince, a double-flowered free-growing variety of great merit. In colour the flowers are of a deeper shade of peach than in any other variety, and in habit it appears to be very vigorous without the weakness of the older kinds. A First-class Certificate was awarded."

The *Gardeners' Magazine* reports at the same time this—"Crown Prince—a very dwarf free-flowering double Zonal, most distinct in character and colour from all existing varieties. The flowers, which are very large, full and of good form, are of a deep rich rose-carmine colour. First-class Certificate." Shirley Hibberd, Esq., in the *Gardeners' Magazine* of September 1870, speaks of Crown Prince thus—"The colour is delightful; in my opinion it surpasses in this respect every known variety, single or double. I shall therefore grow it in the next year, with a view to dry the flowers for winter bouquets, as well as to enjoy richness of colour all the year."

Prices:—2s. each; three for 12s. 6d.; six for 20s.; thirteen for 40s. KING of the DOUBLES.—This is the largest and best shaped pip of all the double-flowered Geraniums now grown of last year. Colour is a beautiful bright crimson, and very free; a noble variety. 2s. 6d. each; three for 6s. 6d.; six for 12s. and thirteen for 20s.

Orders received in rotation as received. A CATALOGUE of NEW FLORIST FLOWERS sent free on application.

H. CANNELL, F.R.H.S., New Florist Flower and Florist Flower-Seed Merchant, Woolwich, S.E.

SUPERIOR VEGETABLE AND FLOWER SEEDS.

Free by Post. Per packet.—d.
BET, Dell's New Blackbeard 1 0
BORRER, Moss, Variegated 1 0
BROCCOLI, Snow's Winter White, true 1 0
CABBAGE, Worcester Incomparable 1 0
CAULIFLOWER, True Erfurt 1 0
CELERY, Sandringham White 1 0
CUCUMBER, Small, Fine Long Frame 1 0
Lettuce, 1 0
LETTUCE, Worcester Hardy White Cos 1 0
MELON, Cox's Golden Gem, true 1 0
ONION, Nuneham Park, true 1 0
POTATO, New Giant Rocca 1 0
TOMATO, Mammoth Red 1 0

ASTER, Truffaut's Superb, 12 varieties, mixed 1 0
AMARANTHUS ELEGANTISSIMUS 1 0
CALCEOLARIA, splendid mixed 1 0
CENTAUREA RAGUSTA COMPACTA 1 0
CINERARIA, CANDIDISSIMA 1 0
CINERARIA, finest dwarf, mixed 1 0
CYCLAMEN, splendid varieties, mixed 1 0
ECHINOPSIS METALLICA 1 0
GERANIUM, 1 0
HEARTSEASE, Cliveden, white, purple, and yellow 1 0
MIGNONETTE, Parsons New White 1 0
LOBELIA SPECIOSA, true dark blue 1 0
PETUNIA, fine double, mixed 1 0
STOCK, finest German, 12 varieties, mixed 1 0
PRIMULA, splendid fringed, mixed 1 0
PYRETHRUM, Golden Feather 1 0
TACONIA VAN VOLXEMI 1 0
WALLFLOWER, double German, 12 varieties, mixed 1 0
ZINNA ALLEGANS, splendid double, mixed 1 0

39s. 4d., and 21s. COLLECTIONS OF GARDEN SEEDS, of the most approved kinds, carriage free.
RICHARD SMITH, Nurseryman and Seed Merchant, Worcester.

Seeds Direct from the Growers
THE BEST MEANS OF PREVENTING DISAPPOINTMENT.
SUTTONS' £3 3s. COLLECTION OF GARDEN SEEDS, for a Large Garden, carriage free.
SUTTONS' £2 2s. COLLECTION OF GARDEN SEEDS, for a Medium-sized Garden, carriage free.
SUTTONS' £1 1s. COLLECTION OF GARDEN SEEDS, for a Small Garden, carriage free.
SUTTONS' £3 3s. COLLECTION OF FLOWER SEEDS, for a Large Garden, carriage free.
SUTTONS' £2 2s. COLLECTION OF FLOWER SEEDS, for a Medium-sized Garden, carriage free.
SUTTONS' £1 1s. COLLECTION OF FLOWER SEEDS, for a Small Garden, carriage free.
SUTTON AND SONS, Seedsmen to the Queen, Reading.

Vegetable and Flower Seeds.
1871 | SEED POTATOS, GARDEN IMPLEMENTS, &c | 1871.
GENUINE AND OF THE BEST SELECTIONS.

All but very small parcels carriage paid.
OUR PRICED DESCRIPTIONAL CATALOGUE of the above, with Cultural Directions, also ILLUSTRATED SHEETS of new and desirable VEGETABLES and FLOWERS, IMPLEMENTS, &c., are now ready, and will be forwarded post free on application.

James Dickson & Sons.
(Old Established Nursery and Seed Business),
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Seeds of Sterling Merit.
EDMUND PHILIP DIXON, Yorkshire Seed Establishment, 57, Queen Street, and 75, 76, and 77, High Street, Hull, begs to announce that his descriptive CATALOGUE of SEEDS is now ready, post free on application.

NEW AND CHOICE SEEDS.
Dillon's Improved Dwarf-top BEET 1 0
Elleston's New Surprise BROCCOLI, a great improvement upon the Mammoth 1 0
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Dixon's Imperial PINK CELERY, growth smaller than the Mammoth White, but of exquisite flavor 1 0
Dixon's Yorkshire Hero CUCUMBER, length 20 to 24 inches 2 0
Masters' Prolific CUCUMBER, 12 to 15 inches, very prolific 1 0
Foster's XL fine Long Ridge CUCUMBER. (All who have seen this variety are satisfied it cannot be surpassed, and those who have tried its flavour are convinced of its excellent quality) 12 to 18 inches 1 0
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E. P. DIXON'S COMPLETE COLLECTIONS of VEGETABLE and FLOWER SEEDS contain the choicest and most approved varieties; price, 10s. 6d. to 10s.

CUCUMBER, ARMITAGE'S SATISFACTION.
1s. per Packet. Five Seeds.

We send this CUCUMBER out as one of the choicest varieties offered. It is very prolific, one of the best in shape, being without neck, good colour, smooth, and fine flavour. Measuring 20 to 24 inches. The stock is very limited, owing to its being very difficult to seed. May be had by the Trade through MESSRS. HURST AND SON, LEADENHALL STREET, LONDON, E.C.

WILLIAM ARMITAGE AND SON, SEED MERCHANTS, HUDDERSFIELD.

ESTABLISHED 1842.

This Advertisement will not appear again this season, as the Stock is very limited.

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POST FREE, SIX STAMPS.

WHEELERS' SEEDS ARE THE BEST.

"The 15s. Packet of Garden Seeds is a most liberal allowance for the money."—Rev. H. J. POTTS, Trevelin House, Llangernon.
Full particulars of the 15s. Packet are given in "Wheeler's Little Book."

"I am much pleased with your Guinea Collection of Garden Seeds received to-day; they are peculiarly well and liberally selected."—Rev. J. LUKIN, Poultoncham.

ONE GUINEA COLLECTION.
Carriage Free.

100. Wheeler's First Family PEAS 1 0
101. Early Green Marrow PEAS 1 0
102. Dickson's Favorite PEAS 1 0
103. British Queen PEAS 1 0
104. Taylor's Windsor BEANS 1 0
105. Early Longpod BEANS 1 0
106. Early Longpod BEANS 1 0
107. SCARLET RUNNERS 1 0
108. FOUR FRENCH BEANS 1 0
109. Wheeler's Extra Fine 1 0
110. Green Curled BORCOLE 1 0
111. ASPARAGUS KALE 1 0
112. BRUSSELS SPROUTS 1 0
113. Walcheren BROCCOLI 1 0
114. Superior Winter BROCCOLI 1 0
115. Elleston's Mammoth BROCCOLI 1 0
116. Adams' Early White BROCCOLI 1 0
117. Wheeler's Imperial CAR 1 0
118. Cocoa-nut CABBAGE 1 0
119. Red Fiddling CABBAGE 1 0
120. Early Horn CARROT 1 0
121. James' Green-top CAR 1 0
122. Early London CAULI 1 0
123. Early London CELERY 1 0
124. Curled CRESS 1 0
125. Australian CRESS 1 0
126. Red Fiddling CABBAGE 1 0
127. Wheeler's Fudge CU 1 0
128. CUMBER 1 0

The Two Guinea and Three Guinea Collections are most liberally selected, and are sent Carriage Free.
5 per Cent. Discount for Cash.

5 per cent. Discount for Cash.



WHEELERS' COCOA-NUT CABBAGE.
Large Packet, 1s.; Small Packet, 6d. Post Free.
"I consider the Cocoa-Nut Cabbage the best I have ever grown."—A. PATTERSON, *Seedpot Park Gardens*.
"The Cabbage seed which I had from you last year has turned out excellent, not one in a thousand ran to seed. All my neighbours have desired me to get some for them this year."—Wm. SMITH, *Penally*.
For List of Agents, see *Gardeners' Chronicle*, p. 66, 1871.

WHEELERS' LITTLE BOOK
(Illustrated) for 1871, is a short Select List of the best Seeds in Cultivation, interesting and instructive to all who have Land, from a Lady's Flower Garden to a Nobleman's Domain, and from half an Acre allotment to a Farm of 1000 Acres. It has been sent Post Free to our Customers throughout the Kingdom: a few copies still remain, applications for which must contain Six Stamps.

"Wheeler & Son's Little Book, or Select Seed List, deserves our warmest eulogy as a work of art. The Flower Seed department affords an opportunity for several happy illustrations, and the Farm List is well treated."—*The Field*.

WHEELERS' SEEDS ARE THE BEST.

Sweet-scented Flowers.
"Give me Cabbage Roses, Sweet Peas, and Wallflowers. That is my idea of a garden. Corsican's garden is the only sensible thing of the sort. * * *"
"No flowers are admitted that have not perfume. It is very old-fashioned. You must get her to show it you."
"It was agreed that after breakfast they should go and see Corsican's garden. * * * It was formed upon a gentle southern slope, with turf terraces walked in on three sides, the fourth consisting of arches of Golden Yew. The Duke had given this garden to Lady Corsican, in order that she might practise her theory, that flower-gardens should be sweet and luxuriant, and not hard and scentless imitations of works of art. Here, in their season, flourished abundantly all those productions of Nature which are now banished from our once neglected senses; huge bushes of Honeysuckle, and bowers of Sweet Pea and Sweet Briar, and Jessamine clustering over the walls, and Gillyflowers scenting with their sweet breath the bricks from which they seem to spring. There were banks of Violets, which the southern breeze always stirred, and Mignonette filled every vacant nook. As they entered now, it seemed a blaze of Roses and Carnations, though once recognised in a moment the presence of the Lily, the Heliotrope, and the Stock, *Lochnair*."

SWEET-SCENTED FLOWERS

The following Twelve Packets of Seed, Post Free, 4s. 6d.
HELIOTROPE
GILLYFLOWER
CANDYTUFT, Sweet
ALYSSUM, Sweet
MALTHIOLA BICORNIS
MIGNONETTE
MUSK
VIOLETS, 6s. per doz.
LILIES, 6s. per doz.
CLOVE CARNATIONS,
STREK, German
WALLFLOWERS
CARNATIONS

We can also offer the following fragrant Flowering Plants:
CABBAGE ROSES, 9s. p. doz.
SWEET BRIAR, 6s. per doz.
HONEYSUCKLE, 6s. p. doz.
JESSAMINE, 12s. per doz.
PERPETUAL ROSES, 12s.

"The advantages of procuring Seeds direct from the Growers cannot be overestimated."

CARTER'S PRIZE GRASS SEEDS FOR PASTURES, &c.

CARTER'S MIXED CLOVERS AND GRASSES

For alternate Husbandry, Per acre—s. d.	
CLOVERS and RYE GRASS only for One Year's Lay	13 6
CLOVERS and GRASSES for One Year's Lay .. 14 6	
CLOVERS and GRASSES for Two Years' Lay .. 18 0	
CLOVERS and GRASSES for Three or Four Years' Lay	22 0
Do. Do. Do. (second quality)	21 0
CLOVERS only for One Year's Lay .. 13s. to 14 0	

ITALIAN RYE GRASS.

CARTER'S SUPERFINE IMPORTED ITALIAN RYE GRASS, as supplied to the Metropolitan Sewage Company, heavy and very clean	8 0
ITALIAN RYE GRASS, English Seed, 6s. 6d. to 7 0	
ITALIAN RYE GRASS, in Bales as imported: per cwt., 44s. to 60s.; per bush., 8s. to 10 0	

THE ROYAL SEEDSMEN

THE ROYAL SEEDSMEN

CARTER'S

FOR ALL SOILS

GRASS SEEDS

Descriptive Lists
Gratis Post Free

CARRIAGE FREE

CATTLE CABBAGE.

ROBINSON'S CHAMPION DRUMHEAD, the largest	2 3
CARTER'S IMPROVED OXHEART, very early, will produce a very heavy crop, if transplanted so inches apart	2 6
CARTER'S SELECTED ENFIELD MARKET	2 6
GIBSON'S DWARF DRUMHEAD	2 6
FLAT DUTCH	2 0
THOUSAND-HEADED	2 0
COTTAGER'S KAIL	3 6
LARGE DRUMHEAD	2 0
EARLY BATTERSEA	2 6
DRUMHEAD SAVOY	2 6

PARNIP.

HOLLOW-CROWNED, the best	2 0
LARGE JERSEY, a great cropper	1 6
LARGE CATTLE	1 3

CARTER'S PRIZE FARM SEEDS—CARRIAGE FREE.

CARTER'S GENUINE FARM SEEDS,

HARVESTED ON THEIR OWN SEED FARMS, FROM CHOICE PRIZE STOCKS.

PRESENT PRICES. Per lb.—s. d.	
CARTER'S IMPROVED MAMMOTH PRIZE LONG RED MANGEL (see Illustration).—This is acknowledged to be superior to any other variety	1 4
CARTER'S WARDEN PRIZE YELLOW GLOBE MANGEL	1 0
CARTER'S NEW CHAMPION INTERMEDIATE MANGEL	0 10
CARTER'S IMPERIAL HARDY SWEDE.—By careful selection we have produced the best Swede in cultivation	0 10
CARTER'S LONDON SWEDE.—Grows to a large size	0 10
SKIRVING'S IMPROVED PURPLE-TOP SWEDE	0 10
CARTER'S CHAMPION GREEN and PURPLE TOP HYBRID TURNIP	0 10
CARTER'S IMPROVED PURPLE-TOP MAMMOTH TURNIP.—Originally selected from the Grey Stone	1 0

Much Cheaper by the Bushel or Cwt.

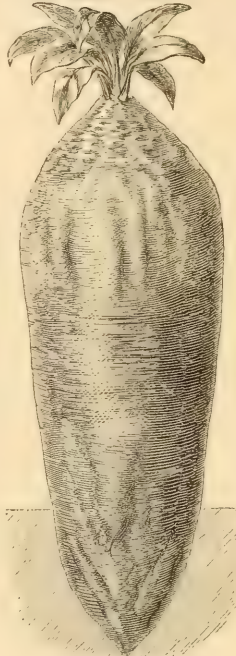
EVIDENCE OF QUALITY OF MESSRS. CARTER'S SEEDS.

From Mr. McVICAR, Gardener to the Dowager Lady Aveland, Grimsthorpe Castle.

"I have no hesitation in recommending your Seeds to any person, for the simple reason, that, during the last four years I have never had occasion to make a single complaint against any article received from you either for garden or field."

All Seeds Carriage Free.

CARTER'S IMPROVED MAMMOTH PRIZE MANGEL. SUPERIOR TO ALL OTHERS.



Price 1s. 4d. per lb., Cheaper per Cwt.

CARTER'S GRASS SEEDS

FOR ALL SOILS,

CARRIAGE FREE.

DESCRIPTIVE LISTS Gratis, Post Free.

FOR PERMANENT PASTURES.

FOR ORDINARY SOILS, best quality, 27s. to 30s. per acre; second quality, 20s. to 24s. per acre.
FOR HEAVY SOILS, best quality, 28s. to 31s. 6d. per acre; second quality, 20s. to 26s. per acre.

Reduced Rates for quantities of more than five acres.

CARTER'S GRASS SEEDS AT ALDERSHOT CAMP.

Col Leflan, Commanding the Royal Engineers, reports as follows, under date February 4, 1871.

"Col. Leflan, R.E., presents his compliments to Messrs. Carter, and begs to inform them that all the Grass and Clover seeds supplied by them to the War Office for use at Aldershot last year and the year before have succeeded admirably. Last year a very fair crop of excellent hay was produced on what had previously been a barren sand."

For the best information on Laying-down Land to Grass, see CARTER'S ILLUSTRATED FARMER'S CALENDAR for 1871; gratis and post free to purchasers.

CONTENTS of CARTER'S 21s. COLLECTION OF VEGETABLE SEEDS No. 2.

Packing and Carriage Free, Suitable for a Small Garden.	
PEAS, Carter's First Crop, 1 qt	CAULIFLOWER, Carter's
Premier, 1 qt	Admirable Mammouth, large pkt.
Bishop's Long-pod, 1 pt	CELESTINE, Incomparable Dwarf
Fire-eater, 1 pt	White, large pkt.
Laxton's Supreme, 1 qt	Manchester Giant Red, lg. pkt.
Champion of England, 1 qt	CRESS, plan, 4 oz
Carter's Victoria, 1 pt	Curcution, 1 oz
Veitch's Perfection, 1 pt	CUCUMBER, Carter's Cham-
BEANS, Bonaparte, 1 pt	pion pkt.
Broad Windsor, 1 pt	ENDIVE, French curled, lg. pkt.
Best French, 1 pt	LEEK, Ayton Castle, large pkt.
Scotch Runner, 1 pt	LETTUCE, 4 pkts. in variety
BEST 21s. 6d. large pkt	MUSTARD, White, 4 oz
KAIL, Cotter's, large pkt	MELON, Carter's Excelsior, pkt.
New Asparagus, large pkt.	ONION, Giant Madeira, 1 oz
Dwarf Scotch, large pkt	Reading Improved, 1 oz.
ALBERT SPROUTS, large pkt	PARSLEY, Dunst's Garnish-
BUTTERBEES SPROUTS, best, large pkt	ing, large pkt.
BROCCOLI, Carter's Champion, large pkt.	RADISH, Wood's Frame, 2 oz
Snow's Winter, large pkt	Early Scarlet short-top, 2 oz
Adams' Early White, large pkt	Mixed Turnip, 2 oz
Purple Sprouting, large pkt	SPINACH, Summer, 1 pt
CABBAGE, 4 pkts in variety	Winter, 5 pt
Savoy, best curled, large pkt	TURKISH, Early Six-weeks
CARROT, large pkt	Turnip, 1 oz
CARROT, Early Horn, 1 oz	YAMO, Red, pkt.
James' Intermediate, 1 oz	VEGETABLE CREAM,
Selected Scarlet, 1 oz	Moore's, pkt.
PARSLEY, student, 1 oz	POT HERBS, 2 pkts.

Other Collections, 12s. 6d., 30s., 42s., and 63s. each.

"COMPARISON INVITED."

THE ROYAL SEEDSMEN

CARTER'S

PRIZE MEDALS

PARIS, 1867. LONDON, 1862.

HAMBURG, 1869. WIDEN, 1870.

BLACKPOOL, 1870. &c. &c.

GENUINE SEEDS.

DESCRIPTIVE LISTS
GRATIS, POST FREE
5 PER CENT DISCOUNT
FOR CASH.

CARRIAGE FREE

237, & 238, High Holborn,
LONDON.

CARTER'S

COLLECTIONS OF CHOICE FLOWER SEEDS

Will produce a brilliant display.

COLLECTION A.	10s. 6d.
COLLECTION B.	15s. 6d.
COLLECTION C.	21s. 6d.
COLLECTION D.	42s. 6d.
COLLECTION E.	63s. 6d.

Carriage Free.

Collection C., Price 21s., Post Free, contains

- AN ASSORTMENT OF
- 12 Choicest Var. FRENCH ASTER.
- 16 " " GERMAN STOCK.
- 10 " " Dwarf Stock-flowered LARKSPUR.
- 6 Choicest EVERLASTING FLOWERS and ORNAMENTAL GRASSES for Winter Bouquets.
- 6 Showy NEW ANNUALS for Bedding.
- 12 Showy HARDY DWARF ANNUALS, including Tom Thumb Nasturtium, Saponaria, Blue Nemophila, &c., &c.
- 15 Showy TENDER ANNUALS, including choice Phlox Drummondii, Balsam, Celosia, Amaranthus ruber, Perilla nankiensis, Zinnia, &c., &c.
- 6 HARDY PERENNIALS for Autumn and Spring Blooming, including Hollyhock, Wallflower, Gaillardia, Alyssum saxatile, &c.

As Supplied to the

As Supplied to the



SUTTONS' GRASS SEEDS FOR ALL SOILS, CARRIAGE FREE.

FOR PERMANENT PASTURES.

20s. to 32s. per acre, carriage free.

From J. J. MUIR, Esq., *Twickenham*.—"Your Grass Seeds are so pure and well selected that I have often spoken of them to those who required them."

FOR PARK GROUNDS, &c.,

18s. per bushel (2½ bushels per acre), carriage free.
From Mr. HENRY AVOCOCK, *Agent to Lady Gentry*.—"The Grass Seeds you sent last year, for seven acres in the middle of Oxen Heath Park, is the best herbage I ever saw."

FOR IMPROVING PASTURES.

Sow at once 8 to 12 lb. per acre.

From S. BRIDGLAND, Esq., *Surry County Asylum*.—"The appearance of the Grass after cutting gives the best evidence of the advantage of using your Renovating Grass Seeds. Our meadows are the admiration of all who look at them."

FOR 1, 2, 3, or 4 YEARS' LEY.

12s. 6d. to 22s. 6d. per acre, carriage free.

From F. H. NICHOLSON, Esq., *Feckin*.—"The Clover and Rye-grass supplied by you I have not seen equalled in this neighbourhood."

SUTTONS' CLEANED CLOVER SEEDS, New and Unadulterated.

	Per lb.—s.	d.	1	2	3	4
COMMON RED or BROAD, clean ..	0	9	10	10	10	10
Ditto, ditto, extra fine ..	0	11	10	10	10	10
YELLOW TREFOIL, or HOP, clean ..	0	4	10	10	10	10
Ditto, ditto, extra ..	0	0	0	0	0	0
WHITE, or DUTCH, clean ..	0	11	10	10	10	10
Ditto, ditto, extra ..	0	11	10	10	10	10
ALSIKE, or HYBRID (very scarce) ..	1	3	10	10	10	10
COW GRASS (true perennial) ..	0	11	10	10	10	10
GIANT PERENNIAL WHITE ..	1	3	10	10	10	10
GIANT COW CLOVER ..	1	6	10	10	10	10
IMPERIAL GIANT COW GRASS ..	1	6	10	10	10	10
MALDEN'S WONDER ..	1	6	10	10	10	10

Cheaper by the Cwt. or Ton.

Samples may be had on application.

SUTTONS' CLEANED RYE GRASSES.

	Per bushel—s.	d.	1	2	3	4
PERENNIAL RYE GRASS, best heavy seed ..	7	0	0	0	0	0
PACEY'S PERENNIAL RYE GRASS ..	7	0	0	0	0	0
ANNUAL or COMMON, best quality ..	6	0	0	0	0	0
SUTTONS' IMPROVED ITALIAN ..	8	0	0	0	0	0

The best and most productive. Sow 3 or 4 bushels per acre, if alone.

ITALIAN RYE GRASS, good English seed ..	7	0	0	0	0	0
FRESH IMPORTED SEED, finest, cleaned ..	7	0	0	0	0	0

Ditto, in bales, as imported, 4s. to 5s. per cwt. bale contains 2 cwt., or about 10 bushels.

Special Quotations for Large Quantities.

SUTTONS' HOME-GROWN FARM SEEDS, SAVED FROM CAREFULLY SELECTED TRANSPLANTED BULBS.



Price 1s. per lb. Cheaper by the Cwt.

For Prices and full particulars of other FARM SEEDS, see SUTTONS' FARMER'S YEAR BOOK for 1871, Illustrated, Price 6d., Lists to Customers.

SUTTONS' ABRIDGED LIST of FARM SEEDS, Gratis, and Post Free.

SUTTON AND SONS, SEEDSMEN TO THE QUEEN, READING.

Siege of Paris.

CHARLES VERDIER, Fils, NURSEMAN, 12, Rue Dumeril, Paris, takes the earliest opportunity to inform his friends of the fact that his SEEDS, LABIOLLI, and P.ONES have not suffered in the least from the Siege, and that dietary communications are resumed he will be able to execute all orders he may be favoured with as usual.

Agents, Messrs. K. SILBERKIND and SON, 5, Harp Lane, Great Tower Street, London, E.C.

From Paris.

L'ÉVEQUE and SON, NURSEMAN, 132 and 134, Boulevard de l'Hôpital, beg to inform their Friends and Customers that their STOCKS, ROSES, and LABIOLLI are entirely safe; and they respectfully solicit orders as soon as communications shall be re-established.

Fruit Trees, Roses, &c.

B. S. WILLIAMS can supply all the best kinds, true to name and in good condition; fine fruit-bearing Trees, open French Seed Stock, trained as Cordons. FOREST and ORNAMENTAL TREES of every description. Parent LIST on application.

BREMEN HORTICULTURAL SOCIETY.

Directors and Secretaries of Horticultural Societies are respectfully requested to send their KATALOGUES, to H. ORTHES, Director of the Institution for Deaf and Dumb, *pro tem.* Secretary to the Horticultural Society, Bremen, Germany.

The Gardener's Chronicle

SATURDAY, FEBRUARY 25, 1871.

MEETINGS FOR THE ENSUING WEEK.

WEDNESDAY, March 1. (Royal Horticultural (Floral and Fruit) Committee), at S. Kensington .. 11 A.M.
Ditto (Scientific Committee) .. 1.30 P.M.
THURSDAY, — — — — — (General Meeting) .. 8 P.M.

WHEN, some time since, it was announced that the Metropolitan Board of Works was in treaty for the purchase of LEICESTER SQUARE, every Londoner felt an interest in the announcement. What had they not seen there? Miss LINWOOD's exhibition of needlework; athletes who would divide a sheep in twain with one blow of the sabre; BARNARD'S panoramas; Poses Plastiques, wherein ill-favoured persons pretended to be antique statues; panopticons with wonderful organs and coloured fountains; WYLD'S Globe and its concomitant attractions (by the way, that globe gave us about the best notions of geography that we ever had, and should have been secured for South Kensington or some such educational exhibition)—in fine, there was always variety and change in Leicester Square, but one thing changed not, and it remains to this day—we mean the indescribable squalor of the central enclosure, the never-failing source of railway on the part of the wags of Cockneydom, whose exploits culminated some year or two since in the equipment of the equestrian statue in the centre with a fool's cap on the head, a birch broom in the arms of the rider, while the steed was spotted all over with daubs of paint, like a child's wooden horse. All the town laughed at the escapade. We never heard that any attempt was made to ascertain who were the perpetrators of the offence. The statue was divested of its adornments, and the last we saw of it was some months since, when the rider had toppled over on to the sooty sward beneath, and the leaden steed stood riderless, like some ugly fossil brute of by-gone times, that had not yet attracted the attention of admiring geologists, and been cared for accordingly. That such a site should be in Chancery is only what the spectator would expect, but whether this be so or not we do not know. We do know that legal efforts were made to endeavour to compel the proprietors of the square to awaken to a sense of their duty, but somehow the said proprietors slumbered on, the legal thunderbolts fell harmless, and matters went on in the same old way, till we heard that the "Board" which has given us the Thames Embankment and the Main Drainage was prepared to take the neglected square under its own protection, and we all rejoiced accordingly.

No sooner was the proposal made known than the florists, with a keen eye to business, and let us hope some feeling for the adornment of the metropolis, discovered what an admirable site the square would form for a FLOWER MARKET. How utterly inadequate the present shed near Covent Garden is for the requirements of the trade needs scarcely be told. A good-sized barn or two would offer as great convenience as that now thought sufficient for the flower-dealers of this metropolis. If we say it is considerably less convenient in point of size and commodiousness than Covent Garden itself, we shall convey some idea, to those who do not know the place, of its complete unsuitability for the purposes for which it is intended. All this is well told in a letter addressed to the Metropolitan Board of Works from one who speaks from long experience.

Mr. J. W. THOMSON, of the Royal Nursery, Penge, formerly of Kew, and head gardener at Sion, thus writes concerning the desirability of establishing a flower market in Leicester Square. Thoroughly agreeing with the writer in principle, but not pledging ourselves to all the details of his scheme, we now lay it before our readers, and especially invite the comments of those more particularly interested in the establishment of a central flower market worthy of such a city as London:—

"I have regularly attended Covent Garden since the year 1836, and I have always considered that we were very much in want of a flower market, similar to those possessed by our neighbours on the Continent, and to which nurserymen and florists could resort for exhibition and sale their horticultural and floricultural productions; a market which ladies also might visit in order to select and purchase plants to decorate their balconies, flower-boxes, &c. When considering the subject for more than 25 years past, it has been a matter of great surprise to me that, from its central position, and the well-known fact that Leicester Square should not have been appropriated to that purpose years ago, and I doubt not, gentlemen, but that you will agree with me in considering the situation admirably adapted for that purpose. Moreover, during my leisure hours in the long winter evenings, fully 15 years ago, I amused myself by preparing a rough sketch of what I considered suitable, and which represented a glass dome, in the centre, not more than 35 or 40 feet high. This I intended to be used as an aviary, a bazaar, winter garden, or promenade; and in it once or twice a year, in the London season and summer I proposed to have a Rose or general flower show. By such an arrangement I disposed of the surface or upper part of the space occupied by the dome, under which I would remove the whole of the soil to the depth of 9 or 10 feet. This space might be used for cellars, or used as the French people do the caverns round Paris, for the culture of Mushrooms; and, if so used, I am confident it would soon be rented to advantage. Having disposed of the centre, my proposal for the disposal of the outside, or fringe of the square, according to my rough plan would be as follows:—To appropriate the whole to a series of ornamental shops similar to those in the grand row, Covent Garden Market. Over each I would have one or two sleeping-rooms, with a good kitchen and bathroom; and in front of each shop I would provide that a space of from 200 to 250 or more superficial feet should be covered by a glass roof: this space should be heated by hot water, or in some other mode, and connected with the shop, to be used as a place wherein to exhibit floral subjects for sale. It would not be necessary to have these glass erections more than 12 or 15 feet high, but they should extend to the very outside boundary, and completely encircle the market, and if tastefully designed would be interesting objects to look upon from the houses surrounding the square. These glass erections I intended to be used not only by the florists and nurserymen in the vicinity of London, but also by those residing within a circle of 20 or 30 miles of London, and who, I doubt not, if they were let at a moderate rent, would gladly avail themselves of the square. These glass erections, for arboricultural, horticultural, and floricultural productions. It has been, and is still, in my opinion, a source of great and serious loss to country nurserymen and florists living at a great distance from London, and who might be the sufferers of new species or varieties of plants, and of floricultural subjects, that they have not a place in or near London where they might perpetually exhibit their valuable novelties, and where the botanist, florist, naturalist, and amateur might see and admire the wonderful results of the great Creator manifested in the vegetable kingdom."

THE suggestions that have been thrown out from time to time as to the expediency of the HORTICULTURISTS of this country holding out a helping hand to their distressed brethren in FRANCE, will, we trust, not be allowed long to remain as suggestions only. That there are considerable practical difficulties in the way we admit, but that circumstances should not prevent us from endeavouring to overcome them. That much has been done already in this country to alleviate the miseries caused by this frightful war we also admit, but we do not see in that circumstance any reason why we should not do more. We may safely leave statesmen, political economists and diplomatists to discuss at their leisure the expediency of neutral nations affording to the unfortunate belligerents that succour and assistance which, theoretically speaking, their own Government should afford. It is not for us, in the presence of appalling disasters, to reproach our neighbours with the folly and wickedness of such a war; all civilised nations must share in some degree the shame and responsibility of such an outrage. Enough for us to know, that there is present misery to assuage—enough for us to feel that the sufferers are human beings like ourselves. War, say its apologists, is not an unmixt evil. Let us prove the proposition by our disinterested endeavours to repair its ravages.

It is probable that most of those who read these words have already in some way or another contributed to the relief of the sick and wounded of both nations, or to the help of the unfortunate peasantry of the invaded districts; but as horti-

culturists we shall surely do well to follow the lead of our agricultural brethren and of the publishing community, and adopt special means to show our sympathy with those heretofore engaged in like pursuits to ourselves.

It is not for us to frame a scheme by which this may be done, the practical instincts and special knowledge of the commercial horticulturists of this country will do this. Meanwhile, with considering the hundreds of *garçons jardinières* thrown out of employ—the number of small florists whose everything has been destroyed, it is clear money must be wanted; while to those in a somewhat higher social position, tools, seeds, grafts, stocks, and other requirements of a nursery business must be specially valuable.

The railway companies are showing their good feeling by transmitting such objects free of charge, and we are sure the subject has only to be fairly brought before the horticultural public to induce them to supplement their individual gifts by others of a more special character, intended for the benefit of their own *confrères*. Those among our nurserymen who have business connections in France, such as Mr. PAUL, to whose letter in another column we call special attention, should be able to inform us in what manner—when and where this special aid could be most effectually rendered. For our own parts, we shall cheerfully render what aid we can to any scheme of the kind indicated.

It is for the horticulturists to say whether they will act by and for themselves, or whether they will avail themselves of one or other of the existing organisations—such as the Mansion House Relief Fund, or the *Daily News* French Peasant Relief Fund.

—At a meeting of the Committee of the SEED TRADE, held at Anderson's Hotel on Wednesday last, Dr. MAXWELL T. MASTERS in the chair, it was decided that a memorial be forwarded to the Post-master-General containing the following resolutions:—

"1. That for several years previous to October 1, 1870, seedsmen had the privilege of sending by post small parcels of seeds and other articles under the then existing arrangements of the sample post, these parcels being generally so small in size as to be in much danger of being lost in the course of transit by rail, or other modes of public conveyance.

"2. That this privilege was a great boon both to the buyer and seller of seed, the seller being in the habit of sending to all parts of the United Kingdom and abroad many hundreds of such parcels annually. That to purchasers residing at remote distances from railway stations or in places destitute of the ordinary means of transit, this privilege was one of the greatest importance, as parcels could be obtained through the post safely, expeditiously, and cheaply, owing to the superior organisation of the Post Office mode of transit. That the enjoyment of this privilege tended in a great degree to develop an important branch of the industry of the kingdom—that of the production of seeds.

"3. That the postal arrangements now in operation interfere most injuriously with the transmission of seeds through the post: as purchasers residing in all parts of the United Kingdom, the Colonies, India, the United States of America, &c., are not able to receive such packages by post, unless paid for at letter rates, which are simply prohibitory, inasmuch as the cost of transit by these means would be equal to at least 20 or 25 per cent. of the average value of the seeds so forwarded. In this manner a considerable loss is entailed on the retail seed trade, as many of the persons engaged in selling seeds have gone to considerable expense to meet this particular requirement of the public, namely, that of obtaining certain seeds, delivered at a nominal rate, prompt and safe, and so expensive are the means of transit, otherwise than through the post, and so much danger is there of loss or delay, that were it not for the facilities offered by the Post Office, there is much reason to believe such purchases would not be made.

"4. That this committee beg leave to advocate the establishment of a 'Parcel Post,' by means of which there could be forwarded through the Post Office seeds,

or other goods, in execution of an order. That such a parcels post as that advocated by this committee is in operation in other countries, and is found to be of great general convenience, and that the establishment of such a system in this country would prove a great boon, not only to the particular trade represented by the committee and to their customers, but also to other trades who have been great sufferers from the restrictions at present in force. That the transmission of parcels so sent might be subjected to certain restrictions as to weight and dimensions, and that the postal authorities might reserve to themselves the right to examine the contents of such parcels if deemed expedient to do so.

"5. That such a parcels post is advocated by the committee of the seed trade, not only because it would remove the numerous objections urged against the present postal restrictions, but also because it would tend to prevent any evasion of the regulations laid down by the Post Office authorities."

It was also resolved that a deputation from this Committee be appointed to wait on the Postmaster-General,

produce fungoid growth. Phosphates in some form or other appear to be indispensable.

—We are informed that the Society of Arts has commended an essay on the GROWTH and MANUFACTURE of TEA in INDIA, prepared by Mr. MACPHERSON, of 49, Hereford Road, Bayswater. Some of Mr. MACPHERSON'S plans for the drying of TEA have been published in our own columns, p. 1538, 1870.

—The MAXIMUM TEMPERATURES in England during the week ending February 18 ranged from 55°·5 at Salford to 51°·4 at Bradford, with a mean for all stations of 53°·3, and in Scotland from 54°·7 at Glasgow and Aberdeen to 49°·5 at Paisley, with a mean for the different stations of 52°·2. The MINIMUM TEMPERATURES in England ranged from 20° at Norwich, at which station the minimum was recorded in the preceding week, also 20° to 34°·9 at Liverpool, which station is also noticeable for its comparatively high mean temperature: the mean for the several stations in England was 26°·3.

In Scotland the temperature at night descended as low as 25° at Perth, and to 33° at Edinburgh: the mean for all stations was 30°. The MEAN TEMPERATURES of England and Scotland, deduced from the observations taken at the various stations, differ but slightly from each other, the two values being 42°·3 and 42°·8 respectively; the northern country, therefore, was $\frac{1}{2}$ ° warmer than the southern. In England the highest mean temperature recorded at any station was 45°·7 at Liverpool, and the next were 43°·7 at Portsmouth, and 43°·5 at Birmingham; the lowest were 39°·2 at Norwich, and 39°·9 at Hull. In Scotland the extremes were represented by 46°·3 at Edinburgh, and 40°·8 at Dundee, showing a range in the two countries of 64° and 54° respectively. RAINFALL.—In the southern country the falls were much less in amount than those in the preceding week, the largest falls having been 0·63 inch at Manchester and Leeds, and 0·46 inch at Bradford, whilst the least amounted to 0·02 inch (at Blackheath), no rain having been registered at Newcastle; the mean for all stations was 0·23 inch. In Scotland the falls at several of the stations exceeded 1 inch, that at Greenock being 2½ inches, which was the largest recorded. At other stations the falls were very small, 0·15 inch at Dundee and 0·20 inch at Edinburgh being the smallest. The mean for all stations was 0·92 inch. (See Mr. GLAISHER'S Tables in our present issue.)

—The general utilisation of CHINA GRASS, or RHEA FIBRE, in this country has been so long delayed that it is with regret we notice the Indian Government has been compelled to extend the time to January 11, 1872, for competition for the prize offered by them for the invention of suitable machinery for cleaning and preparing the fibre. We use the word regret because the fact of the extension of time appears to imply that the difficulties in the manipulation of the fibre are found to be greater than were at first anticipated. From a report from Hankow it appears that, in anticipation of a great demand for the fibre for the

European market, increased attention has been given to the crops, and a much larger quantity than was actually sent would have been shipped to London early in the season if home rates had not ruled so low as from £43 to £50 per ton. It seems that the fibre cannot be cleaned and sent as a remunerative article from China, for sale in the English market, at anything less than £70 per ton. We fear, therefore, that until some labour-saving machine has been invented and fully established, we cannot hope to see this beautiful fibre in great demand.

—Professor JOSEPH BALSAMO, of Ortranto, has published a paper on certain experiments effected by him on the COTTON PLANT. It struck M. BALSAMO that a hybrid of the short and long staple might be obtained, which would ripen faster. The Cotton obtained from these hybrids was of excellent quality, showing decided improvement of the inferior sorts. It is not stated whether he succeeded in accelerating the ripening. That object, however, has been attained by a M. BLONDEAU. This gentleman has made a series of experiments, from which it appears that seeds



FIG. 51.—OPHIOCLELLA (SAMPPELOIDES).—(See p. 235.)

on Friday next, in conjunction with a deputation from the Manchester Trade Association.

—The keepership of the BOTANICAL DEPARTMENT of the BRITISH MUSEUM, vacated by the resignation of Mr. J. J. BENNETT, has recently been conferred on Mr. CARRUTHERS—a very satisfactory appointment.

—Mr. SORBY recently read at the Sheffield Philosophical Society a paper showing that, in cases of poisoning by BELLADONNA, the "Belladonna spectrum bands" may be detected by the spectroscope.

—Dr. FRANKLAND, who has accepted the presidency of the Chemical Society for the ensuing year, recently laid before that association the result of some experiments he has been making on the DEVELOPMENT of FUNGI in WATER. He appears to have satisfied himself (1) that the germs which give rise to the development of Fungi need not necessarily come from sewage contamination, but that they may be derived from the atmosphere, (2) that neither the presence of sewage alone, nor the addition of sugar, is sufficient to

exposed to a weak induction current, and afterwards subjected to germination, will sprout twice as fast as those which have not undergone this discovery may testify. It seems possible that this discovery may ultimately be developed so far as to obtain an increased number of crops, or at least to avoid the dangers of bad weather.

The **CORDELINES** may be classed amongst the useful plants of New Zealand; some of the species were one time much cultivated by the natives for the sake of the stems and roots, which were cooked and eaten. The following description of the native method of propagating the plants may be interesting to our readers:—Slips or cuttings were taken, and in planting a cutting all the outer leaves were pulled off, and the inner ones cut off pretty close to the bud, the cutting being buried so deeply as to leave only the tip exposed to the air. If a number of plants were required, a piece of the stem was taken and buried in a horizontal position, a small strip of the bark being left exposed. So soon as the shoots made their appearance, they were earthed up, to promote the growth of roots near each shoot. The following season the whole could be cut up in such a way as to make an independently rooted plant of each shoot. The plant to which the above remarks apply is the "Cape" *Cordeline*, as it is called. It is the species of which, however, is not fully ascertained. It is said to be by no means so common as it used to be.

Recent numbers of the "WOCHENSCHRIFT," the official organ of the Royal (Imperial) Horticultural Society of Prussia, conducted by our learned and travelled colleague, Dr. KARL KOCH, contain articles on the history of Passion-flowers, on the Dracenas of the terminalis section, as well as other articles from the pen of Dr. KOCH, also the record of some observations on the periodical phenomena of vegetation, especially the foliation and defoliation of trees and the climatal conditions influencing those processes. A comparison, extending over several years, is instituted between the foliation of plants of the same species growing in a greenhouse, a stove, and in the open air respectively. We shall avail ourselves at a future time of some of these articles, which are of great value from a horticultural point of view.

New Garden Plants.

OPHIOCAULON CISSAMPLOIDES.

Folia cordato-oviculata 5-nerviis obsolete 5-lobis intergerrime membranaceis, glabris subus albidis; petiolo apice glandulifero; fl. fem. petalis linearibus ad basin loborum ciliatis insertis et his brevioribus (fl. masc. campanulatis sepalis oblongis basi tantum connatis, petalis ad marginem involutis ciliatis, filamentis brevibus subulatis basi coherentibus; antheris linear-oblongis; imatis; pistillo rudimento minuto).—*Modesta cissamploides*, Planch. in Flor. Night, 355; quoad plantam feminam. *Passiflora parviflora*, Hortul.

The genus *Ophiocaulon* has been separated from *Modesta* by Dr. Hooker, in the "Genera Plantarum," chiefly on account of the completely divided calyx. As now constituted, it consists of two or three species, of which one is in cultivation under the name *Passiflora parviflora*. The name *Passiflora* was applied to the plant before the flowers were observed, as the structure is so different that no one could mistake them for a Passion-flower. The specimen (see fig. 51) from which the accompanying description was taken flowered last autumn, in the Royal Gardens, Kew; and we have to thank Mr. Smith, the curator of that establishment, for the opportunity of examining and describing it. The plant is a climber, with slender, cylindrical branches. The leaves are glabrous, membranous or sub-orbicular, cordate, occasionally showing traces of lobes, glaucous, and marked with black dots beneath, deep green often mottled with white above, 2½–3 inches long. The leaf-stalk is rather shorter than the blade, and bears at its junction with the latter a solitary gland. Stipules membranous, fugacious. Tendrils axillary. Male flowers numerous, in stalked, terminal, and axillary trichotomously divided many-flowered cymes. Calyx bell-shaped, half an inch in diameter, deeply 5-parted, sepals greenish glabrous, oblong obtuse. Petals five, as long as the sepals, oblong, inflexed and ciliated at the margin. Stamens five, monadelphous at the base; filament short subulate. Anthers innate, linear-oblong, 2-celled, introrse, opening lengthwise. Pistil rudimentary. The female plant is not, so far as we are aware, yet in cultivation. Its description is given in Hooker's "Flora Flora," above cited, and the plant will be more fully described in the forthcoming volume of the "Niger of Tropical Africa."

The plant is a native of Western tropical Africa, but appears to thrive well in the succulent house at Kew. Its prettily marbled leaves and elegant inflorescence render it a graceful plant, even though its flowers lack colour. M. T. M.

HORTICULTURAL BOILERS.

THE boiler which appears, like the conjurer's box, to be inexhaustible. Of all the appliances that have ever been presented to the public, for any purpose, I know of none that have been so much altered, and so little improved. They exist in almost every imaginable shape into which iron can be either cast, welded, or riveted. As each is ushered before the

gardening world it is proclaimed as having a whole string of good qualities, which are to put all that have preceded it in the shade, and as simply requiring trial to be universally adopted. But, in far the greater number of cases the expectations thus raised are doomed to disappointment; and the worst of the matter is that, in very many cases, the disappointment thus experienced is not admitted. I have known many a good serviceable boiler removed to give place to some new invention, just simply through the high character with which it was ushered before the public, and yet those who have been so far disappointed in their expectations were very loth to admit the failure.

I have in my time had in use a considerable number of boilers, differing in shape and general make as much as they well could, and most of them if well set would do the work required of them; but there has been this difference—that some would do it with a great deal of fuel and attention, and others would do it with a reasonable amount of each; and, in fact, two parties generally existed. If a boiler requires a deal of attention, it generally consumes a deal of fuel in proportion to the work it has to do.

In selecting a boiler, the considerations ought to be efficiency, durability, and cost. By efficiency, I do not simply mean the capability to heat the structures which it is required for, at the smallest expenditure in fuel; but also, that it can be safely left even in severe weather, without that attention during the night which keeps the men up when they ought to be in bed. If men are up till a late hour of the night, it is unreasonable to expect them to accomplish a full day's work. And yet how often do we hear of places where the fires during frosty weather have to be attended to even until far into the small hours of the morning. The one-boiler system I look upon as radically wrong in more ways than one, but principally as there is a moral certainty of a break-down some time or other, and which will happen at a time when it will cause the greatest loss and inconvenience.

Tubular boilers, however constructed, either upright or horizontal, with the water circulating through the tubes, or with the fire passing through them, locomotive-engine fashion, or both combined, I would not have at any price; first, on account of their extravagance in, and inability to work well, with any kind of fuel, for any boiler used at a private establishment ought to be able to consume all the fuel that can be had; and, secondly, on account of the contents of the boiler being liable to get out of order; and, finally, from their cost. Indeed, in the case of the upright ones, I have frequently seen as much expended in making and draining the stoke-hole as ought almost to have covered the cost of heating a moderate range. We hear of the length of piping attached to a boiler; nothing can be more deceptive—without we were told what temperature is kept up in the several strata, and, as the heat comes from the bottom, the contents of any given house in cubic feet may lead to a fallacious conclusion, inasmuch as a lofty house requires a great deal more heating than a low one, the internal capacity of each being equal. Span-roofed houses also require a great deal more heating than lean-to's.

Some years ago I thought it advisable to replace a common saddle boiler that had been at work for 20 years, fearing it might give away. I went to a man well acquainted with the sort of work, and he declined to induce me to put in one of the tubulars; but I had seen sufficient to deter me from having one. I selected a flued saddle, which did its work admirably at a considerable saving in fuel; and here I had an excellent opportunity of seeing the advantage of the flued saddle over the common one in extracting the greater amount of heat from the fuel. Instead of the usual upright shaft, the flue, after leaving the boiler, was taken through some pits which were used for forcing pot Vines, French Beans, &c. With the old boiler we could easily keep up a temperature of 60° in these pits, but after the flued saddle was put in we could only just keep out the frost, showing at once the capability of the latter to extract a greater amount of heat from the fuel consumed. From this and subsequent experience I have come to the conclusion that the flued saddle possesses the advantage of two-sevenths over the common one in the matter of fuel. Some time after I was showing this boiler to an individual who at that time did a large business in the hot-water apparatus way. He remarked that he had no doubt that the boiler would do its work as well as any in existence. I happened to say, "Then how is it that you boiler gentlemen all recommend the tubulars in preference to an improved saddle?" He answered by wishing an unmentionable personage to take all the saddles, as, after they were once in, they required nothing more. An admission so plainly more honest than judicious in his case.

For the work here we have two flued saddles, placed side by side, both working into one flow. In mild weather one is used; during the spring and in cold weather we use both. The fires are made up in ordinary weather at half-past 9; during severe frost they are made up from 10 to 11, and left until 6 the following morning. One fire is left so as to burn on briskly at once, the other is banked up so as not to burn for several hours, but so as to come into active operation as the other weakens. By this means we secure the requisite temperature in the morning without any excess in the earlier portion of the night.

I always keep a combined maximum and minimum

thermometer in the stove, so as to ascertain exactly what fluctuations of temperature there have been during the night, and this is a most important point, as otherwise, to insure a given temperature in the morning, it might have been a great deal too high in the earlier part of the night. I always require the temperature in any house, where any considerable heat is used, to be reduced at the decline of daylight as nearly as possible to what it is required to be until daybreak; and this I manage to a nicety with the boilers worked as I have described. Frequently the temperature in the stove does not vary more than 2° or 3° during the whole of the night; in the severe Christmas week '70 was the greatest fluctuation in any one night.

The houses here are eight in number. Stove, 48 by 18 feet, 650 feet of piping, temperature 70°; house containing Mexican Orchids and Ferns, 40 by 20 feet, 400 feet of piping, temperature 55°; conservatory, 30 by 20 feet, 300 feet of piping, temperature 48°; New Holland house, 40 by 18 feet, 250 feet of piping, temperature 40°; Azalea-house, 40 by 18 feet, 250 feet of piping, temperature 38°. The preceding are all span-roofed houses. The following are lean-to's:—North house, 35 by 18 feet, 250 feet of piping, temperature 40°; early viney, 30 by 18 feet, 300 feet of piping, temperature 60°; late viney, 30 by 18 feet, 230 feet of piping, temperature 40°. (In all cases I have given the night temperature.) Thus, with connections, amounts altogether to about 2000 feet of 4-inch pipes. In the seven days from December 24 to 31 we burnt 3 chaldrons of gas coke and half a ton of nuts. As will be seen, the temperature kept up in the stove is a comparatively high one for this season of the year, and it takes about one-fourth more fuel in the whole to maintain 70° in that house during severe weather than would be required if it was kept 10° lower. In conclusion, I may remark, that one of the boilers will easily do the work in severe weather, but we find that it takes no more fuel to work both slowly, and it gives us such an advantage during the night in keeping an even temperature. T. Baines, The Gardens, Southgate House, Southgate, N.

THE RHODODENDRON TRIBE.

UNDER the title of "Rhododendrea Asiæ Orientalis," M. Maximowicz has lately published a paper in the "Mémoires of the Imperial Academy of Sciences of St. Petersburg," vol. ser. L. xvi., n. 9, on that portion of the great Heat family (Ericaceæ) to which, not only the Rhododendrons but many other garden favourites belong. The paper in question is a purely technical one, devoted primarily to the description of the Rhododendrons of Japan and Amoorland, but we think it may be acceptable to those of our readers who like to know something about the plants they cultivate, if we present them with a brief abstract from the monograph of the Russian botanist.

The tribe Rhododendrea is divided into two primary groups, according to the nature of the seed-coat, the form of the anther-pores, and the mode of inflorescence. Each of these two subdivisions contains several genera, thus discriminated:—

Tribe RHODODENDREÆ.

Sub-tribe, *Phyllocladæ*.—Seed coat firm in texture, closely adhering to the seed, and destitute of wing-like appendages. Flowers regular, produced in the axils of the older and uppermost leaves, and provided at the base with two small bracts. Flowers very rarely produced on the terminations of young shoots:—

Flower clusters elongated, placed at the end of leafy shoots.	
Corolla ovoid, dentate.	DABOECIA.
Corollatube, deeply divided.	BRYANTHUS.
Flower clusters contracted.	
Seeds ovoid, anthers opening by rounded pores.	
Corolla ovate or bell-shaped, cleft.	PHYLLOCLADE.
Corolla rotate, deeply cleft.	RHODOTHAMNUS.
Seeds ovoid, anthers opening by chinks.	
Corolla bell-shaped, petals united.	LOISELEURIA.
Corolla of five distinct.	LEIOPHYLLUM.
Seeds linear.	KALMIA.
Sub-tribe, <i>Fin-Rhododendrea</i> .—Seeds scale-like, seed-coats loose, prolonged into wing-like appendages (see fig. 52). Flower-buds surrounded by scaly overlapping bracts, and usually quite distinct from the leaf-buds.	
Corolla of five separate petals. Calyx splitting into five below upwards. Parts of the flower in fives.	LEDUM.
Capsule splitting from above downwards. Parts of the flower in threes.	BEJARIA.
Corolla of united petals.	
Capsule 3-celled; anthers opening by long chinks.	TSUSIOPHYLLUM.
Capsule 5-celled; anthers opening by an elliptical.	MENZIESIA.
Anthers opening by a circular pore.	RHODODENDRON.

Tsusiophyllum is a newly described genus, representatives of which will probably be grown here shortly,

even if not already introduced. The type is described to be a Japanese shrub, differing from *Rhododendron* in having a regular flower, in the anthers bursting by long clinks, and by the 3-celled ovary. In the two last points it differs also from *Menziesia*.

The distinctions between *Azalea* and *Rhododendron* have long been felt by botanists to be unstable. M. Maximowicz then only follows the general opinion by placing them, and also *Osmothamnus*, under the same heading. The annual membranous leaves of *Azalea*, the 5-cleft corolla, the reputed absence of scales on the foliage, the five stamens, all points rely on for the discrimination of *Azalea*, break down when put to the test; thus *Rhododendron dauricum* has deciduous leaves, *R. albiflorum* has membranous leaves. On the other hand, *Azalea indica* has biennial leaves. The corolla of many *Rhododendrons* is 5-cleft, *e. g.*, *R. dauricum*, *laponicum*, *Veitchianum*, *moulmainense*, &c. Again, five stamens sometimes occur in *Rhododendron*, and ten in *Azalea*. Lastly, as to the scaly pubescence, it is no guide, as many *Rhododendrons* are entirely destitute of scales. *Rhodora* and *Osmothamnus* are also suppressed by M. Maximowicz, or rather treated as sections of *Rhododendron*.

Rhododendron macrosepalum is described as a very curious species, linking together *Azalea* and *Tsusia*, in habit near to the former, but in floral characteristics closely approaching the latter. The corolla occurs in three different forms on the same plant, viz., bell-shaped, regularly 5-parted, or bilabiate, a circumstance which has led M. Maximowicz to suppress *Rhodora* as a distinct genus.

The genus *Rhododendron*, as understood by M. Maximowicz, is thus divided:—

RHODODENDRON.

I. Flowers on the ends of the shoots, not intermixed with leaves.
Shoots (innovations) produced from distinct buds.

Section *Osmothamnus*.—Scales of the flower-bud few, all about equal in size. Flower-bud globose. Dwarf shrubs.

Section *Eu-Rhododendron*.—Scales of the flower-bud numerous, the lower ones the longest. Flower-bud cone shaped. Trees or shrubs. Leaves biennial, triennial, or even of longer duration.

Section *Azalea*.—Like the preceding, but leaves annual. Hairs soft, bristly, often glandular.

Shoots (innovations) produced from the same bud as the flowers, but below them.

Section *Tsusia*.—Buds as in *Osmothamnus*. Leaves annual or sub-biennial. Hairs scaly, rarely glandular.

II. Flowers lateral, produced in axillary buds.

Section *Keyisia*.—Inflorescence many-flowered. Innovations terminal. Corolla tubular. Leaves perennial.

Section *Rhodorastrum*.—Buds 2-flowered. Innovations lateral, below the flower-bud. Corolla bell-shaped. Pubescence scaly. Leaves annual.

Section *Leucodermis*.—Buds 2-flowered; innovations from among and beneath the flower-buds. Corolla rotate. Leaves annual.

III. Flowers intermixed with leaves in terminal clusters. Bud-scales few, persistent, leathery.

Section *Therorhodion*.—Corolla rotate, deeply cleft. Capsule somewhat membranous.

The section *Osmothamnus* includes *R. hirsutum* and *ferrugineum*, the Rose des Alpes of the Swiss mountains.

The section *Eu-Rhododendron*, to which the species represented in figs. 52, 53 belong, is the largest, and, horticulturally speaking, the most important group. It is divided by M. Maximowicz into four subdivisions, as follows:—

§ 1. *Candelabra*.—Trees or shrubs of large size. Leaves large, persistent; pubescence downy or none, scarcely ever scaly. Flowers numerous, in dense heads. Here belong *R. Hodgsoni*, *Falconeri*, *Fortunei*, *argenteum*, *fulgens*, *Windsori*, *Smithii*, *niveum*, *arborescens*, *ponticum*, *Thomsoni*, *catawbiense*, and others.

§ 2. *Chrysanthæ*.—Dwarf shrubs. Leaves persistent. Flowers yellow. *E. g.*, *R. caucasicum*, *R. chrysanthum*.



FIG. 52.—RHODODENDRON BROOKEANUM.



FIG. 53.—RHODODENDRON BLANFORDIFLORUM.

§ 3. *Lepidota*.—Dwarf shrubs. Leaves biennial. Flowers sub-umbellate. Pubescence scaly. *E. g.*, *R. glaucum*, *clitatum*, &c.

§ 4. *Rapana*.—Leaves rather large, bullate, rugose, netted. Flowers few, 5-parted. *E. g.*, *R. Edgeworthii*, *Nuttallii*, &c. *M. T. M.*

Home Correspondence.

New Grapes.—I demur to some of "P.'s" sensational descriptions of some of the new sorts, as well as to his estimate of some of the older varieties mentioned at p. 135. The vibration through the ears of all the Grape growers of Great Britain of the chord made by the remarks of Mr. Pearson anent the ripening of thick-skinned Grapes, will lead, I have no doubt, to some diversities of opinion on the subject. In my practice, I have found that late-keeping Grapes of the thick-skinned section, such as *Barbarossa*, *Trebbiano*, the *Royal Vineyard*, *Morocco Prince*, *Alicante*, and *Lady Downe's*, white and black, with West's St. Peter's, amongst the thin-skinned keeping sorts, will, if well-coloured and ripe by the end of October, keep better and longer than when they are forced to ripen earlier. In my late vineries all the above varieties start naturally in April, and fire-heat is only applied at setting time in dull summer weather, and in the months of September and October to ripen them thoroughly. Their flavour is never complained of, being generally excellent for late Grapes. Great care, however, is taken of the roots, both inside and outside, to produce such results. I always reckon the late Grape crop the most valuable of all, for it comes in at a time when Grapes cannot be had in quantities, the supply from the winter forced ones, and from those grown early in pots, being limited. "P." says, "Correctly speaking, half the people who eat and admire Grapes do not know what a good Grape is or ought to be." This is a deplorable state of things, and perhaps the best way to teach them would be to begin with the rising generation; and the boards of education now about being formed might be able to carry out a Grape-tasting test, in the higher schools, in the Grape season, with Messrs. Speed, Thomson, and Henderson as Government Inspectors. With regard to the new Grapes lately introduced, I differ from "P.'s" estimate of the merits of Mrs. Pince's so-called Black Muscat, as I believe, from my experience in growing it, that it will never supersede the "Alicante," either for bearing or keeping purposes. As for the Golden Champion, I think it will yet be found to be a noble Grape when gardeners find out the way to grow it, but, like the Golden Hamburg, it is essentially a summer Grape, and will be found unfit for keeping long when ripe. With me it prospers best when grafted on the Raisin de Calabre, a strong growing, coarse variety. The Madresfield Court Black Muscat I have not tested yet as a late-keeping kind, but from fruiting it in a middle-season viney I regard it as one of the very best flavoured new Grapes sent out. I quite agree with "P.'s" description of the *Royal Ascot* as to its being a fine bearing and excellent Grape for amateur growers. As to Melville's Champion Muscat, when grown well, as Mr. Carmichael, of Sandringham, grows it, both for flavour and size of berries and bunches it will be found a first-rate sort. The colour is rather against it, but a good flavoured Grape, like a good horse, can never be of a bad colour. The *Royal Vineyard* is now reckoned a very thick-skinned, coarse variety, and so it is, compared with summer or autumn ripened varieties, but let it hang till April or May and no one will quarrel with its flavour or texture. Having exhausted the list of new Grapes mentioned by "P.," I hope his descriptions and mine may be thoroughly ventilated in the *Gardeners' Chronicle* by other growers. Q.

Shading Greenhouses, &c.—I would recommend Mr. Craig, p. 202, to simply use milk instead of whitewash,

Tree Planting and Wire Fencing.—Please to say (1), whether the outer line of trees in a wood may be used as posts for a wire-fence, with staples driven in, without injury to the trees; and (2), what is the smallest distance which ought to be laid down between a row of *Pinus insignis* and the wire, so that the trees may be prevented from growing roots or branches. *A Subscriber.* 1. Growing trees employed as posts and pierced by staples suffer a certain amount of injury, not very evident perhaps for some years, but eventually the wound inflicted may become cancer-sore, and hasten the decay of the tree. 2. The distance between the trees, intended to be employed as posts, should be exempted from such utilitarian degradation. It would be less objectionable to employ young plantation trees of adequate size, such as Elm, Ash, Sycamore, or Lime. These trees in active growth more readily bear wounds. Oak is the best to repeat injury inflicted from bark wounds. 3. Local circumstances, levels, aspects, must all be taken into consideration, and it is difficult, without more precise information, to answer the inquiry satis-

factorily. A line of *Pinus insignis* on the north side of a garden wall, and planted partly for shelter, may be placed within 20 yards of the wall; but if the south side of the wall is to be planted, and the space in front is required for fruit trees, 50 yards is the minimum distance, such trees should approach the fruit wall. *W. L.*

Odontoglossum Alexandree.—Being confined to the house with a bronchial attack, I am thankful that I can occupy myself with the study of Orchid cultivation. I am therefore taking advantage of Mr. Anderson's letter at p. 171, and I shall try to show how much information we still need before we can say that our present treatment is warranted by what we know of their native climate. First let me correct a misprint in my letter you gave at page 76, where you make me say, "We do not willingly let the house go below 68° even during the night;" the figures should have been 60°. It is quite possible the error was through my fault in not making the little note to signify theoretical degrees distinct from the larger numbers, but I am not at all put out that Mr. Anderson should have so far excelled us, on the contrary I congratulate him, and all Orchid growers can congratulate each other, on this new and enlarged field being opened out for their efforts. The reason why we sent our flower-spike up for exhibition was simply because we did not know that Mr. Anderson had done so much better in October last, and we hope that he will not continue to hide his successes. Would it not be a good thing for the Royal Horticultural Society to try to find a place for photographs of really excellent things in this way? The popular opinion with regard to *Odontoglossum Alexandree* cultivation is, that they come from Bogota, that Bogota has an elevation of 8000 feet, that the temperature should range from 55° to 75°, that they should be extra well shaded, and always kept moist. These *Odontoglossums* have now been imported some years, but their day of success is only just coming; do we owe this extra success to a more stringent following of these rules, or to judicious departure from them? We have written you the history of our practice and the results. May I remind you that at p. 1411, on October 22 last year, you half promised to help to elucidate *Odontoglossum* cultivation? The only information I am able to find is contained in Mr. Purdie's letters, published in volume 5 of the third series of the "Botanical Magazine." Did Mr. Purdie send over any of these *Odontoglossums* when he was collecting at Bogota, or Ocaña? I have been again reading his letters, and I naturally ask myself why, if they grow near Bogota, he should not have found them? If they come from 8000 feet of elevation on the hill sides, his description of the climate there should suit them in our cultivation here. And then the incredulous doubt pushes itself in—suppose it only means that the collector dated his letters, and started on his excursions from there; in fact, only made Bogota his headquarters? A few thousand feet up or down is soon made in a mountainous country. At p. 23, he says:—"Some of the mosses of the Paramos now sent are interesting; also a box of the Orchideæ, which I gathered at a height of 10,000 feet, containing many new and beautiful species. The cold at that height is intense, particularly in the morning and evening: the absolute degree of cold is not great, but it is extremely penetrating, and sets the teeth chattering violently. However reluctant to give way, I found myself constrained to own its trying effects." I presume this is the same Paramo that he speaks of at p. 17, where "I found the cold very severe in the Paramos, not at its absolute intensity, for the thermometer rarely falls below 40°, but because in these elevated regions the atmosphere is so rare. Animals and birds perish in great numbers with the cold. I noticed a large tract strewn with their bones." Can you not obtain for us from Kew the names of those Orchids that can live where birds and animals perish? He writes, "The situation of Bogota is delightful, though rather cold, the thermometer varying from 58° to 63°." The city stands at the sloping base of a rock, which rises almost perpendicularly 1500 feet above it. We thus find that Bogota possesses advantages that the mere diminished height of 2000 feet below the Paramos he speaks of, would not entitle it to. That vastly different climates can be reached in a few days' excursion from Bogota is clear, by the description he gives of a valley, at p. 21:—"The scenery and vegetation of this ravine are most beautiful; its elevation is 2000 feet above the sea, and as Dr. Marks, who accompanied me, justly observed, you would sooner take it for a flower garden than a forming part of a primeval forest." *G. H.* [We hope to be able to satisfy some of our correspondent's requirements shortly. Eds.]

Decoration.—We are all waiting for, and trying to take advantage of, new features of beauty as they unfold themselves in our various occupations. This spring, in addition to the usual mode of only dressing the surfaces of the vases, and other plant baskets in the Castle with moss, I have been putting in as well in that material, wherever they would look best and however they could be most conveniently put, such things as Snowdrops, Crocuses, Tulips, &c., in flower. These have proved to be of great advantage in the making up of a fuller and

better show in a smaller compass, and this plan I believe would be very valuable if properly carried out for basket plants, especially where there is not much room for so many plants. Bulbous plants, such as those kinds mentioned, can be taken out of their own pots, and put amongst the moss, where, keeping them well watered, they will last nearly as long as if they had not been at all disturbed. *Robert Makellar, Elvaston, Derby.*

A Large Vine.—There is a remarkably fine Vine in the gardens at Buscot Park, Berkshire. It is a Black Hamburg, grown on the extension system, in a lean-to house, 50 feet long and 15 feet wide, which is well and regularly filled with wood. From the stem, which measures 25 inches in circumference, single rods branch off to the right and left along the front of the house, and from which the upright rods are trained at about 32 inches apart. It is supposed to be about 85 years since this Vine was planted. The wood is strong and vigorous, and I am told that abundant crops of first-class fruit are produced every year. *W. T. M.*

Warner's Big Ben Cordon.—I send herewith two sketches of my system of cordon training, which I call "Robert Warner's Big Ben Cordon." The form is taken from the big bell which I made, and is one that will be sure to give satisfaction to whoever tries

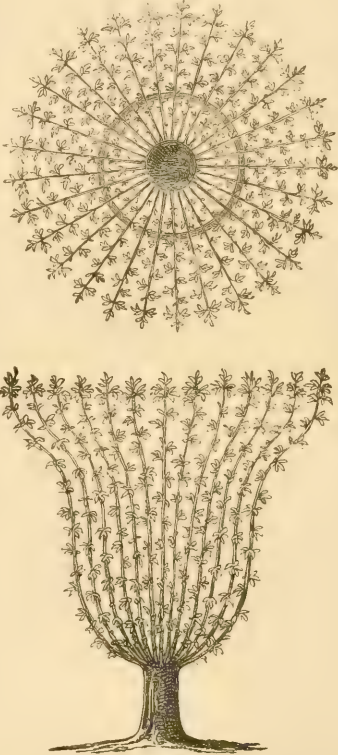


FIG. 54.—WARNER'S BIG BEN CORDON. (Elevation and Plan).

it. I submit that they will be much approved of. The branches must be trained sufficiently far apart for spurs to form, and to enable the hand of the fruit-gatherer to pick the fruit that will grow on the inside. It is not desirable to have the cordon too high, about 4 to 5 feet is sufficient for small gardens. The advantages of this method are:—(1.) The blossoms and buds on the inside are well protected from high winds and frosts. (2.) The fruit is never blown off. (3.) The great facility of protecting the blossoms and young fruit of choice kinds of Apples, Pears, and Plums from early frosts by merely throwing a mat over the top in cold rough weather. If the mat or tiffany is allowed to hang down all round about 6 inches from the top, the lower outside blossoms will also be protected from frost and cold sleet in early spring, so that a crop is certain either from the outside or inside of the bell cordon. (4.) Round wooden hoops, fastened inside, keep the young shoots in their places, and a permanent iron hoop at the top makes the whole so firm that no wind, however strong, has any injurious effect on the fruit, &c. *Robert Warner, Broomfield, near Chelmsford.*

Vines: Peas.—I purpose very soon to try something like the same system Mr. Simpson so well describes in your last issue for raising young Vines. I am sure it is a first-rate method. The same sort of thing I have tried this year for my early Peas. They are sown in boxes on three rows of turf in each at the bottom, which is covered with an inch or so of loose mould. The boxes measure 1 foot by 2, and when turned out each one of course will make a row three times the length of a box. In this way the Peas cannot suffer any material check in transplanting. I remember years ago, when a boy, I had a task before me to transplant boxes of early Peas to the open border, the turf had been laid indiscriminately at the bottom of the boxes, and I had difficulty in getting the roots disentangled, but now I think I have mastered that obstacle. *R. M.*

Asphalting Garden Walks.—In the autumn of 1869, my employer was persuaded to have a "Fives Court" laid down with asphalt, for some young people to play upon. It was done by a builder from a neighbouring town, who professed to understand it. Before laying it on the workmen levelled the ground and rammed it down well. Great pains were taken with it, but before the winter was over it cracked and sunk in various places. The gravel around it always had a dirty, tacky, sooty appearance, and if it was used much in the day or wet weather it got very muddy, and this sooty substance. In the summer time it became soft and run around the sides, which, of course, it ought not to have done. During the five years it has been in use it has been getting worse, and in November last a tradesman close by undertook to relay, or coat it over, by contract, at 2s. 9d. the square yard. The cost was £14, but I am sorry to say it is anything but satisfactory at this time, for it is cracking and has an uneven appearance. Although this piece of work has not answered our expectations, I by no means wish to condemn the practice. Good walks are indispensable about any place, but more so where there is a family of young people to provide exercise ground for. I have often known the high road to be more enjoyable for promenading than the walks on a so-called well kept lawn after a hard frost or very much rain. When returning home from the late sale at Chiswick, I had a very communicative fellow passenger. Amongst other things, asphaltum was commented upon. He said he had laid, and laid out, and originated the laying of, a good many floors, and had much to say in its favour. The *modus operandi* which he practised was stated to me as follows:—When a certain quantity of tar and pitch is put in a furnace, say half full, it must be heated; let one man keep stirring it about while another keeps sprinkling the top of it with sifted sand, which must be dry. Add a peck of sifted lime, then keep sprinkling more sand, and well stir it at the same time; if it should get too thick, add more tar, "but by no means let the tar throw the sand in in spadefuls at a time." This was considered a "secret," and the lime was much prized, as it helped to set it. Your correspondent (at p. 106) mentions rolling at the time it is laid down. How this can be done I am perplexed to know, for it seems to me such an adhesive thing to put a roller on. If any of your readers should feel induced to try this experiment without having seen it done, I would say, "Don't." If you should not succeed, do not try it, as it will always prove a source of disappointment. Let some one do it that you know to be experienced in the work; it is a thing you cannot patch up well, and if it is uneven it is an eyesore. Walks to be laid down with this material should be prepared as your correspondent says, but should be left for a time to settle and get firm before applying it. *T. Wynne, Holbrook, Shiffield.*

A Drooping Plant.—Having recently had a lot of suspended flower-baskets to arrange and keep in good order with beautiful plants, in places connected with the Castle, I had some difficulty in finding those plants that would look best, and at the same time last some considerable period without requiring to be renewed. I had at hand in the garden a good supply of Chinese Primulas, sweet-scented and Ivy-leaved *Delandium*, *Dracæna*, *Cinerarias*, *Ferns*, *Centauries*, &c., and such like plants occupy the baskets at present; but I was at a loss to find enough suitable drooping species, which, for showing off baskets especially, are of great value. In accordance with the object I had in view, I therefore kept observant for some time, and, when out in the grounds one day, I accidentally came upon one, which I may say above most others has answered my purpose well. It is, I have now found, *Androsace*, a very rare and some times quite seen in shrubberies, on rockwork, and such places, but as an elegant basket plant, to look beautiful and make others around it look still more beautiful, its qualities I am sure are not nearly so well known as they should be. It is the *Vinca major variegata*, being the variegated form of the common Periwinkle, above all a first-rate plant for natural drapery on rockworks, sloping banks, and rugged places. When I took my idea for its use as I describe, I recollect that some fine able flower baskets I had seen before were suspended in one of the most famous places in the country, and naturally at the time I thought I had found something I could soon turn to good practical account. Without much delay then I got a lot of plants lifted, divided, and potted, to be ready or fill the baskets; and now,

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VEGETABLES.

Artichokes, Jerusa- *s. d.* Herbs, per bunch *0.10* —
Asparagus, p. bundle *0.10* — Cauliflower, p. bunch *0.10* —
Beet, per doz. *2.0* — Mint, per bunch *0.3* —
Broad Sprouts, 4 sieve *0.3* — Mushrooms, p. pot. *1.0* —
Cabbages, p. doz. *1.0* — Onions, per bunch *0.4* —
Carrots, p. bunch *0.4* — Parsley, p. bunch *0.6* —
Cauliflowers, p. doz. *1.0* — Rhubarb, p. bundle *1.0* —
Celery, red, p. bun. *6.0* — — — — — — — — —
— white, do. *1.0* — — — — — — — — —
Cucumbers, each *2.0* — — — — — — — — —
Fennel, Beans, p. doz. *2.0* — — — — — — — — —
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HENDERSON AND SON, Wellington Nursery, St. John's Wood, N.W.

Sugar Beet and Beet Sugar.

At the LIVERPOOL, having studied on the Continent

and at ADVENTURE in Suffolk, the Cultivation of the Root, and the

Processes of Manufacture, and having conducted Mr. Duncan's

Sugar Factory, at Lavenham, during the successful season just closed,

is now in a position to apply his practical knowledge to the

Planting and Cultivation of the Root, and the Processes of Manufacture.

For particulars apply to J. H. PARKER, 15, High Street, Birmingham.

GARDENER (HARD). — Age 30; thoroughly practical

in all branches of the profession. — Highly recommended. —

J. S., Hadnor Gardens, Droitwich.

GARDENER (HEAD). — Age 28, married; thoroughly

practical in all branches of the profession. — Well recommended. — W. DODD, Mead Vale, Redhill, Surrey.

GARDENER (HEAD). — Age 28, single; thoroughly

practical in all branches of the profession. — Unexceptionable

references. — J. H. PARKER, 15, High Street, Birmingham.

GARDENER (HEAD). — Middle-aged, no incum-

brance; thoroughly understands the profession in all its

branches. — Wife a good Cook, or otherwise, if required. Good

references. — J. H. PARKER, 15, High Street, Birmingham.

GARDENER (HEAD). — Age 35, single; thoroughly

competent in all branches, and can superintend Land, if

required. — Character — A. Z., Mr. Clarke's, Streatham Place, Brixton Hill, S.W.

GARDENER (HEAD). — A single young Man, of

ability and energy, is open to stand at above. Has had extensive

practical experience in the management of the Horticulture.

First-class references. — L.C.H., Stanby Bridge Post Office, Fulham, S.W.

GARDENER (HEAD). — Age 30, single; thoroughly

understands the Early Forcing of all kinds of Flowers, Fruits,

and Vegetables. — Twelve months' good character. — W. C.,

15, High Street, Birmingham.

GARDENER (HEAD). — Age 29, well educated; 14

years' practical experience in the various departments of first-

class Gardening. — Qualified to furnish Designs for New Grounds, or

to superintend the execution of the same. — JAMES CLAPHAM, Tottenham, Wotton under Edge.

GARDENER (HEAD), age 30, married. — J. DOLBY

Gentleman requiring the services of a good practical Gardener, or

handled place, accepted. Wife a first-class Landlady, if required. —

DOLBY, The Gardens, Manor House, Sudbury, Suffolk.

GARDENER (HEAD). — Age 45, married, no incum-

brance; a good Working Man, of long experience in the Growth

of Stove and Greenhouse Plants, Grapes, Melons, and Cucumbers; a

first-class references. — H. T., 1, United, Stoughton, Kent.

GARDENER (HEAD), age 26; — C. BERRY wishes to

thoroughly understand Early and the Forcing of all kinds of Fruit,

and Vegetables. — Three years' good character. — J. G.,

15, High Street, Birmingham.

GARDENER (HEAD). — Age 35, married, no family.

perfectly understands the Management of all kinds of Stove and

Greenhouse Plants, Grapes, Melons, and Cucumbers. — R. B.,

6, Princes Road, Falmouth.

GARDENER (HEAD). — Age 30, single, possesses an

extensive and thoroughly practical knowledge of modern and the

most approved system of Gardening in all its branches, Landscape

Gardening, and the various kinds of Horticulture. — J. H. PARKER,

15, High Street, Birmingham.

GARDENER (HEAD). — Age 42, married, one child;

thoroughly understands the Early Forcing of all kinds of Flowers,

Fruits, and Vegetables. — Twelve months' good character. —

J. H. PARKER, 15, High Street, Birmingham.

GARDENER (HEAD). — Age 35, married; first-class

Cultivator of Stove and Greenhouse Plants, Orchids, Ferns, &c.;

GARDENER (HEAD). — Age 29, married; thoroughly

understands all kinds of Early and Late Forcing, Stove and

Greenhouse Plants, also Flower and Kitchen Gardening. — Good

references. — J. H. PARKER, 15, High Street, Birmingham.

GARDENER (HEAD, married, no family). — F. HILL

desires an engagement with any Lady or Gentleman requiring

the services of a first-class Gardener, well versed in the Management

of all kinds of Horticulture. — Kind references. — F. HILL, 15, High

Street, Birmingham.

GARDENER (HEAD, WORKING), where one or two

are kept. — Age 29, married, no family; well acquainted with the

Cultivation of all kinds of Fruits, Flowers, and Vegetables. —

Kind references. — A. B., Mr. Aspin, 10, Finsbury, London, E.C.

GARDENER (HEAD, WORKING), where one or two

are kept. — Age 47, no family; understands Forcing, Kitchen

and Flower Gardening, and can charge of Stove and Meadow

Land. Fifteen years' character. — L. L., Rev E. King, Uddingston,

West Lothian, Scotland.

GARDENER (HEAD, WORKING). — Age 40, married;

a first-class Grower of all kinds of Forced Fruits, Flowers, and

Vegetables; thoroughly practical in the Kitchen and Flower Garden; is

well acquainted with the Management of all kinds of Horticulture.

For particulars apply to J. H. PARKER, 15, High Street, Birmingham.

GARDENER (HEAD, or good SINGLE-HANDED). —

Age 26, married, no family, steady and sober; thoroughly under-

stands the Management of all kinds of Horticulture, and is well

acquainted with the Management of all kinds of Horticulture.

For particulars apply to J. H. PARKER, 15, High Street, Birmingham.

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For particulars apply to J. H. PARKER, 15, High Street, Birmingham.

experienced is the gradual lightening of this evil—by the substitution of horse and steam for hand. Why should not a benefit which has been so obvious in the barn and field and fold, be as welcome in the dairy? And why should the wife of a dairy farmer, who has been thus relieved, be supposed more destitute of occupation or of home interest than the wife of another farmer who may have never had a dairy to direct? We oppose to the poetical sketch of our clever correspondent the following simple prose account of a friend of our own—the wife of a dairy farmer—who, though she has always been proud of her dairy, and never discontented with her lot, yet confesses plainly enough that the work has been too hard, and is not the unmixt blessing which our correspondent seems to think it—

"During the cheese-making season I find it needful to be in the dairy by half-past 5 o'clock in the morning for an hour. Then there is an hour's release for breakfast. By that time the cows will be fed, and the milk will be making it into cheese, which will take from two to two and a half hours, excepting intervals of not more than a quarter of an hour twice during the aforementioned time. It will be then about 10 o'clock. If I have a good servant I can then leave the cheese to her, if not, it will be necessary to go to it in an hour to dry-cloth it, and again in two hours to salt it. In the latter case I have not done with it till 1 o'clock. Then if cheese be made twice a day this has all to be repeated, commencing at 4 o'clock P.M. When Sir J. JENKINSON said he could not see what farmers' wives would have to do if they gave up cheese-making, he must have forgotten that such people are very frequently mothers of families, and have them to attend to besides their usual housekeeping duties. I think there is really too much devolving upon a female who looks well to her dairy and wishes to get her duty in a domestic way. Now that our family are mostly grown up, and can share in the work, I do not find it very burdensome, and as Sir GEORGE rightly says, we take a pride in it. Who does not take a pride in seeing things done well which are done with great care for which one is responsible? And there are many of us who would be very glad nevertheless if the work could be done to answer as well without our doing it. When I commenced cheese-making, about 24 years ago, good dairy girls were not so scarce as now. At that present time it is difficult to get a respectable servant who will undertake the work. They prefer going where the work is lighter, and they have an idea that the work is not only very heavy but less respectable than mere housework. If the dairy arrangements and conveniences were what they should be, there would be no need for making cheese twice a day, and then it would be much lighter both for mistress and servant."

This is a report from Gloucestershire. We are very much mistaken if Cheshire does not hold an equally distinct opinion of the advantage of that co-operative system by which so much of the hard labour of the dairy may be transferred from women's hands.

UNDER the provisions of an Order of Council which came into operation on February 16, the stamping-out system may be applied to PLEURO-PNEUMONIA. That it will be applied to any extent we do not for a moment believe; indeed, the one essential condition of the slaughter system—the payment of compensation for animals killed to arrest the spread of disease—is fatal to its adoption, except under extraordinary circumstances, such as the prevalence of a virulent disease like the rinderpest, or the accidental introduction of an infectious malady into a district which has always been free from it, and in which there are special facilities for carrying out sanitary regulations. The new Order of Council does not insist upon the slaughter of cattle affected with pleuro-pneumonia, but it permits such slaughter under certain conditions. The second clause of the Order runs thus:—

"Where a local authority is authorised by the Privy Council to put in operation this provision of this Order, such local authority may cause all cattle affected with pleuro-pneumonia within their district to be slaughtered, subject to the following provisions:—

- "1. The local authority shall, by way of compensation for any such animal, pay to the owner thereof such sum, not exceeding £20 and not exceeding one-half of the value of the animal immediately before it was affected with pleuro-pneumonia, as to the local authority seems fit.
- "2. They may require the value of any such animal to be ascertained by the officers, or by arbitration, and generally they may impose conditions as to evidence of the slaughter and value of any such animal.
- "3. They may, if they think fit, withhold compensation in respect of any such animal, where the owner or the person having the charge thereof has in their judgment been guilty, in relation to such animal, of any act in contravention of the Act of 1869, or of any Order or regulation, or licence of the Privy Council of or of a local authority, or has, in relation to such animal, failed to comply with any provision of the Act of 1869, or of any Order or regulation, or licence, in respect of the giving of notice of disease, or in any other respect."

Clause 3 provides for the event of the diseased animals being insured.

"Where any animal has been slaughtered in pursuance of this Order, the owner thereof shall not be entitled to recover in respect of the insurance thereof any sum which, together with the payment which he receives for the same under this Order, would exceed the sum which he would have been entitled to receive in respect of the insurance."

Clause 4 provides for the record of slaughter and compensation as under:—

"Every local authority shall keep, in such manner and form as the Privy Council from time to time direct or approve, a record, and cause to be kept, of any order for slaughter, and the execution of the order, and other proper particulars; and such record shall be evidence if any question arises concerning an order for the slaughter of any such animal, or concerning compensation in respect thereof."

Clause 5 relates to the movement of diseased animals and of things which have been in contact with them:

"Where a local authority is authorised by the Privy Council to put in operation this provision of this Order, such local authority may, from time to time, with the view of preventing the spreading of pleuro-pneumonia, make regulations for the following purposes, or any of them:—

"For prohibiting or regulating the movement out of any field, stable, cowshed, or other premises, of any such animal, or of any thing which has been in contact with the carcasses of any cattle which have died or have been slaughtered in consequence of being affected with pleuro-pneumonia.

"For prohibiting or regulating the removal of hay, straw, litter, or other thing commonly used for food of animals, or otherwise, or of any such animal, that has been in the same field, stable, cowshed, or other premises with cattle affected with pleuro-pneumonia.

"Provided that such local authority shall, from time to time, define the area within their district within which any such regulation shall have effect, and they may, from time to time, revoke or alter any such regulation."

It will be observed that no allusion is made in the Order to cattle which have been in contact with diseased animals, power to regulate the movement of such animals being already possessed by a local authority under the provisions of the 7th schedule to the Contagious Diseases (Animals) Act.

Clause 6 provides for the prohibition of fairs, markets, and sales:—

"Where a local authority is authorised by the Privy Council to put in operation this provision of this Order, such local authority may, from time to time, with the view of preventing the spreading of pleuro-pneumonia, regulate or prohibit the holding of any specified market, fair, auction, sale, or exhibition, of cattle within their district, and may, from time to time, alter or revoke any such regulation or prohibition."

Clause 7 relates to the powers of the Privy Council in respect of the restriction imposed by the local authority:—

"Provided that the Privy Council, if satisfied on inquiry, with respect to any regulation or prohibition made by a local authority under this Order, that the same is of too restrictive a character, or otherwise objectionable, may direct the revocation thereof, and thereupon, as from the time specified in that behalf by the Privy Council, the same shall cease to operate."

The ample powers conferred by the Order are not to be exercised by the local authority without the sanction of the Government; each restrictive clause has attached to it the proviso, "where a local authority is authorised by the Privy Council." In practice, therefore, the Order will only be enforced in certain districts or counties in which the conditions are apparently favourable for the eradication of the disease, and we may anticipate that the occasions on which the Privy Council will be called upon to authorise the application of the provisions of the Order will be few and far between.

Nevertheless it is fair and reasonable that the authorities in the principal breeding districts, which being in some instances at least, out of the lines of cattle traffic are less exposed to the risk of infection, should have an opportunity granted to them of dealing summarily with pleuro-pneumonia, if it should, by some untoward chance, be introduced. In this way the new Order of Council may be very beneficial in its application, but we have no hope that permissive legislation will ever succeed in ridding the country of pleuro-pneumonia, or any other contagious malady; and, with our extensive trade, the attempt to deal with ordinary infectious diseases as we dealt with the cattle plague would be productive of more harm than good.

If pleuro-pneumonia, like cattle plague, could only be introduced in England by cattle from abroad, we might succeed in getting entirely rid of it; but taking into account its extensive prevalence for many years all over the United Kingdom, we must be aware that while cattle

are allowed to move freely through the land there is no probability of its cessation for any length of time in the centres of cattle traffic.

THE supply of English Wheat on Monday at Mark Lane was small, the condition bad, and a slow sale at a reduction of from 1s. to 3s. per quarter had to be submitted to. On Wednesday, prices remained about the same. The Metropolitan Market wheat trade was not quite so brisk, and the prices of the previous week were reached in the case of only the choicest qualities. On Thursday trade was brisker, and prices better.—In the Seed Market prices are maintained, and a great deal of business has been done.

At an interview last Friday between the executive committee of the FRENCH PEASANT FARMERS' SEED FUND and the administration of the Mansion House Paris Relief Fund it transpired that the subscriptions to the French Peasant Farmers' Seed Fund amounted to nearly £6000, of which about £4000 had been expended in purchases of seed corn. The subscriptions which had been promised, but not paid, the value of donations of grain which had been received, and the amount of subscriptions in the hands of local secretaries, were estimated at probably £4000, making altogether a total of £10,000 which had been subscribed. Mr. CAIRD, C.B., pointed out, that however great a yield it might produce, £10,000 was only sufficient to sow 15,000 acres, whereas in the Department of the Somme, about 200,000 acres of seed were required for no less than 60,000 acres of land. To this we add that special notice should be taken of the energy and public spirit of Mr. MARTIN H. SUTTON, of Reading. That gentleman himself gave £100 to the fund, and as a local secretary he has printed and distributed 25,000 circulars at his own expense. The county of Worcester also has done well, Messrs. WEBB and BUCK, of Worcester, having collected nearly £300; and Messrs. C. DANELL and W. W. GILWYN have done well, and they still expect to send more. If every county would send £500! These examples may stimulate others.

Mr. DONNELLY's annual report on the AGRICULTURAL STATISTICS OF IRELAND has just been published. We shall give the substance of his Tables next week. Meanwhile, we may say that there was last year a diminished area under Wheat and Oats to the extent of 56,000 acres, and under Flax to the extent of 34,000 acres. Other cereal crops were 20,500 acres more than in 1869. Of green crops there was an increase on the whole of 29,500 acres, and of Meadow and Clover of 105,000 acres. The number of horses at cattle in 1870 remained pretty much the same as in 1869. Of sheep, however, there were 317,000 fewer, and of pigs 377,000 more. We shall give the full returns next week.

Mr. MCINTOSH, of Havering Park, Romford, President of the Essex Agricultural Society, has published the following conditions under which his CHALLENGE CUP, for the best PURE-BRED SHORT-HORNS, shown at the annual meeting of the Society, will be competed for:—

"(1.) The competition for this cup to be open to all England, Ireland, and Scotland.

"(2.) To be decided at the meeting of the Essex Agricultural Society's Show at Romford in 1871; and subsequently challenged, until ultimately disposed of, at each successive annual meeting of the Essex Agricultural Society.

"(3.) To become the property for one year of the exhibitor of the best pure-bred Short-horn (male or female of any age) in all the classes, having due regard to animals for breeding purposes. Should the cup be awarded to the best bull, the owner to produce satisfactory proof to the committee, by a certificate from the owner or owners of the cows that, during the year, he got a calf or calves in twelve months preceding the show; or, if a cow or heifer in a breeding state, satisfactory evidence that she produced a life calf; or, if a dead calf, to have gone her full time—provided always in each of the above cases, that the animals are of sufficient age to admit of the conditions being complied with."

"(4.) The holder of the cup to give security that it shall be forthcoming, and delivered up to the secretary, ten days before the commencement of the next show. The cup to be won three years in succession by the same exhibitor, but to be his *domino* file property."

One is glad to notice the conditions which ensure the retention of the stock to which the prize is to be awarded. The history of the prize is stated in the following note, which Mr. MCINTOSH has been good enough to address to us:

"You may have heard that I am giving a challenge cup at our next county show, and it occurred to me that you might possibly like to remark upon it. I send you 'conditions' enclosed. I may remark, the first idea of the cup was suggested itself to me in this way, viz.: Having, as you are aware, sold my yearling heifer, *Lady Knightly*, ad, on the ground at Oxford, after taking 1st prize in her class, to Messrs. WALCOTT & CAMPBELL, New York, for 500 gns.; also the same day my bull calf, *Grand Duke*, to Mr. J. H. BRASSEY, of Preston Hall, Kent, for 600 gns., it seemed to me that I might be well satisfied to pocket the round sum of 1000 gns., and give the remaining 1000 gns. for a challenge cup."

We are glad to see it announced that the Mansion House Fund, now that the immediate needs of Paris have been attended to, is to be administered with a view to the relief of country districts, and that the sum of £5000 was voted on Tuesday last for the purchase of seed corn.

challenge cup. Both *Lady Knightly* and *GRAND DUKE OF HAVERING* are by my celebrated 3D DUKE OF GENEVA."

— An unusually interesting number of Mr. THORNTON'S Shorthorn Circular has just appeared. It contains, in addition to news of coming sales, a history of the Shorthorn sales of 1870, and a very interesting account of the Editor's journey in America, to which we shall refer next week. We quote now the following paragraph relating to the forthcoming sale at Berkeley, to which reference was made last week, p. 285:—

"This sale consists of 20 young bulls and half-a-dozen heifers, bred from good cows, selected from Messrs. BOWLY, RICH, and HOLLAND'S stocks. Since the sale last year, the herd at the Castle has been increased by the purchase of a few of the best animals that were offered at Capt. OLIVER'S great sale. The catalogue contains the bull calves from three of the finest cows, *Lady Wild Eyes 2d*, *Cassip*, and *Bracelet 3d*, by that noted sire *GRAND DUKE 7TH* (19,877). *LORD WILD EYES 5TH* (26,762), a pure Bates bull, the sire of many of the young animals, is himself the first lot in the sale. The herd at the Castle has been established for the improvement of the stock throughout the famous district known as the Vale of Berkeley; milking properties are especially cultivated, and

Messrs. CURTLER, MACE, STEPHEN, &c. Buyers will have more ample choice with reference to blood than is afforded by attending several different sales, as nearly every strain of note is represented. In consequence of the numerous entries, the auction is fixed to commence at 10.30, and all animals exhibited are for *bona fide* sale, after the starting price of 20 gs.

THE SEVENTH DUKE OF YORK (17,754).

THERE lies on the table before us a broad sheet, ornamented by rude engravings of a bull and cow, hardly recognisable now-a-days as of the pure Shorthorn breed. It is "A Catalogue of the Improved Shorthorn Cattle and Leicestershire Sheep belonging to Mr. C. Colling, which were sold at the Auction at Ketton, near Darlington, in the County of Durham, A.D. 1810." The first day's sale included 17 cows, sold for 2669 gs.; 12 bulls, which sold for 2249 gs., among which was COMET, sold for 1000 gs.; 7 bull calves, which sold for 655 gs.; 7 heifers, which sold for 898 gs.; and 5 heifer calves, which sold for 306 gs.

It was one of the heifer class in this extraordinary

different mothers being themselves related both to one another, and to FAVOURITE the bull to which they were put.

The following is the pedigree of the 7TH DUKE OF YORK (17,754), the g-g-g-g-g-g-g-son of the cow whose breeding is thus described, as given in the Herd Book:—

White, calved January 24, 1859, bred by Captain Gunter, Wetherby Grange, Yorkshire.

Got by 6TH DUKE OF OXFORD 12,765.
dam *Duchess 6th*, by 4TH DUKE OF YORK (10,167).
g.d. *Duchess 5th*, by 2D DUKE OF OXFORD (5046).
g.g.d. *Duchess 5th*, by 2D DUKE OF NORTHUMBERLAND (3646).
g.g.g.d. *Duchess 51st*, by CLEVELAND LAD (3407).
g.g.g.g.d. *Duchess 41st*, by BELVEDERE 1705.
g.g.g.g.g.d. *Duchess 3rd*, by 2D HUBBACK (1423).
g.g.g.g.g.g.d. *Duchess 19th*, by 2D HUBBACK (1423).
g.g.g.g.g.g.g.d. *Duchess 12th*, by THE EARL (646).
g.g.g.g.g.g.g.g.d. *Duchess 4th*, by KETTON 2D (710).
g.g.g.g.g.g.g.g.g.d. *Duchess 1st*, by COMET (155).
g.g.g.g.g.g.g.g.g.g.d. by FAVOURITE (52).
g.g.g.g.g.g.g.g.g.g.g.d. by DAISY BULL (186).
g.g.g.g.g.g.g.g.g.g.g.g.d. by FAVOURITE (252).
g.g.g.g.g.g.g.g.g.g.g.g.g.d. by HUBBACK (310).
g.g.g.g.g.g.g.g.g.g.g.g.g.g.d. by J. BROWN'S RED BULL (97).

A further examination of the Herd Book shows that in the course of the 10 generations of the above pedi-

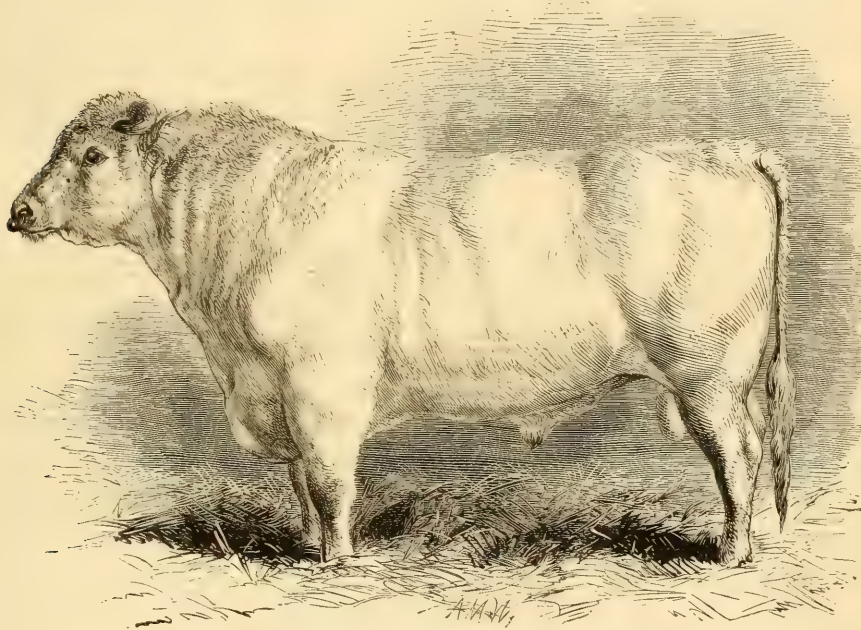


FIG. 55.—THE SEVENTH DUKE OF YORK (17,754).

the fine character of the stock, coupled with their good blood, makes them very desirable animals.

"The small herd belonging to the late Mr. A. BOURNE, of Steeple Ashton, will, by permission of Lord FITZHARDINGE, be offered at Berkeley. It consists of about a dozen animals, in nice condition, bred from the Earl of RADNOR, Mr. BOWLY, and Mr. MANN'S stocks."

— We have received the catalogue of the BIRMINGHAM SHORTHORN SHOW AND SALE, to be held in Bingley Hall on Thursday next, March 2. It contains the pedigrees of 153 animals, divided into six classes. In the class for bulls between 12 and 20 months old there are 37 entries, against 19 last year; and amongst these and the class for older bulls will be found many animals which obtained premiums and commendations at the Oxford and county shows. In the class for bulls between the ages of six and 12 months, there are no fewer than 67, against 39 in 1870. Amongst the most taking of the pedigrees will be found that of a "Wild Eyes" bull from Mr. ATHERTON; a "Foggothorpe," from Mr. RATCLIFF; and two calves from Milcote. Booth blood will be well represented, there being, in addition to several of Warley and Killerby families, eight sons of Mr. T. C. BOOTH'S ROYAL BENEDICT (27,348), now in service in the Royal Herd at Windsor. The blood of 7TH DUKE OF YORK (17,754), and the American bulls 4TH DUKE OF THORNDALE (17,750) and LORD OXFORD 2D (20,215), whose stock are so eagerly sought after, will no doubt attract attention, in the animals from Lord SKELMERSDALE,

sale, and not the highest priced one, *Young Duchess*, purchased by T. Bates, Esq., then of Halton Castle, Northumberland, which has given rise to one of the most extraordinary and valuable families of the Shorthorn breed of cattle. Let us trace one of her descendants through the successive generations, now 10 or 12, which have elapsed since the Ketton sale. *Young Duchess* was the result of an almost unparalleled in-and-in breeding, to which, indeed, the owners of the original herds of Shorthorns were forced to resort, owing to the then comparatively few strains of pure blood. This, conducted with consummate skill and judgment, has resulted in conferring on those herds a wonderful power of reproducing the qualities which they inherited. The following Table indicates the breeding of *Young Duchess* through four preceding generations.

Descent of *Duchess 1st*, the *Young Duchess* of C. Colling's Sale.

Dam	<i>Duchess</i>	sire	g. dam	g. g. dam
		(152)	(186)	(152)
and				
			g. dam	g. g. dam
Sire	COMET	sire	(152)	(153)
	(155)	(152)	(152)	

The numbers are those of bulls in Coates' Herd Book. No. 252 is FAVOURITE, 186 is DAISY BULL, a son of FAVOURITE. It will be seen that for three generations, excepting DAISY BULL, the only bull employed was FAVOURITE—and *Young Duchess* was the produce, in fact, of half brother and sister—the

gree since *Duchess 1st*, the bulls used have been almost all of them related, more or less, to the family into which they were brought—so that in no other instance of a Shorthorn family, probably, is there such a repetition of the same blood in such a number of successive generations. We quote the new number of Mr. Thornton's Shorthorn Circular on this subject:—

"It may interest the uninitiated breeder to know that after Mr. Bates obtained the tribe in 1810, he used KETTON 2D (710) (whose dam was by a grandson of FAVOURITE (252), out of a cow of J. BROWN'S RED BULL); then a pure bull, THE EARL (646), bred from the "Duchess" tribe, who in his turn was succeeded by three bulls, of different strains, viz., 2D HUBBACK (1423), of the "Red Rose" tribe; BELVEDERE (1705), of the "Princess" tribe; and NORFOLK (2377), bred by Mr. Whitaker, from *Nonpareil*, with the blood of NORTH STAR, PUNCH, and HUBBACK; and these three bulls, be it remembered, were all of Robert Colling's best blood. The CLEVELAND LAD (3407) (a bull with three crosses), now generally known as the Oxford cross, was introduced a few years before Mr. Bates' death, and it is only this cross now that is admitted as pure."

Of the cows named in the list of the 7TH DUKE'S pedigree, it may be mentioned that *Duchess 51st* is the mother of the so-called *Grand Duchess* tribe, which sold for such enormous prices at Mr. Betts' sale. And if need were, a list of prices could be given achieved in successive generations of the breed, showing the enormous and increasing value which is put upon this particular strain of Shorthorn blood.

The use of a single bull may affect such large numbers of cattle, that the price given for a single animal, extravagant as it may seem, may be more than justified; and we give now the experience of two Gloucestershire farmers in proof of the profitable character of the purchase of a single young bull for 500g.

Notes on 7TH DUKE OF YORK (17,754), by Mr. Stiles Rich, late of Didmarton, Gloucestershire.—He was bred by Captain Gunter, January, 1859; his dam, *Duchess 66th*, having been bred by the late Earl Ducie, and sold as a calf at the Tortworth sale in 1853 for 400 g. She was some time afterwards sold by Mr. Tanqueray to Captain Gunter, for 500 g. His grand-dam on other side, *Oxford 11th*, bred by Mr. Bates, was also sold at the Tortworth sale, then in calf to the celebrated *Duke of Gloucester*, and was afterwards bought at Mr. Tanqueray's sale for 500 g. by Captain Gunter; and at the same time her son, 6TH DUKE OF OXFORD (12,765), the sire of 7TH DUKE OF YORK, so that the latter was a pure Bates bull, from the "Duchess" and "Oxford" tribes.

7TH DUKE OF YORK, after some use at Wetherby, was let to Mr. Stanhope, M.P., where he got a number of good calves. He was then hired by Mr. E. Bowly and myself, and, in about one and a-half years was purchased by us of Captain Gunter for 500 g. In our hands he was used alternately for several years, many times journeying in his van the 18 miles between Didmarton and Siddington, doing good service in both herds till about January, 1868, when I sold my half share of him to Mr. Bowly, having in 1867 bought, ultimately for myself, at Wetherby the bull calf 2D DUKE OF COLLINGHAM, for 500 g.

During the 7TH DUKE's time at Didmarton he got for me 41 heifers and 40 bull calves, which were all reared, and probably Mr. Bowly could tell of like service at Siddington. Mr. Harvey, too, near Liverpool, had a few choice calves by him of the "Lally," "Kirklevington," and "Wild Eyes" tribes, since sold at high prices; others also, as the Duke of Devonshire's fine bull, BARON OXFORD 4TH, in use at Holker.

7TH DUKE finally ended his career of nearly 12 years at Gaddesby Hall, Mr. Cheney having bought him of Mr. Bowly about the early part of the last year; and he has lately sold a bull calf by him from an American *Duchess* at 850 g.; besides which, he has a few more calves, and several cows are in calf to him; so that, to the last, he has been for many years an extraordinarily useful bull.

The 7TH DUKE OF YORK was, perhaps, in appearance not what might be called a show animal, and, in fact, I believe he was never exhibited; but a good judge would be struck with his general style,—such a noble head, so well set on, such grand loins, ribs, and quarters, with plenty of thick, soft hair, and beautiful quality of flesh, found by the touch—sweet, fine temper also. But his real excellence is best proved by his stock, all of which appear of one striking uniform grand character; in fact, I have never yet seen anything like a bad calf by him. Many have been sold at public and private sales, and their value has been well proved, and, in fact, more scattered far and wide in England and the colonies.

As such, the bull has therefore done much credit to his high lineage, maintained the high prestige of his race, and may fairly be considered intrinsically one of the most valuable sires which Colling has produced since the days of the brothers Colling.

Notes on 7TH DUKE OF YORK, by Mr. Edward Bowly, of Siddington, Cirencester.—I never saw the 7TH DUKE OF YORK until he came to Siddington. I am told by Mr. Knowles that he was a plain animal as a calf; indeed, I do not think he was ever a show animal. He was chiefly remarkable for his magnificent head, superb quality of flesh and fine hair: his hips were completely covered with flesh, so that you could feel no bone—it was almost like putting one's hand on a feather cushion.

During his time at Captain Gunter's agent, Mr. Knowles, in the Battersea show, and also at Mr. Rich's share, which was at once taken. He came to us from Mr. Banks Stanhope's, but from his having been overworked as a 2-year-old, he was of little use to us the first year. Many cows slipped their calves when at half gone; this is often the fault of the bull, and was clearly proved to be so in this case, as cows served by other bulls in the same herd brought their calves to maturity.

The following year Mr. Rich and myself decided to purchase him, if Captain Gunter was disposed to sell, and the contract was completed for 500 g. From the rest we gave him, and the care bestowed upon him, he now became a sure getter, and travelled many times between Siddington and Didmarton, and once paid a visit to Mr. Harvey at Walton-on-the-Hill, near Liverpool; and for some years, except occasionally being a little lame behind, he never had an ailment of any kind. He had a most wonderful constitution; perhaps nothing is a greater proof of this than the health and vigour of those animals having a double cross of him. Lord Dunmore has a "Siddington" and Lord Fitzhardinge a "Musical" of this description. I also have two calves of the sort, almost the last of his getting here, which I consider the best animals I ever bred.

I think it was towards the close of 1867 that Mr. Rich and myself purchased 2D DUKE OF COLLINGHAM, intending to sell 7TH DUKE OF YORK, and he was offered to two or three parties; none of them, however, would give the price we fixed on, and as Mr. Rich's sale was coming on, I agreed to take him at the price, and give up my share in 2D DUKE OF COLLINGHAM to Mr. Rich.

Very soon after he became my property the symptoms of the malady, to which he eventually succumbed, appeared, and for upwards of 12 months he could with difficulty be moved out of the loose box in which he lay. Things looked so hopeless that I sent for the butcher to purchase him, and when he came I said to him, "He must be killed here, he cannot be got out of the box." However, when we went into the box, he got on his legs better than usual, and after getting free of the long straw he walked into the yard; so I bid away my friend the butcher, telling him I would not sell at any price. He continued to improve, and three or four months after proved servicable again till he left Siddington.

I thought at first his malady was spinal, but this could not have been the case, and I have no doubt it was rheumatism, which affected the off hindquarter more than the other. Mr. Cheney proposed to hire him, but he eventually purchased him, and a most successful purchase it has been. The calf sold to Mr. Davies is one of the most promising young bulls in England, and I am rejoiced that he is coming into our county, as I hope to make arrangements to put him on a double cross of the 7TH DUKE's, so as to get as much of the blood as possible concentrated in one animal.

The 7TH DUKE was distinguished in giving a most marked character to his stock. It is extraordinary the mark his sons have put on the ordinary herds of this district, so much so that any judge of stock would know that some of the best districts in the county are steers I ever saw together were by a son of his (a *Gazelle* bull), a plain white one, sold at my sale in 1865 for the low price of 24 g., and out of very second-rate cows. I should advise all those who possess sons of his not to fool them away, as many have done. I am pleased to say I have now 15 daughters of the old bull. A cross of the same blood would, I feel sure, be attended with the best results. I should have used him on his own stock to a much greater extent than I have done, but he had been afraid of white predominating too much. However, out of the four double crosses I have had, only one is white, and one is a dark rich roan.

7TH DUKE was remarkable for his good temper and intelligence, and I shall never forget the way in which he appeared to recognise me when I went to Gaddesby, after an absence of some months.

To this we append a note from Gaddesby, giving the last account of an animal which has certainly done a great deal towards maintaining and perpetuating the excellence of past generations of Shorthorns. At how many thousands of pounds in actual money-worth are we to value the services he has rendered?

"The poor old 7TH DUKE OF YORK (17,754) ceased to be of service after August 3 last year. You know the conditions on which I bought him, viz., I was to give 200 g. down for him; and if he got calves I was to pay 130 g. more, and if he did not get stock I was to receive back 30 g., and his engagements were to come with him, viz., three cows of Mr. Sartoris, for 100 g. each; 12 calves for 100 g. each; have calved and seven are to calve), one for Mr. Sartoris, *Polythron*; one for Mr. Snodin, *Modesty*; and a "Blanch" heifer, which I sold to Mr. Crowdon, of Ulverstone (which has calved a heifer calf)—these making 16 calves. The one from 11th *Duchess* I sold to Mr. Davies for 850 g.—I sold him to the butcher on December 16. His flesh was a very dark colour, and many farmers who saw the meat exhibited for sale at Leicester on the 16th of the same day, chaffed the butcher about bringing so much flesh from the poor French. His carcass was very good indeed, especially the one from *Waterloo*."

THE BREEDING AND MANAGEMENT OF POULTRY.

[At the February meeting of the Muddam Farmers' Club, the Rev. A. G. Brooke, of Sharncliffe, Salop, read the following paper on this subject.]

THE subject was one of considerable importance, and he hoped that his remarks would lead to an interesting and instructive discussion. When they found from statistics that an immense quantity of poultry of all descriptions was annually imported into this country from France and Germany, that hundreds of millions of eggs were imported yearly; and that, in spite of the terrible war which had been raging on the Continent, 22,000,000 of eggs arrived in this country from France during November in last year, it must surely be admitted that for some time past we had too much neglected our farmyard poultry, which in these days formed such an important market commodity as food for the people, but which at present might be described as a question of fowls of all sorts and sizes, mostly the result of breeding in-and-in for years past. The owner continually grumbling because they cost so much to keep. The feeding generally was left to a personage known as the boy who fed the fowls and hunted up the

eggs, and most liberally threw down handful after handful of grain with more zeal than discretion; while in the winter months, when eggs are scarce, and might be a source of profit, few, if any, were to be found.

To make poultry profitable they must first of all begin with a breed which would ensure them success. Having been a most successful exhibitor and breeder for nearly 20 years, and having kept almost every variety of fowl, I have no doubt that I suggest that they should either send to market and so dispose of every fowl in their yards, and then commence with an entirely fresh strain, or that they should keep about a dozen of the best and biggest of the pullets, purchase another "bold chancier," and thus introduce fresh blood amongst them. As regarded starting with an entirely fresh strain, which he strongly recommended, he thought it would answer their purpose best to keep *Brahmas*—say, a 2-year-old cock and six pullets, by way of a start. The work *Brahmas* were very hardy, extremely prolific, and good mothers. If hatched in April, they would lay during the winter, and, with a liberal supply of food, the chickens attained size and flesh very fast, could soon be got ready for the market, and were by no means coarse for the table. In addition to this they were handsome, and an ornament to the farmyard. The eye was naturally peeled by seeing a true and pure strain of fowls foraging about, and in the districts of poultry exhibitions good birds, especially of this breed, commanded high prices, and they would be found very remunerative. He commenced keeping *Brahmas* some four years ago, and the first time he exhibited them was at Middleton, near Manchester, where, with a cockerel seven months old, he won the 1st prize; and the bird was sold at the catalogue price, £5. In this breed he had been most fortunate, and he had sold many of his birds at the rate of 50s. a cockerel and two pullets, the others being couple for household purposes. The pullets he saved each year for winter laying were invaluable. As a rule, he preferred purchasing birds rather than eggs for hatching; and now that poultry shows are so numerous, *Brahmas* might always be met with at fair prices. In this strongly recommending *Brahmas* as best suited for farmyards, he did not wish to speak disparagingly of the many other useful varieties of fowls which we have, such as *Dorkings*, *Cochins*, *Spanish*, *Games*, and *Hamburghs*. But, were he a farmer and wanted a couple for household purposes, bred, for hardiness, fast growing, and sure and certain winter-layers, he would keep *Brahmas*—*Brahmas* and nothing but *Brahmas*.

Another suggestion which he would offer was that of keeping some of the best and biggest pullets, and turning down with them a fresh cock. Here he would recommend either *Dorking* or *Brahma* as being most suited. If we looked into our markets we did not find the best poultry offered for sale at a price larger than it used to be, with the exception of turkey geese and ducks, in which a vast improvement was to be noticed. And here, again, the result of having only first-rate strains to breed from soon showed itself. A good strain would cost no more to keep than a bad one. To show how much ducks have, of late years, improved in weight, he might state that at the last Birmingham show the 1st prize *Aylesbury* weighed over 13 lb. the couple. Seventy-two pens of *Rouen* ducks competed there, and the 1st prize couple weighed 19 to 4 oz. *Geese* weighed 58 lb. and 56 lb. the couple, and *Cockings* of last year 49 lb. The 1st prize adult turkey cock, which came across the Atlantic to compete, weighed 36 lb. 4 oz. This bird was now the property of Mr. Frederick Lythall, and won the silver cup at Bristol during last month. Both the prizes for turkey cocks of 1870 went also, at Birmingham, to the same gentleman, with birds weighing 24 lb. and 23 lb. each. The old prize hens weighed 35 lb. and 34 lb.; the 1st prize couple of 1869 weighed 32 lb. and 31 lb. from strains as these they might go and do likewise. But, whatever their breeds of poultry, they must be careful to infuse fresh blood into them every spring.

As regarded management, the most important point was to have a properly-constructed, well-ventilated poultry-house, with plenty of light, and free from draught. By all means have this before entering upon a fresh breed of fowls, as on their arrival they can be shown for the first time in their new abode, and we learn to return to it for the purpose of laying and roosting. Have the door well secured by two flat iron bars to go across it, fastened with staples screwed into the post at one end, and by patent padlocks at the other. There should also be a sliding panel in the bottom of the door for the fowls to go in and out during the day, and the lower iron bar should go across the panel when shut down for the night. The walls of the house should be renewed at least three times in the year. The perches should not be more than 3 feet from the ground, and ought to be, at least, 3 inches wide; a larch pole, split in halves, answered the purpose admirably. These perches should be placed all round the house, about 3 feet distant from the wall, not one above the other, and care should be taken that there are no beams or rafters that they can fly up to in the roof, as in their descent they alight on the ground with great force, and it is the cause of so many chicks not being able to get out. Round the walls, on the ground, at convenient distance, place three bricks, to form a square nest for laying and sitting; in these place some hay and a china egg. He

preferred this plan to boxes, because they are easier to keep clean, and the other fowls cannot roost upon them to disturb the sitting hens. The interior of the house being open, there is room to have the droppings properly raked out from under the perches once or twice a week, and fresh earth or coarse sand thrown all over the floor, and well raked over. The value of these droppings as manure could not be too highly estimated. The cleaner the fowl-house was kept the healthier would be the stock. Let the floor be well littered with straw and occasionally shook over, or changed. In winter time, 8 o'clock almost always being the best time for the fowls to be out of the house, but before so doing it is a good plan to give them a liberal supply of soft food (warm, if possible), as it will teach them to become attached to their abode, and the sitting hens will reap the benefit of a regular meal. By soft food he meant Potatoes, boiled the night before, and mashed up when warm with Indian or barley meal. Corn should be given in the middle of the day, and again before going to roost, in the vicinity of the fowl-house. Calabashes should also be kept specially ground, and be taken to them daily during the winter months. In summer time they can, in a measure, cater for themselves. The sitting hens would also be much benefited by having a cast-iron trough (costing about 3s.) placed on two iron brackets, fixed in the wall of the house about a foot from the ground, to contain water, which ought to be changed every morning. As regarded the rearing of chickens, he would only say that the early and the late should receive the liberal supply of little and often, of different kinds of food, but above all particular care must be taken that the water given them to drink was clear, and often changed. In drawing his remarks to a close—though he could assure them that poultry may be made a profitable adjunct to the stock of the agriculturist, and a source of great pleasure and amusement to the amateur, and that with proper care, judgment, and attention it will be exceedingly remunerative—yet he trusted that the country gentleman of this day allowed no further discussion on the subject, and learn much by listening to the experience of some members of the Club, who might take heed to his suggestions, which, out of pure love for things appertaining unto poultry, had been humbly offered.

DISCUSSION.

Mr. Councillor LOWE said the subject required looking at from a farmer's stand-point, which was, the price at which poultry could be produced and sold for the pot. No doubt farmers, generally speaking, had very much neglected their poultry, which was attributable to one or two causes. Some half-century or a century ago farms were much smaller scale, and the farmers themselves, and their wives in particular, were more anxious and more disposed to look after useful adjuncts; but latterly, the fashion had been for very much larger occupations, and the attention of farmers had naturally been drawn to other and more profitable branches of husbandry. As to varieties of poultry, his experience went back to the time when a decent black-breasted hen was thought to be a very useful bird. The sort was very hardy, and of good constitution; and he had heard it said that, next to a pheasant on your table, a good cock and well-coupled cock was the next best thing, by no means a bad dish.

Mr. WISE said he was a large fowl-keeper whilst residing in Ireland, and from a diary which he kept he found that he always got more eggs in the month of February than at any other time. The next best month was July. He always gave his poultry the best food, such as Potatoes, Indian meal, and light Oats, and fed them regularly and well; and he could only say he found them the most profitable of anything he had at the time. He kept about 30 laying hens, and generally got from 16 to 18 eggs per week; but he was sorry to say he never got above 5s. a dozen for them.

Mr. MASEN said he agreed with Mr. Brooke's remarks concerning the dark Brahmas, looking at them not from an amateur's but a farmer's point of view. They were a very profitable breed. He had not then been a continuous freer for 30 days, during which he had had fresh eggs every day from the Brahmas—the first instance of the kind he could remember. Speaking at one of the dinners connected with the Wolverhampton Poultry Show, Mr. Hewitt said that nothing would enhance the value of any particular kind among them. Up to that time he had generally selected for keeping some of the best birds from his own or his neighbours' stocks; but after hearing Mr. Hewitt he gave a guinea or two for any bird which took the variety of a pouter; but he was never had cause to regret it. In reference to Mr. Lowe's remarks upon the present generation of farmers' wives looking with contempt on the poultry-yard, he was happy to say they did not apply to Rendelower, where a debtor and creditor account was carried on. He was not a member of the House, but the wives also of many of the nobility and members of Parliament, paid great personal attention to the poultry.

Mr. WRIGHT said that during nearly the whole of his life he had taken a great interest in poultry; he had observed that many kinds of poultry were a very constant cause to extent; and the first point which occurred to his mind was that it was impossible to lay down any strict rule as to the breed which should be recommended to be universally kept. Differences in climate, soil, and convenience have to be considered, and some very great gradations, while others are kept in confined spaces. Such varieties as game or Hamburgs, would be worthless if kept in a confined space. With regard to keeping poultry generally, one of the great difficulties was that two runs or yards were requisite—one for the old and the other for the young birds, and when such a thing was not possible almost impossible to keep them profitably or satisfactorily. Many of their agricultural friends had out-barns,

where the chickens could be sent when old enough to leave the hen, where they could be fed at a little cost, and thrived admirably. Where they had not two walks it was well for friends to join—the one to keep the old breeding stock and the other the young birds. With regard to which was the best variety of fowls for farmers' use, in any particular situation, the Dorkings were to be recommended. In the number of eggs they laid they were not equal to either the Hamburgs or the Brahmas; but for the table there was not a breed to equal them. They were very fair foragers, getting their own living as far as possible, and therefore the food they ate. When they came to market great weights at a tolerably early age—a couple of pullets, for instance, weighing from 10lb. to 11lb. at eight months old. In damp localities Dorkings would not do, as they were in such situations liable to roup; the Dorking was a very good bird, and was of the same nature of the fowl, and their liability to that disease, as from want of care on the part of persons who keep them. If Dorkings were not so much crowded together, they would be very much less affected by roup. With regard to roosts and the care of poultry, he had been for a long time in hatching a considerable number of chickens every year. He had only a small roosting place; and till he could kill them off they were very crowded. Notwithstanding that, however, he had rarely any disease among them; and when disease did appear it was always a favourable situation, the Dorkings were to be recommended. He did not have the roosting places swept out every morning, and the floor sprinkled with sawdust and MacDougall's disinfecting powder; and he recommended every poultry—and he might say stock-keeper—to do so. A favourite and prevalent disease, however, was the want of a variety of food was to some extent necessary; and he thought that some errors were committed in regard to feeding. For his own part he never used Indian Corn, as it made the poultry fat and gross, and the eggs had not the right quality. The best food he had used was a mixture of barley, and a small but good sample of English Wheat, and Barley; the latter, when steeped, being an excellent thing for bringing fowls into high condition. He soaked the grain one day, putting it afterwards into an iron dish in the oven or near the fire to dry it. As to the matter of the right kind of poultry, which he wanted plenty of bone-forming material, brain, horse, and meal were very useful; but the best thing he had found for his young Dorkings, in addition to other food, was a good sample of small white Peas, which were not only a good variety of food, but they were also a good variety of food.

Mr. BROOKER said he was a couple of years ago, on this day, hatched in April, and killed about November or December, weighing about 10lb. or 11lb. The Pencilled were very beautiful, but more delicate; but one of the most useful of all fowls, especially to the inhabitants of our towns or villages, was the old-fashioned Cock. He had seen a number of these "red caps," as they were called in some localities, which, he was sorry to say, had been deteriorating for a number of years. If a large supply of eggs, of a good size, was wanted, no variety was better. If some of their friends could induce the Cock to come under the hen, he would be a very good doing service. He had had them sitting for months on a heap of stones. They were not, as a rule, very good for the table. A young Cochon cockerel, about five or six months old, would have consumed a wonderful quantity of food, and he would not sit, they were not so good for the table as the Brahmas might find favour as an amateur's fowl. They were handsome, and laid well; but they were not table fowl, he should say. Malays were a valuable variety, and he was surprised they had not received more attention. They were not handsome, but they were a very good variety, and they were thought crosses of all kinds in poultry were decided mistakes. They had been told that the best of all crosses was that between the Brahma and the Dorking. For two years he took the opportunity of testing this point fully with some of the best strains, and when the birds were killed they were not so heavy by three or four pounds the couple as some pure Dorkings which were hatched at the same time. The crosses had broad, deceptive, flat backs, but no breasts. He thought this was the case with regard to all crosses. He was not a pleaser, but in the spring, and the worms appeared, poultry never threw so well; and the last three seasons had been against them in that respect. A great mistake was made in the manner of killing poultry. Much of the poultry which came to market was killed, plucked, and sent to market at once. The poultry was not ready for the table until the day before killing, and hung a week or a fortnight, according to the state of the weather, when the meat would be much better and much more nutritious.

Mr. BROOKER said, in answer to a question from Mr. Lort, that he was not a member of the Malaya Farmers' market; they were very long in the leg, and unsightly; the market people did not care about buying them. They were also very pugnacious, and it was sometimes hard work to keep the peace among them. They were also very noisy, and never more than a few days before wanting to sit. In conclusion, he again urged the value of the Brahmas, and hoped that ere long they would have another discussion upon the same subject.

THE CULTIVATION OF SUGAR BEET.

[The following letter has been addressed by Mr. W. Biddell, of Lavenham Hall, Suffolk, one of our largest growers of this crop, to Mr. Blyth, of Aldington, Evesham.]

WE (the farmers in this locality) have now grown Sugar-Beet three years, and some of which we have had very favourable results from the growth of roots. In 1868, the season being much too dry throughout, my crop only averaged about 9 tons per acre. In 1869 we obtained good plants, and all promised well up to June, when the severe drought blighted our prospects; still

my crop averaged between 12 and 13 tons per acre. In the past year, 1870, a good plant was but rarely met with, and when obtained the dry weather prevented a good crop being secured. Nevertheless, mine came up to the scale better than I anticipated, weighing 11½ tons, and that, in spite of having little more than two-thirds of a plant, and having sown several acres of an inferior small kind of root. Some of the crops of my more fortunate or more fertile neighbours averaged, I believe, 13 tons per acre.

Contrary to the nearly unanimous predictions of the scientific men whom Mr. Duncan consulted before erecting his factory, it is now conclusively proved that our growth is quite equal in quality to the Sugar-Beet grown on the Continent. Indeed, it is reported that Mr. Duncan has succeeded in producing sugar better than any obtainable elsewhere from Sugar-Beet.

As to the effects of growing a sugar factory in a locality, there can hardly be two opinions on the point. Every acre I grow costs me in labour £1, in addition to what I should have expended had I continued to grow the crops displaced by Sugar-Beet. Indeed, I am convinced the 60 acres I grew this year caused me to increase my annual expenditure for labour some bit more than £60. Mr. Duncan at his factory does not, I am sure, get off with so little cost for sugar as £4 per acre. Taking into account at this sum, and estimating that my growth here at 500 acres, we have an additional outlay of £1000 in the labour market, which cannot fail to enliven it, while the heavy expenditure for skilled labour at the factory must do local good. The great drawback is, that the demand suddenly ceases at the very flattest season of the year for labour—that is, January.

Secondly, as the farmer's view of the question. It is decidedly a very expensive crop, as may be concluded from the following estimate of cost per net acre:—

Common charges—rent, 3s. 6d.; tithe, 7s. 6d.; rates, &c., interest on exp., &c., 10s. 0d.	£ 14
Horse tillage and drilling	5 0
Hand-hoeing and singling, 12s. 6d.; seed, 9lb., 4s. 6d.	0 7 0
Planting and hoeing, 12s. 6d.; seed, 9lb., 4s. 6d.	0 11 0
Filling and carting, 4s. 2s. 6d.; per ton on 15 tons	1 10 0
Manure, 10 loads, 45s.; 3 cwt. phosphate, at 5s. 6d.	3 18 0
10s. 6d.; guano, 1 cwt., 14s.; labour, 10s. 0d.	3 18 0

We have thus at cost the sum of £14 15s. per acre. Upon the second side we have the tops, worth say 7s. 6d. on the 15 tons of Beet, for which £15 is paid, making total receipts £15 7s., leaving an apparent profit £3 12s.

It may be thought that I have formed a low estimate of the yield of Sugar-Beet. I have met with estimates of 30 up to 40 tons per acre, but on investigation it will be found such and similar estimates have been made by parties who have never grown them. My object, in this letter, is to give you what I might call an unbiased experience and opinions. It should be borne in mind that Sugar-Beet are topped much closer than others, and that the thorough washing they undergo seriously diminishes their weight, as compared with the roots weighed in the common manner.

Comparative Profits: If we compare results with that of such crops as Beans, Peas, and other roots, as I advise, Sugar-Beet superceding in part, the result will work out favourably for the latter. Let us take Beans and Peas. These cost as under:—

Common charges as before	£ 14 10
Horse tillage and drilling, &c., &c., 10s. 0d.	0 7 0
Seed, 3 bush,	0 15 0
Manure, 10 loads	3 0
Harvesting, filling, and carting	0 10 0
Hand-hoeing and cleaning	0 10 0
Threshing and dressing	0 6 0

Total cost £ 38 13 0

The receipts will be, straw, &c., worth 45s.; and say 32½ bushels of corn, £8 and 10s. 5d.; or 9d.; leaving an apparent profit of 36s. In connection with profit I have used the word apparent, for the real profit cannot be ascertained without the state in which the land is left be taken into consideration. I have grown Sugar-Beet side by side with Beans, and as yet not at present noticed any appreciable difference in the crops.

Mangel & Swedes cost about £10 per acre to grow. Reckoning the indirect advantage of feeding them upon the farm, he is a first-class grazer who makes £10 off them, leaving the direct profit nil. Where Mangel can be sold off the farm at 16s. or 17s. per ton, I have no hesitation in saying the growing of them is more profitable than Sugar-Beet growing.

Excepting where the farmer has easy access to London, or other large towns, he will find the demand for roots very limited and uncertain.

Artificial grasses when fed seldom pay their cost, viz., common charges, 54s., and 10s. for seed and sowing; but as a preparation for corn are doubtless 55s. per acre better than Sugar-Beet. Even so we have 27s. left as the greater profit on Sugar-Beet growing.

To supersede white straw crops by Sugar-Beet would, I think, be a mistake; for assuming the fertility of the farm to be maintained by growing, to diminish the quantity of straw grown would be a great inconvenience.

In short, the conclusion to which I have arrived is, that where a farmer is situated within two miles of a Sugar-Beet factory, it will answer his purpose to grow from one-eighth to one-fourth of his arable land in Sugar-Beet, if he can there obtain £1 per ton for

* First-class land will average more than this, as it would more than 15 tons of Sugar-Beet.

the straw and hay as chaff should be drawn to the fields to the sheep. The pulping, which must, in the case of the sheep, be done by hand-power, must be debited against them, as compared to horse-power pulping in the case of cows; but if, as in some instances, the sheep are house-fed, then there is no difference for the cost of carriage. The £15 which was allowed as the interest of purchased manures, should not, strictly speaking, be charged against the tillage as compared to grass, for, although no good farmer would attempt to go on without it, the land is really enriched to that amount, and at the end of the term the occupier would be equitably entitled to that amount of compensation for manures, because from the system pursued the increased fertility was not allowed to lessen. This would bring up the profit of the tiller to £123 10s. for dairy cows, and £100 10s. for sheep. But, if we allow £15 as a set-off against the loss of phosphates and extra cartage for the cows, we have only a profit of £8 left us between dairy cows and sheep, which, I believe, is not far from the mark in practice in districts remote from towns, where a market for new milk is not obtainable.

Here, then, we have the tiller making a profit of £100 10s. in sheep on his farm, while the grazier makes but £35, or little more than one-third as much; but the grazier has but £3 per acre invested, while the tiller has £9 per acre, and, therefore, of the sums that he has charged interest on, so that the percentage of profit is about the same in both cases, or a little over 11 per cent., and on that very fact the great question of "Shall we graze or cultivate?" depends. One man with £1000 capital grazes 300 acres, and employs only a shepherd; the other has £1000 capital, and tills 200 acres, giving employment say to four men, two women, and two boys, and besides his blacksmith's, carpenter's, and harness-maker's bill. Some of this money is circulated through the hands of the implement manufacturers, the seed and manure merchant, and through his *employés*, the village baker and grocer, clothier and shoemaker. Still, the grazier without talent or exertion or annoyance, with one man employed, can realise as much profit as the tiller, who to succeed at all must be a man of energy and skill—employing 18 persons. Under the one system as compared to the other, the country even without manufactures only as at present could support twice the number of inhabitants. It is true that under the grazing system the inferior lands will deteriorate rapidly, still "sufficient for the day is the evil thereof." The grazier has his family to support, and so, perhaps, not more selfish than other men, says he will go with the times, and not make sacrifices to alter them. He has not the talent of a husbandman; he must, therefore, to save himself, "turn out men, and turn in cattle."

In the history of nations there are few things more deplorable than this, and other nations estimate their wealth by the number of their inhabitants as well as by any other test. Ireland's wealth must be estimated by the decay of her people, and the deterioration of her soil. Swift, referring to the great propensity of landlords to consolidate farms, and turn them into pasture in his time, with characteristic bitter humour says, "Ajax was mad when he mistook a flock of sheep for his enemies; but we shall never be sorer till we are of the same way of thinking, and it is a sad world upon that, that we are now living in a corresponding period."

Home Correspondence.

Agriculture and Railways.—What a remarkable influence railways are exercising upon agriculture and the value of land. How they are opening up immense tracts of valuable country heretofore greatly isolated—districts capable of bearing a vast amount of every agricultural produce, but for which no outlet was open till the establishment of railways and railway traffic was brought home to them. Many large tracts of land in the fens of Cambridge, Huntingdon, Lincoln, and elsewhere, were almost devoid of communication by road; their chief means of transit being by the water collected in their drains, and the carriage being by a class of boats called lighters—a class of boats which is cheaper for other than river traffic, hence a very expensive way to reach distant markets, involving unloading and reshipment, with all the injuries and loss of time, condition and quality of the produce. Now railway stations are within a reasonable distance in all these districts, and the products of Potatoes, Carrots, Mangels, Turnips, Kohl Rabi, and the Cabbage tribe is immense; grain, too, is on the increase,—a crop that can be transported to the populous towns and markets with the greatest facility, and at a greatly reduced expenditure. This has advanced the value of land in some of these districts exceedingly, and special sales have been made to realise £100 per acre. There are very many districts similarly isolated, which have been similarly benefited, the consequence is that a vastly increased amount of root products are grown and are continually augmenting; so much so, that a very extensive demand has sprung up in every population down for them, for the consumption of both man and beast. Independent of human consumption there is a large demand for the use of cow-keepers, pig-feeders, &c., for Mangels, Turnips, and leaf food. The great drawback against the transit of the latter, is the heavy charge of carriage compared with the value of the pro-

duct. This cannot be too forcibly impressed upon railway managers. The same rate of carriage should not be charged upon a ton of Mangels, of 15s. value, as upon a ton of Potatoes of 120s. value, and other things in like proportion. Railway charges for heavy produce should be based upon value as well as bulk and weight. This would enable growers to supply the distant districts with demands, and prove a further great boon to agriculture. Unquestionably, railways have wonderfully benefited the agriculture of the whole kingdom. It would be superfluous to try to enumerate them. The transit of farm stock is one of the most important acquisitions, cattle and sheep are carried at half the old drift cost, and without loss of condition or weight. Milk is now sent up to the large towns at a cheap rate from very distant districts. Fruit, roots, and garden produce are becoming finer crops, and are brought by railway facilities, in competition with the localities of large towns. These agricultural deviations in practice are rapidly on the increase. Railways have thus brought about very important alterations in the transit and sale of agricultural products. It is for them to open out a vast trade by an assimilation of charges proportionate to distance, between the growers of heavy produce and the consumers in distant towns. O. F.

Meat and Corn.—Your able and interesting correspondent, "G. A. H.," is quite right in selling his corn to his fat cattle rather than sending it to a distant market, for, if I am not mistaken, he has a good meat market in his own county among the miners and ironworkers. He can also buy lean stock cheap among the Welsh hills, and grow plenty of Turnips to feed them. We hear, too, that the Welsh ranches or bullocks at least 10 per cent. dearer than "G. A. H." does, for they come to us loaded with expense of transport and heavy dealers' profits, besides loss of condition in travelling so far. Lean stock make lean corn crops; so I have often wondered why our Welsh friends send us lean cattle instead of fattening them at home. "G. A. H.," has, however, made a great miscalculation as to his profit (no doubt by oversight). He assumes that the grain suitable for market for 1870-71, at 10s. to his live stock, realise £2570, or £750 more than market price. Now this is contrary to all experience, my own included. Ask a Norfolk or Lincolnshire farmer how he charges his corn? He will reply, "I charge half to the bullocks and half to the manure." This is, perhaps, rather an exaggerated view, but we know that the distinction between market price and consuming price is generally allowed by valuers at one-third, or 33 per cent. In fact, the sum left for the root and green crops consumed varies from £4 to £7 per acre. Mr. J. C. Morton, in his able paper in the *Society's Journal*, found that on a consumption of some 4000 tons of roots, the price left for them, after paying for hay and cake, was only 3s. 4d. per ton, so that I must, most reluctantly, knock off at least £1000 from "G. A. H.'s" assumed or expected profit of £1600. If I am wrong in these conclusions I shall be glad to be corrected by £1000, or any other of your correspondents. £6 per acre is very little for farm capital; £1 per acre seems low for rent, rates, tithes, and taxes. Would "G. A. H." be kind enough to give details of the farm capital, live stock, farm horses, implements, hay and corn, &c., in hand unsold, and tillages? In my case, my farm capital is about £16 per acre, invested as follows:—

Live stock	£10 10
Sum of horses	1 0
Tillages, &c.	3 10
Implements and machinery ..	2 10
Hay, corn, &c., unsold	2 5

7. 7. Mechi, Tiptree, Feb. 20. £15 15

—Your correspondent, "G. A. H.," in your number dated February 11, invites attention to the above subject, in connection with farm profits, and establishes the superiority of turning out meat instead of selling grain, on the particular kind of land he mentions, by a rather elaborate calculation as to the two systems. He wishes any of your readers to care to do so, to "pick his figures to pieces." To begin with them, I will just say, what is well known to all practical farmers, that calculations are mostly not to be trusted, for results seldom agree with them—take these calculations as an instance. For example, take the first part of paragraph No. 5.—"I calculate that this quantity of feeding-stuff will fatten 200 bullocks bought in at the end of October, and sold out about five months thereafter." Then go on to paragraph 11, "Fat 200 bullocks of the above weight, bought in at £10 or £12 per head, they ought certainly to sell out fat at £20 to £22 per head; leaving a gross profit of £10 per head for their feeding, or £2000 for the 200." I venture to say this "calculation" is entirely wrong; these beasts, according to the writer, would have eaten 70s. worth each of corn, and have been kept about five months upon ordinary farm food, and in this short time are to pay £10 per head (there is nothing put down for the cost of the feeders). As I can say, I never had beasts pay me so, and should much like to buy the sort at £10 or £12 per head that would do so. If I did venture a "calculation," I should say beasts bought in at such a price would have to be kept at least 10 months (more likely 12), and have the allowance of corn during the last

four months, in order to pay such a sum each; and I very much doubt if even then they would do it; but suppose they did, this would take off one half of the bullock profits, for he could keep only 100 instead of 200. That this calculation is much nearer the mark, I am sure all your practical readers will allow. If 200 bullocks were bought and kept five months, and then turned out fat, they would have to be in very good condition when bought, and much more than an average of £11 each be given for them; and after eating their 70s. worth of corn each in these five months, I should say their owner did exceedingly well if he sold them for £6 each more than he gave for them, that is, £3 10s. for corn and £2 10s. for profit, if you can call it so, after eating their other food.—To change the subject, allow me to call your attention to the seed market report given in your paper every week; our market reports invariably state prices, but this report never, or at all events extremely seldom. Why should this be? How are we to know the prices of seeds if it is stated only that "values are hardening" or "declining"? Why not state a price weekly for the principal seeds, and so enlighten us a little? The price of red Clover seed, for instance, has been £10 a cwt. once for years, and if prices harden, or the contrary, we might as well be without the information. *Leisurely.* [This note has been sent to Messrs. Shaw.]

Chinese Agriculture.—It would appear ridiculous to draw any comparison between the agricultural progress of two countries in England and China, but the march of intellect or some unknown cause seems to be operating amongst the Chinese agriculturists in a remarkable and satisfactory manner, for we are told, in a report of an expedition into some of the districts of central China, that "the agricultural population are in good circumstances, the farms are large, and the heads of families are as well dressed as merchants in great cities. The women also are as a rule richly attired, and the appearance of many of the villages and large farms is as that of the people kept a perpetual holiday. In Szechuen the labourers sing at their work, and their manners are more cheerful than is usual with Chinese." English farmers had better beware. *John R. Jackson, Kent.*

Record Books.—With reference to the inquiry of "An Irish Landowner" as to the most advisable method of charging for the land, and the necessity of those who charge for the cropping of each field over an entire estate, I beg to forward you a form in which I register annually the cropping of an estate about 5000 acres in extent, and which I believe to be a practice not so singular as your remarks would infer—my own practice being to commence the inspection, field by field, about the end of May or beginning of June in each year, and to enter in the form as a record the crop 1 find each field held, and the form is bound in a book, a certain number of pages allotted to each farm, and, as you will perceive, no very bulky volume would be required to register the history of an estate of considerable extent for many generations. It would probably be necessary for the Irish landowner's purpose to increase the width of the columns in order to have space for notes. *W. F. M., Feb. 6.* [The form in question has in successive columns the number of the field on the plan, its extent, and the acreage of the successive years, in each year the crops and the crops in hand. We also learn that some such book as the above is, or was, kept on the Cleveland estate, and that possibly information may be had at the Estate Office, Raby Castle, Darlington.]

Ploughing Match in Ireland.—In my sojourn in that land of great promises to the tenant-farmer, who is for the future to be made successful by legislation, I stumbled, near Drogheda, upon a friendly competition of double-furrow ploughmen, each being confident that he had selected the best implement of his class. The soil was tenacious and thirteen year old lea; the work was generally well done, but the labour to the horses was very heavy. On testing by the dynamometer, however, it was found that the double-furrow ploughs were easier for the horses than the single-furrow plough, that was chosen by the parties who were adverse to the new implements. The depth was laid down at 6 inches, and the width at 9 inches; the single plough, a grand implement by Gray & Sons, recorded 64 cwt.; Howard's N. B. double-furrow, 6 inches deep and 18 inches wide, 8 cwt.; Mitchell's, 6 by 18, 10 cwt.; Gray & Sons, 6 by 18, 94 cwt., average 94; being about 3 cwt. per horse, while the two-horse single furrow was 34 cwt. per horse; but taking Howard's, which was only a two-horse plough, it was struck with the very unusually heavy draught here indicated, and rather inclined to think something was wrong, but the following day, viz., Friday the 10th inst., I saw the same Howard's plough tried against a single-furrow, near Dublin, ploughing the same depth and width of furrows, when the single plough recorded only 44 cwt. and the double-furrow 54 cwt. This was a four year old lea on gravelly clay. I was delighted to see the Irish farmers are quite as great prize-takers of these economies of labour as we are. *L. P. B.*

Tiptree Hall Farm Accounts for the Year 1870.—Having just balanced these, I send you the result, which is much more favourable than that of 1869.

The balance available for landlord and tenant, after paying all expenses, including farm bailiff and under-driver, is £690 14s. 9d., or £42 2s. per acre; this gives for the year of 45 acres, which I hire, £45; rent of 128 acres, my own land, at 40s., £510; tenant's gain on 173 acres, £395 14s. 9d., equal to 144 per cent. on £2728 tenant's capital, or 46s. per acre. Although the 50 acres of light land gave a very poor crop, though in good condition, the season was favourable to the heavy land crops, which were better, and sold at higher prices than in 1869. The drought prevented the growth of weeds, and economised labour in various ways to the amount of £50; and owing to the advance in meat our live stock left £100 more than in 1869, so that the total advantage over 1869 is £268 15s. 7d. I shall publish in May, 1871, the second volume of "How to Farm Profitably," and shall there give full details of all my farm accounts. I annex the available balances for the last six years. They confirm the well-known ups and downs in agriculture from causes which no human management can control; therefore, we must live in the present, of good and bad years. 1870 has been a ruinous season for light land farms in the east, south, and west of England, especially in pasture land. We clay arable farmers have had the best of it. The drought prevented the too luxuriant growth of straw, stiffened it, prevented its falling, and permitted a thorough ripening and development of the grain. In a wet season all would have been different, especially on the undrained lands, which have in 1870 produced excellent crops of Wheat.

Average price of Wheat	Available surplus for landlord and tenant
40s. 2d. 1866	£543 7 4
40 6 1866	521 13 0
41 7 1/2 1867	573 15 10
61 9 1868	572 12 6
48 2 1869	457 19 0
40 9 1870	620 14 9
Total	£2887 12 1
Deduct six years' rent, at £301 per year	1806 0 0
Balance gain on £7305 tenant's capital, at 11 per cent., for six years	£728 12 1

7. 7. Mechi, Feb. 24.

Farmers' Clubs.

HUNGERFORD.

Agriculture and the Earth System.—At a recent meeting of this club, Mr. A. PERKINS, of Marlborough, read a paper on the above subject, from which we make the following extracts:—

Farmers are interested as members of a community in the great social question of the day, viz., the utilisation of sewage; and above all they are interested in the immense waste daily going on, the enormous quantities of valuable manure which runs into and pollutes our rivers from every town and village, and is by this means carried out into the sea. I could give you practical examples without number of the vast amount of money wasted in the disposal of the refuse of various towns and cities in this country, commencing with our great metropolises, which has expended millions only to poison the districts which lie between it and the sea. But to bring the subject home to you, I prefer to briefly mention the three nearest towns as an example of the difficulty and expense connected with the question. At Newbury the Council are obliged to turn farmers, by taking a sewage farm on which to pour the refuse of the town for fertilising purposes. At Swindon £8000 has just been expended for the purchase of land for a similar object, thereby securing a repetition of the Pontine Marshes, and poisoning the neighbourhood. At Marlborough the very mention of a drainage scheme was sufficient to cause a municipal revolution. And why is this the case? For the reason that the wrong element is dealt with to carry away the excreta and refuse from the various premises and cesspits. Water is an effective carrier; it drives everything away before it, but it simply transfers the nuisance from one spot to another without lessening it in the slightest degree. Water promotes putrefaction, not deodorisation. On the contrary, a liberal admixture of earth with the refuse, and the use of lime and household refuse, street sweepings, and other things of the sort, a valuable fertilising agent. The efforts of science have only proved that it is utterly impossible to effect deodorisation of such a mass of sewage unless earth is applied to the source and in detail.

The application of dry earth, rendered as easy as, and much less expensive than, the water system by one of the most valuable inventions of the day—Moule's patent earth closets, and by reverting to the customs of the Moors and the Israelites, is everywhere being adopted with the greatest success. Government reports, particularly with reference to India, the reports of surgeons to public establishments and gaoles, Devises goad along the number, speak of it as a great sanitary improvement, and the private testimony of every individual I have spoken to on the subject with any experience is freely given both as to the sanitary value of the closet and the excellence of the manure for gardening purposes. But the object of this paper is to point out to agriculturists the vast field thus afforded

them of obtaining a most essential requisite for modern farming—good manure. The isles of the Pacific are searched for their guano, brought home at enormous expense, the very mummy-pits of Egypt are despoiled of the ashes of the dead, and yet innumerable thousands of tons of manure, which, when earth is properly applied, is as "odorless and clean as guano, and about half as strong again," are daily worse than wasted, poisoning the fresh air, polluting wells and streams, and producing sickness and death. The earth closets have only to lie under cover for five or six weeks, in a shed or any sheltered place, and having during this period been occasionally turned over, it will be inodorous, dry, and fit for use as manure. If the earth manure be not drilled in, care should be taken to use it during rainy weather; otherwise the valuable salts contained in it are subject to waste. The process of deodorisation by earth has been tried since 1860 on Baron Rothschild's estate at Haillet. In the earth sheds there were the second water closets, and the earth was removed from the closets, and in barrels, dried and ready for the corn and Turnip drills. In all its stages it is perfectly inodorous, even when subjected to the fiercest summer heat, and it may be handled with the utmost impunity. Interesting experiments have been recently carried on this estate.

In the course of a letter I lately received from the Rev. H. Moule he says:—

"I may add that the estimate of Mr. James has since been altered, and he estimates the value after one use at £4; after two uses, at £8; and an experiment of the following kind was tried by him and his two agricultural friends in the park of Baron Rothschild.—Five strips of land were marked out. The first highly manured with stable dung; the second with earth which had passed through the closets; the third with that which had passed twice; the fourth, thrice; and fifth, four times. The effect of the several kinds was traceable to an inch. The stable dung the least effective; the earth used four times the most effective. Of course much must always depend on the care and exactness with which the earth is applied. And it is this which, in my opinion, adds so much to the increase in value on the repeated use of the same earth."

An experiment was made in 1869 with 57 grains of Hallet's Pedigree Barley. These grains were sowed, on January 6, by Mr. Moule, in a pot of common earth, and the 57 plants produced rather less than one-fifth of a rod or perch. Into each hole (10 inches deep) was poured 1 oz. of the earth, which had passed through the closet four times. The sparrows destroyed 15 of the 57 plants, but by a subsequent division of the stronger plants the number was raised to 50, occupying one-fifth of a rod or perch. The smallest of these produced 15 stalks, and the larger 40 to 45 stalks, with ears measuring 6 to 7 inches in length, and some of them 40 or even 44 grains in weight. The whole crop, therefore, was equivalent to 25 stalks each ear, and a weight of eight and a-half score to each sack. A startling experiment truly, but the question is, "Can this be done on a larger scale?" and the reply, "Yes, on any scale for which you can find, and are able and willing to employ, labour; and by it the door is opened to a remunerative employment of a larger amount of labour during the open weather of winter." I do not care to affirm this myself, but simply ask you to give it consideration.

Then, again, I would ask you to take the greatest interest in the efforts of science beneath you. Now, if you can teach them to apply earth to their closets you would at once get rid of a nuisance which is most productive of low fevers, and supply them with a wonderful means of improving their gardens, by applying the manure formed in this manner, and other refuse, which usually forms a stagnant heap, to the plant or crop; to the crop or root of the plant rather than to the ground. The deodorisation may be effected by the rough-and-ready application of a shovelful of dry earth to the earth, and the manure might be removed in a wheelbarrow, and applied to the plant or crop. A store of dry earth can be secured by a few wheelbarrows full of earth being wheeled under cover in the dry summer weather. It can be used a second, third, or fourth time, after being dried, the value of the manure being considerably increased by each use. By this means an industrious man may, with a wheelbarrow and family, if he has a good road, raise out of an acre of garden, three crops in the year. Two small tracts, entitled "Manure for the Million" and "Land for the Million," afford every information. I hope there may be some gentleman in the room ready to give an opinion on the value of this manure—not so much to a small occupier as to the large agriculturist, who yearly spends so many pounds in artificials, guano, &c., and sees no prospect but an increase of that expenditure.

On this subject I wish to provoke discussion. I wish it to be known whether there is a demand among the agriculturists of England for the means of fertilisation provided by Nature, but which man up to the present time has not taken advantage of. Water sewage, I am aware, farmers utterly despise. The contents of a large cesspit at an establishment in my own neighbourhood, receiving the excreta of about 600 persons, are utterly valueless. A neighbouring farmer, however, the contents to be placed in a tank, and not an atom of it expended will he incur, in the removal, as he considers it valueless. The same applies to the sewage of towns; no farmer will

poison his land with the filth which is rendered worse rather than improved by the mixture of water. But what is your opinion, gentlemen, of the earth manure? What is your opinion of its utility in the corn and Turnip drills? Any you have to offer will be duly appreciated. Many farmers now supply straw for the stacks during the winter, and obtain in return, and venture to submit that there can be no question that if earth were supplied by farmers in exchange for earth manure received in the same way, it would be a great source of profit. In conclusion, allow me to express my humble opinion that a distinct understanding on the part of the public that, while water mixed with sewage deteriorates its value, the application of earth at the source and in detail converts it into a fertilising agent valued by farmers, would tend greatly to the general adoption of the earth system, and thus afford a solution to one of the greatest social questions of the day.

DISCUSSION.

Mr. T. CHANDLER said he was sure they were much indebted to Mr. Perkins for bringing forward a subject so eminently useful to agriculturists. One point in particular many gentlemen were not aware of. He had alluded to the Peruvian islanders for supplying manure to the English farmers. This would soon be confirmed. He had arrived stating that a certain amount, which would come in this year, would clear the islands. This would be apportioned among the sellers according to the quantity they usually sold. Thus the failure of one particular sort of manure, or rather of one particular system, had increased the importance of the subject before them. It was a subject which must be looked full in the face, for if the sewage of our great towns which now runs to waste could by any means be utilised, the result would be most important for agriculture. He did not quite agree with Mr. Perkins on one particular; he had said that water deteriorated the value of sewage. With this he could not quite agree, but the difficulty was to know in what way to add the great quantity of water required. In one of the three towns alluded to, Swindon, he had an opportunity of seeing the matter, and by allowing an amount of water to flow over grass land, the nuisance was neutralised, and the water, being allowed to percolate through the soil, was purified. The farm was admirably arranged, and carefully attended to, but he thought Swindon was an exceptional case. The drainage system was very high, the grass growth was secured, and excellent crops of grass were grown. But in many places the difficulty was to find a fall, and what was to be done with it then? In cottages and in towns the removal of sewage was considered a great nuisance, but by the earth system it would be removed to the sanitary room. If they had to do was to throw in a certain quantity of ashes or dry earth, and the qualities of the manure were concentrated while the bulk was not increased.

Mr. SPACKMAN said he had been practising this system for some time, both from a sanitary point of view and with the object of securing a valuable manure. He had a place large enough behind the closet to stow a quantity of soil, and a shovelful of earth or two occasionally was sufficient to insure both these objects. He could not speak too highly of the system, from the sanitary point of view. He had applied the manure last year, but as owing to the season they could not tell the results of the best manure, he could not give them his experience that way. He had applied night soil manure from Newbury, but had never been satisfied with the results, owing, he believed, to the quantity of water mixed with it, which took all the best qualities away.

Mr. F. WATTS had made use of the system for three years, and gave elaborate details of its working. He had used the manure for Mangels for two years, and had grown very good ones.

Mr. W. CHANDLER believed water was of very little use with sewage. He had a very large tank, and had used the water for some time for liquid drilling, but had seen no difference between water that came out of a tank and pure spring water. He was decidedly of opinion that water did not certainly improve it.

Mr. KIMBER had used the system for the last 10 years, mixing burnt ashes with the contents of his closet, which was situated at the top of an incline, with the ashes at the bottom; he also used the dung of the fowls, which he put over his meadows, and which did not cost him what he had now 300 bush of good manure in consequence.

Mr. BEARD had used a quantity of night soil and Bath ashes, and had grown good Swedes and Mangels. He gave some interesting facts connected with the collection, screening, and supply of Bath ashes.

Mr. PERKINS, in reply, expressed himself exceedingly gratified with the interesting discussion. The only point calling for reply was that raised by Mr. Chandler as to the deterioration in value of sewage caused by water. He was of opinion that the water in that particular, as the land irrigated by water sewage in the neighbourhood of Edinburgh let at £30 a year, but at the same time he contended that the results of that quantity of manure compared in dry earth compared with the value of the water sewage diluted by water, would be proved by his statement, sewage diluted by water, would cost the grower, his statement, and bad smells resulting from sewage farms, and the state of the effluent water, and replied briefly to one or two questions put to him.

GALASHIELS.

Management of Breeding Ewes.—Mr. THOMAS ALLAN, Windydoors, sent the following communication stating that he had nothing to say upon the selection of ewes for breeding, as each stockowner had his own grounds of selection. Whether it was advantageous or not to give extra feeding to ewes before and during the time rains were among them depended a good deal upon how ewes could be grazed during the subsequent

* We obtain these figures from Mr. McCabe's Communication Tables. (Rivington)

spring and summer. He thought ewes very often received improper treatment in this respect, inasmuch as, after having been kept on an unlimited supply of Turnips for a month in autumn, they were turned away to bare fields to seek food as best they might until the New Year, and in some cases after that time, perhaps getting no food but what could be taken from a piece of rough land or a cattle park in time of snow, though that had been eaten as bare as possible during the previous summer. The consequence was the ewes lost condition, and then arose the difficulty of making that which was the lambing time, the time of the gorging and then half-starving ewes, the better way was to begin early with feeding to get them into good condition; and it would be more profitable to keep them in that state until the lambing time than it would be to let them down and then force them into good condition afterwards. The lambs would be found stronger and healthier too when the ewes had been carried on equally during the whole season. They had heard of scores of ewes with dead lambs, which were common at the full time. There could be little doubt that was owing to improper treatment of the ewes, and he had as little doubt it was in the way of feeding that the mistake lay. It could not be due to injury arising from going over fences, as in such cases the lambs would be dropped within a day or two of the ewes receiving such injury. Nothing, he thought, would cause a greater number of dead lambs than allowing ewes to get a severe nip of hunger, and if that happened eight or ten weeks before lambing time, it would matter little how generously ewes were treated afterwards. It was worthy of consideration whether, in a great many instances, twins were profitable. There were some other branches of the subject upon which he would like to hear the opinion of the Club, such as the treatment of ewes during the lambing season, the advantages of good lambing sheds, and the most economical method of feeding—on none of which he had anything to say himself.

The CHAIRMAN thought that Mr. Allan's views were very nearly correct. Before lambing the ewes should have a little exercise, nor should they be kept too fat, nor too long on Turnips. He had no objection to any number of twins, as it was all a matter of feeding, and when that was attended to they did well enough.

DUN quite concurred in the idea of beginning early and keeping the ewes in good condition all through, as it would be found better for ewes, lambs, and wool. With regard to lambing sheds, he thought unless they were kept very clean they would be more loss than profit. Sheds were indispensable in stormy weather, and were highly profitable when rightly attended to, as they served both ewes and lambs and were comfortable for the shepherd, but all crushing and overcrowding should be studiously avoided.

Mr. ELLIOT, Hollybush, generally agreed with Mr. Allan, and said that the different character of farms necessitated different ways of managing breeding ewes. Low farms would admit of high feeding, and as many twin lambs as possible; while upon high-lying farms twins would be often found a disadvantage.

Notices of Books.

Scientific Agriculture with a View to Profit. A Paper read before the Maidstone Farmers' Club, Dec. 15, 1870. By John Bennet Lawes, Esq., F.R.S., F.C.S., of Rothamsted, Herts. *South Eastern Gazette Office, Maidstone.*

What a capital title for a useful book! All agricultural readers will say; and What a capital lecture, on the subject thus announced, Mr. Lawes has given to the Maidstone Farmers' Club! all readers of this pamphlet will say. We have nowhere seen in fewer words the theory and practice of manuring, and the maintenance of soil fertility, than in this thoroughly distinguished paper. We could not do better than publish the lecture in full; but, meanwhile, we lay before our readers an extract, which shall give the central facts of Mr. Lawes' experience in soil cultivation for 28 years at Rothamsted:—

The Use of Nitrogen in Manure.—"Among the results of the Rothamsted field experiments there is one fact which stands out with the greatest possible prominence, viz., that certain substances, which constitute a small proportion of the crops, have a very strong influence on their growth when employed as manures. Thus, nitrogen, in the form of ammonia salts, or nitrate of soda, used in admixture with superphosphate of lime, and applied to the Rothamsted soil when in an agricultural sense in the autumn, has the effect that, when it is unfit to grow another grain crop without manure—will yield a full crop of corn; and, with a repetition of the manure each year, will continue to do so for many years in succession.

For example, a mixture of 300 lb. of superphosphate of lime, and 200 lb. of ammonia salts, applied every year for 19 years, has yielded almost exactly the same amount of Barley as 300 lb. of superphosphate of lime and 1000 lb. of rape cake, or as 14 tons of dung, applied annually for the same period. Each of the three has given an average of about 24 bush. of Barley, or of the straw about 28 cwt. of straw. Nitrate of soda has not been used in similar combination for so long a period; but it may be assumed that, if instead of the 200 lb. of ammonia salts, 275 lb. of nitrate of soda had been employed every year

with the superphosphate of lime, almost certainly the same result would have been obtained.

Now, let us compare the quantity of certain constituents in 48 bush. of Barley, and its straw, with that of the same constituents contained in the above-named different kinds of manure which will produce it. The following Table illustrates the point:—

	Dry organic matter.	Mineral matter.	Nitrogen.
lb.	lb.	lb.	lb.
64 qrs. Barley and 38 cwt. straw ..	4566	196	56
14 tons farmyard manure ..	8540	808	200
200 lb. rape cake ..	310	80	50
200 lb. ammonia salts ..	..	..	41
275 lb. nitrate of soda ..	..	..	41

"Thus, of dry organic matter the crop would contain about 4566 lb., or rather more than 2 tons. Of such matter the annual dressing of dung would supply nearly twice as much, and the rape cake not one-fifth as much as the crop contained; whilst the ammonia salts, or nitrate of soda, would supply none at all. Of mineral matter, again, the dung would annually supply very much more than the rape cake very much more than the ammonia salts, or nitrate of soda, would supply from three to four times as much as the crop; whilst neither the rape cake, the ammonia salts, nor the nitrate, would contain as much as the crop. Practically, then, the dung supplies the same quantity of mineral matter as we supply much more or much less organic matter than the crop contains, or even none at all. In fact, more than 90 per cent. of the really dry substance of the crop may be derived, either directly or indirectly, from the air and water, and not from the substance of the soil itself, or of the manure.

"A similar result is brought out even more strikingly in the experiments on the continuous growth of Wheat. To one plot in the experimental wheat field, 14 tons of farmyard dung per acre have been applied annually for 27 years in succession; but the amount of produce yielded by it is exceeded by that from mixtures of mineral and nitrogenous manure, supplying no organic matter whatever. It may be considered established, then, that, at any rate in the case of moderately heavy soil, such as that at Rothamsted, the results of the experiments on the production of good corn crops for a number of years in succession, are such as will supply certain mineral constituents, and nitrogen, the latter either in the form of ammonia salts, or nitrate of soda.

"The answer to this question must be, that the activity of vegetation does not depend alone upon the mere amount of the required constituents provided within the soil; but very materially also on the state of their combination, and distribution, being such that they can be taken readily by the growing plants. Only a small proportion of the nitrogen of the dung exists as ready-formed ammonia, and the remainder only very gradually passes into that state of combination. Hence it is that dung is found to be what is considered by some so desirable—namely a lasting manure; that is to say, a manure which only yields up its fertilising constituents very slowly. Salts of ammonia and nitrate of soda are, on the other hand, both very soluble in water; but when applied as manure, the ammonia of the ammonia salts is much more readily absorbed by the soil than is the nitric acid of the nitrate. The latter, consequently, distributes more rapidly, and is more liable to be dissolved by heavy rains, and washed into the drains, or the subsoil; though a portion of the ammonia of the ammonia salts itself becomes converted into nitric acid, and then is subject, in like manner, to loss by drainage.

"The farmer has, therefore, to deal with that very important constituent of manure—nitrogen—in very different conditions of combination, in which it acts very differently when applied to the soil. It is probable that when the reactions of these various descriptions of nitrogenous manure on different descriptions of soil have been more carefully investigated, and are better understood, some considerable saving may be effected in their use. At Rothamsted, the experiments on Wheat, less, and in those on Barley not much more, than half of the nitrogen supplied as ammonia salts or nitrate of soda is recovered as increase of produce in the first crop; and only from one-sixth to one-fifth of that which is supplied in the form of ammonia salts, and experiments are progress in determining whether a reduced amount of these valuable manures will not yield an equal result, if applied more carefully in close proximity to the growing plant."

The lecturer then proceeds to consider the subject of profit and loss attendant on artificial manuring in various manners to various crops, and attendant also on the several forms of the four-course rotation of crops. On the former of these subjects we shall here-

after make an extract, under the title "Practice of Artificial Manuring;" and on the latter we extract the concluding passages of Mr. Lawes' interesting lecture:—

"I will now direct your attention to some experiments on roots, &c. In one field at Rothamsted an experiment on rotation of crops has now been carried on for nearly 24 years. The course followed is—Turnips; Barley; Clover, Beans, or Fallow; and Wheat. On one portion the Swedes are very highly manured, with a mixture of rape cake, salts of ammonia, superphosphate of lime, and salts of potash, soda, and magnesia. From one-half of this piece the whole of the Swedes, both roots and tops, are carted off; and on the other half the crop is consumed on the land by sheep. The 24th crop, that is the last of the sixth course, is now growing. Omitting the first course, in which the Norfolk Clover and Fallow were sown in sixteenth, which is not yet completed, the following are the quantities of roots, and of dressed corn, per acre, obtained in the second, third, fourth, and fifth courses:—

	Course.	Crop.	Swedes Carted off the Land.	Swedes Consumed on Land.
2d	1852	Swedes	161 tons	169 tons
	1853	Barley	331 bush.	354 bush.
	1854	Beans	10 "	124 "
	1855	Wheat	37 "	73 "
3d	1856	Swedes	163 tons	171 tons
	1857	Barley	48 bush.	63 bush.
	1858	Beans	10 "	124 "
	1859	Wheat	39 "	381 "
4th	1860	Swedes	43 tons	31 tons
	1861	Barley	603 bush.	543 bush.
	1862	Beans	43 "	42 "
	1863	Wheat	46 "	448 "
5th	1864	Swedes	82 tons	81 tons
	1865	Barley	477 bush.	433 bush.
	1866	Beans	10 "	124 "
	1867	Wheat	23 "	212 "

Summary—Average of the Four Courses.

1852, '56, '60, '64, ..	Swedes	124 tons	12 tons
1853, '57, '61, '65, ..	Barley	402 bush.	354 bush.
1854, '58, '62, '66, ..	Beans	312 "	254 "
1855, '59, '63, '67, ..	Wheat	362 "	393 "

"Thus, the average produce of Swedes was about 12 tons of roots, and there were besides about $\frac{1}{2}$ ton of tops. The manures applied to the crop of Turnips, if they had been employed directly for Barley, would have been sufficient to grow three crops of about 6 qrs. each; that is, in all, 18 qrs. of Barley. Yet we find that the average yield of the rotation where the whole of the roots were consumed on the land, was almost exactly the same as where they had been carted off. The condition of these two plots must, however, have been very different. The amount of nitrogen alone, returned to the land by the stock consuming the Turnip crop, would probably be equal to that contained in between 400 and 500 lb. of nitrate of soda.

"From the results of these experiments we may learn:—

"1. That the growth of the root crop did not of itself contribute anything to the fertility of the land.

"2. That the manure applied to the Turnips by the stock was injurious to the succeeding Barley crop.

"3. That it is not alone the quantity of manurial constituents applied, which determines the amount of the crop; but that the effect depends very much upon the condition in which the manurial constituents are applied.

"A careful consideration of these results, and also of those of experiments in which Swedes have been grown year after year for many years in succession on the same land, leads me to the conclusion, that on the heavier class of soils, where the treading of sheep is injurious, the three crops of root crop, or even two at least, at every advantage occupy a much less proportion of the area of the farm than it usually does. There are many and obvious reasons why it would be impracticable to devote the whole of the arable land of a farm to the growth of corn and if I were farming with a view to profit alone, I should not attempt to do so. But, taking as a basis the facts that, on moderately heavy, and heavy land, full crops of Wheat, Barley, or Oats, may be grown with certainty for some years in succession, by means of artificial manure containing soluble phosphoric acid, and nitrogen in the form of ammonia or nitric acid, and that the increased produce obtained by these manures is remunerative, I should certainly devote a much larger proportion of my land to corn than is usual in the district. To give an example of what I do not do, I will mention that a field, adjoining the experimental Barley field, received a heavy dressing of dung and artificial manure for Mangels in 1866, and since then has grown Wheat, Oats, Barley, and Barley in succession. The last two crops of Barley have each been full of grain, and another corn crop is to be taken from the land in the coming season.

"I am also disposed to give up the growth of Turnips altogether; growing no other roots but Mangels, and thereby probably to the extent of not more than 1-rth or 1-20th of the arable land of the farm. Under this system the land for the Mangels should be manured very heavily with dung, applied partly in the autumn and partly in the spring, and also with artificial manure at the time of sowing. It would be advisable, too, to prepare the land for the spring corn as much as possible in the autumn, by means of steam; and, of course, altogether to avoid injury by treading with sheep in wet weather. To what extent such a system would be applicable and profitable to other classes of soil, I will not be in a measure to the judgment of the individual farmer to decide.

"The time is past for maintaining a servile adherence to fixed systems of rotation as essential to profitable agriculture, whatever the description of the land, the intelli-

gence of the farmer, or the local conditions of his farm. Whether we look to the greatly extended knowledge of the present cultivators of the soil, to the greatly increased command of the elements of fertility in the form of purchased cattle food and manures, to the marvellous development of mechanical appliances, or to the increased facilities for transit and for the carriage of produce, it must be admitted that the farmer of the present day, as compared with his predecessors, has very marked advantages. And it is only reasonable to suppose, that these great changes should have a commensurate influence in modifying systems and practices which owe their origin, and their reason, to other times and to other circumstances.

Farm Memoranda.

MESSE OF DERWICKSHIRE: Feb. 18.—The winter now (we may hope) has passed the most destructive of recent times, in the matter of root crops at least. About Christmas things were tolerably safe under 6 inches of snow, although the air temperature did several times descend to 8° Fahr. But a few days (thaw left as, unprotected, to the regions of retreating winter. As regards the root crops, they are fit only to fill cattle,—not to feed them. Indeed, so excurative are the ravages of ground gear,—and every broken bulb is red-rotten, that even the "fill" may fail us. Some few prudent ones have a store, not large, to fall back upon; but storing in such a wet back-end was possible on dry land only.

It is fortunate that we have a good crop of cheap Potatoes for feeding cattle, and cake and meal will be heavily requisitioned. It will take some time, and it will be six weeks of lost time. Lea ploughing is being finished, while Turnip land gets time to settle after its soaking. Rain and melted snow measure 2½ inches for the current month, and pools may yet be seen in wet places. But, in general, ploughing may now be proceeded with; and it may be justifiable to sow a little Wheat even yet, where (in many cases) so very little was got into the ground before winter. The Wheat crop is turning out fine quality, and we never saw anything like the straw for brightness and absolute freedom from rust. Barley is not such fine quality, but heavy in the bushel as in previous dry years. Oats are rather a poor affair, somewhat discoloured and sprouted in the stook by harvest rains,—an unfortunate peculiarity of these "fine" seasons.—G. T.

HOFGARTEN, LAKE WELTER.—[We took last week an extract from the *Field* on a whimsical item on the dairy management of Mr. Schwartz, resident on this farm. We now take from the *Field* the substance of the report given in its columns of the dairy management here:]—

In Denmark, Sweden, and many other parts of the Continent, the system of treating milk adopted by Mr. Schwartz, of Hofgarten, Lake Welter, is rapidly extending, and although in some respects it differs radically from the practice pursued by dairymen in this country, it may still be found to merit careful attention, especially by those with whom economy of space is an object.

The farm occupied by Mr. Schwartz consists of 1200 acres of arable and 107 of pasture and meadow land, and the method of culture followed is a 10 or 11 years' course of cropping, in which Wheat, Barley, and Oats are the chief cereals. Timothy grass, Hop, Trefoil, and Clover the intervening forage plants.

The live stock includes 160 to 170 cows (well-bred animals, and Shorthorn, with their respective produce), 20 oxen, and 32 working horses. The cows remain out during summer, but are driven under cover at nights.

To turn now to the dairy arrangement proper, the milking, we should observe, is done in the stalls by women, and the milk emptied at once out of the pail into large copper vessels immersed in water. It is afterwards removed in carts to the milk-room, and there we first become acquainted with one of the leading features of the Schwartz system—viz., that of letting the cream rise at the lowest temperature possible. When the milk has been measured in a cylindrical tin vessel, with a glass scale inserted in its side to indicate the quantity, it is poured into tinned-iron cans, 20 in. high by 16 in. in diameter, and these, with their perforated lids on, are suspended in a tank occupying the middle of the room.

During summer the water is kept by means of ice at 39° or 40°, or at most 44° Fahr.; whilst in winter its temperature ranges but a little above freezing point.

The buildings at Hofgarten devoted to cheese and butter making are handsome in appearance, and at the same time practically arranged. A horse-gear, which is used for churning, &c., occupies a space near the street entry, and stepping into the dairy, the eye is first attracted by a boiler and a number of utensils undergoing a thorough cleaning at the hands of the head dairymaid and her assistants. Not only in this, but in all other branches of the establishment, the work is performed entirely by females, and everywhere the most scrupulous cleanliness prevails. In cases—necessarily arising in the manufacture of butter and cheese—which demand delicate handling, judgment, and great exactitude, the head dairymaid—single-handed—undertakes the operation. Adjacent to the so-called wash-room is situated the curd kitchen, fitted up with four

rectangular boilers of English make, 4 feet in height and diameter. In order that the milk may be raised to the proper temperature without coming in direct contact with steam, these boilers are jacketed and surrounded by a distance of half a foot with hot water, and above the spigot in front of each of them a perforated tin plate is introduced, to prevent particles of curd escaping with the whey.

Coagulation having been brought about by the addition of rennet, the mass is stirred round for 20 minutes with a curd-breaker, and afterwards, at a temperature of 84° Fahr., cut into small pieces by means of knives attached to an upright shaft in the boiler. The knives are moved backwards and forwards by horse-power, half of them cutting horizontally, half vertically. In about 20 minutes the hot water surrounding the boiler is found to have raised the temperature to 98°, and this to-and-fro movement of the mass is continued for another half-hour or so. The spigots are then turned to allow the whey to drain off, and any buttery particles which may escape with the latter are afterwards skimmed off and utilised for other purposes. As required, the curd is broken into more cut small, packed in deep perforated tinplate moulds, and removed to the press rooms. These, situated above the offices already alluded to, are furnished with 20 superior English presses, capable (each) of holding two cheeses, and adjustable to any required degree of pressure. After having wooden covers fitted closely over them, the tin moulds containing the cheeses are piled on one another in twos) with a board between them, and placed in the presses. At an early hour of the following morning they are taken out, cut fresh into pieces, and cooled down to a temperature of 55° Fahr. About mid-day they are broken and crumbled in a curd-mill; and the next operation, previous to their being thoroughly kneaded by the head dairymaid and again exposed to pressure, is that of salting them. The salt requires, of course, to be distributed as uniformly as possible, and the time during which the cheeses remain under gradually increasing pressure varies from three to four days. They are then removed to the cheese-room, and by the end of two or three months, if the different operations above described have been carefully attended to, they will have acquired a delicate flavour and be quite ready for market. Those intended for export to England are sown up in linen cloths, to protect the rind from injury. They sell at Hofgarten, under the name of "fat Cheddar," at 7½d. to 8d. the Swedish pound (15 cwt. to the cask). On the Continent it is found that 60 lb. of milk yield in summer 22 lb. of cheese—i. e., just pressed—and 53 lb. of dry or ripe cheese.

The cheese-room at Hofgarten—a detached building, partly under, partly above ground—testifies to the many experiments in cheese-making which occupy the attention of Mr. Schwartz. Arrangements have been made for heating it, and thus complete protection is afforded against the influences of the outer air. The shelves, ranging above one another to a height of 12 feet, easily reach the ceiling, and are of a valuable floor, and owing to the loftiness and construction of the cellar, the cheeses can be placed either in a dry or moist atmosphere, and in the temperature best suited to them. They have each of them, whether English or Swedish—for Mr. Schwartz makes, in addition to so-called Cheddar, fat, medium, and thin Swedish cheeses—a label attached indicating their weight when taken from the press, the date of completed manufacture, and the name of the milk used.

As regards the making butter, this operation is conducted at about 50° Fahr., and, as before mentioned, the maintenance of a low temperature (especially during the rising of the cream) and the employment of deep milk pans, or rather cans, form two of the chief characteristics of the Hofgarten system. Mr. Bliss, director of an American butter factory, recently observed that, "old theories to the contrary notwithstanding, cream will rise as fast through one foot as one inch of milk." Mr. Schwartz's experience would appear to bear out the assertion. Repeated trials and carefully recorded experiments have shown the following to be the rate at which it is thrown up at a temperature of 50°, the quantity of milk stood being 144 lb.: during the first 12 hours, 5, 30 lb.; during the second 12 hours, 0, 17 lb.; and during the third, 0, 06 lb. As nearly all the cream thus rises during the first 12 hours, it is not common that the whey to be pressed is of a considerable beyond that time. Whatever has not then risen serves to enrich the thin cheese made of the residue. The churn used is of a barrel shape, with upright axis, and worked by the horse-gear.

When intended for export to England the butter is packed in casks holding 60 lb., and these, before being used, require to be carefully rinsed out (and whilst moist) sprinkled with salt. The layers of butter do not, however, come in direct contact with the sides of the casks; a linen cloth, which has been steeped in brine, is first placed round them.

Enumerating, in conclusion, the advantages claimed for the deep-can and low-temperature system exemplified at Hofgarten, we should mention, first and foremost, the greater economy of space and vessels it permits of. Whilst holding a much larger quantity of milk than the ordinary pans or dishes, the deep cans require, as stated by Mr. Schwartz, occupy, proportionally speaking, far less room, and, owing to the circumstances, the farmers of Sweden and Denmark who have

taken to them find that extensive dairy premises are no longer needed. Even on holdings of a considerable acreage, a small or but moderate-sized wooden construction, with thatched roof, is all that is now deemed necessary.

A second point in favour of deep cans is the comparatively short time in which they can be cleaned. The surface that requires washing is of course less than when shallow vessels are used, and there are a fewer number of corners. Being provided with lids, the milk contained in them is protected against dust or any injurious matter floating in the air, and thus great cleanliness is secured.

Another circumstance favouring the use of them is the facility with which the cream, in consequence of its greater depth, can be skimmed without removing any of the milk below.

With regard to the advantage—a twofold one—that results from the maintenance of the milk at a low temperature, it consists in obtaining the cream, and also the skimmed milk, in a perfectly sweet condition, and reducing the time the former occupies in rising to 12 hours.

Miscellaneous.

LOCAL TAXATION.—According to the amended returns of the local taxation of England and Wales, issued by the Poor-law Board, the total sum raised in 1868 throughout the kingdom was £16,783,000. This was the money actually assessed and paid in respect of the rateable property of the island south of the Tweed; and since the taxable value was for the same period £100,669,000, the rate in the pound surrendered by the local ratepayers averaged 3s. 4d.; in other words, they were called upon for exactly one-sixth of their rentals—assuming, however, in this way of expressing it, that rateable value and rental are identical quantities, whereas, in fact, they differ considerably. The analysis of the aggregate sum raised in the year is set forth with great clearness under five divisions:—1. The total sum raised for the relief of £1,826,000; but including in this the figures £1,000,000 for the poor and registration fees, payments of parochial and union assessments, salaries of collectors, and some other items which either have no connection, or only a partial connection, with the succour of the indigent. 2. County, hundred, borough, and police rates, £2,956,000; of this sum, £2,465,000 is defrayed from payments made out of the poor rate, and £493,000 is levied separately. 3. Highway rates, £453,800; of this also £621,000 is contributed for the poor rate, and £517,800 levied separately. 4. Church rates, £217,000; an impost which is not at all likely to remain at so high a figure hereafter, and in course of time may be entirely removed. 5. Lighting and watching rates, £79,000. 6. Town improvement commissioners, £410,000. 7. General district rates, £1,684,000. 8. Metropolitan district and lighting rates, £981,000. 9. Sewers rates, drainage rates, and embankment rates, which the total sum for £1,500,000 (these rates are levied under the powers which the law has conferred on courts of sewers or on commissioners of sewers). 10. Rates of other kinds raised upon real property, £377,000; of this sum £152,000 was contributed from poor rates, principally in the shape of burial board rates, and £225,000 levied as separate rates. It must be borne in mind that this account does not exhaust the heavy schedule of local taxation—tumpike, bridge, and land tax tolls. The City of London, for instance, finds no place in the return before us. *Full Mill Gazette.*

THE IDEAL FARM.—Some people talk as if the wealth of the country lay chiefly in coal, iron, and cotton, but that is a mistake. The wealth of the country lies chiefly in the man whose strong arm, whose active brains were producing that coal or iron out of the bowels of the earth, or weaving that cotton into goods for the extension of commerce. The great reason why the country possesses it in the strong arms, activity, and moral energy of the class of men who are engaged in industrial pursuits. What I like to see is a model farm. Now by a model farm is often meant a farm which had buildings well constructed, and arranged with the utmost convenience, or a farm in which the processes of cultivation were carried on by the most scientific means, and where the best returns were produced by the most economical outlay. But the model farm which I like to see, is the farm where the farmer and his men are all working together, bound by one common tie as a great industrial family—a farm where the farmer has his eye upon every man in his employ, who takes care that every man is doing the right thing in the right way, who encourages those who are doing well, and is just and considerate when he finds fault with those who are doing ill, and is willing to show improvements which may be made in short, a farmer who exercises a kind and paternal interest in the welfare of every one in his employ. On such a farm each man is under a sense of responsibility, and he considers himself bound to discharge his duty. He is grateful for the guidance given to him, he is happy in his work, zealous for the interest of the farmer, feeling that in his master he has also a friend. On such farms are to be found cases of longer service, in which there is contentment and a sense of mutual interest, the labouring man feels that he really has a home. That is the model farm which I admire.

It depends upon friendship and mental duty well performed. *The Hon. W. Copeley-Temple at Kenney.*

FOLLY OF DISPUTES BETWEEN MASTER AND MAN.—A common form of applying driving force in all factories is that of an upright shaft moving a horizontal spindle, and again driving other vertical shafts that perform the actual work. Now suppose we call the first the landlord, the second the tenant, and the third the labourer. Observe, all the moving parts we have noticed are equally necessary for the utilisation of force; all in their places are alike useful. If either spindle spalls to the other, "I have no need of you," the work is instantly stopped. Neither is one free to detach itself from the other at its own option. The thing which we are firmly connected to the spindles, and so adjusted that they must cog with and propel each other. It is just so with the three parties that provide the driving power of agricultural production. The wedge that binds them together is self-interest. It is best for each that all should work together firmly and simultaneously. Misunderstanding between these three forms of driving force is like a loose wedge on a spindle—it will at once disarrange the whole cause and effect, and the work will be the same great firm. The landlord receives his share in the form of rent. The farmer's share is called profit, the labourer's wages. This is generally the arrangement made to ensure exact cogging together. Some have thought that a co-partnership would be a more equitable arrangement. This is an open question. Possibly it would, but in all co-partnerships the division of profits must be proportioned to the amount of capital, skill, and working power invested. Good crops are easily measured out of course, the co-partnership would be the most equitable mode for all parties. Every one would get a fair return for what he invested. It would break up the uniformity of wages, and give some labourers 10 and to others 20 shillings a-week. But whether this system be applied to agriculture, or the present be continued, each of these great parties must be made to feel that their interests are studied, and their investments profitable, otherwise their driving power will be lost. Cogging is one of the first essentials in the sustentation and development of all driving force. But in all mechanical motion there is, there must be, friction; and the machinery of agriculture is no exception to the rule. On the contrary, it seems pre-eminently exposed to friction, interruptions and losses. Misunderstandings frequently occur between landlords and tenants, and bickering with labourers are far too common. In fact some rural magnates would not hear that there are any such here—rather pride themselves upon such incidents. They sandwich the monotony of rural life with spicy wranglings with their neighbours, high or low. To spite the parson and tilt the squire a bit of their mind, and bully their inferiors and equals, that is the way they attempt to carry all before them. There never was a greater mistake. Such conduct is just like throwing a handful of grit between cog-wheels. You hear the rattling, crash, and clatter, and you know that the sound and fury but reveals the waste of power. That force that smashed that grit is not simply wasted, but the machinery itself is injured. You must have quiet, smooth working if you would have effective work done. Plenty of misunderstandings will arise without your making any for yourselves. Such questions as leases, game, losses from bad seasons or plagues, cottages, wages, elections, often cast much light upon the cog-wheel and make them drag heavily. The antidote to friction is "the cold, cool, quickens and keeps all smooth. Your power is great. It is well to have the power of a giant, but often very ill to use it with a giant's might. Be content to govern men by gentleness; it is easier far and better to lead than to drive. Men's heads, and hearts, and hands may all be won by kindness. With such energies devoted to production, the returns will be large. But if unavailing hands are only forced to work for bare wages, the returns will starve yourselves and the hands together. If, therefore, you would enjoy peace and plenty, honour and prosperity—if you wish your barns to be filled with plenty, and your stalls with the finest cattle—be it yours ever to pour the oil of gentleness on the troubled waters of strife. So shall the wheels of production all be made to move rapidly and smoothly, to the happiness and the profit of all concerned, and to the better feeling and the growing prosperity of the nation at large. *Mr. D. T. Fish, at Lavenham.*

work must thoroughly comprehend what practically suits the machine. Much depends upon the uniform dryness of the guano and ashes, to effect which both should be well stirred and mixed separately in the sifting so as to bring each to a uniform state of dryness before the two are mixed together; and for very obvious reasons we have found it advantageous to make the person who provided the ashes last summer do the work of mixing at this season.

Grass Land Top-dressing and Renovating finish as early as practicable. The finer grasses and Clovers extract largely from the soil the phosphates and sulphates of lime, soda, and potash; and when they can no longer get the food they require to support the grasses and weeds. In renovating it is equally necessary to pay attention to the proper kind of seed for the land, and when artificial fertilisers, mixed with ashes, are used, both the seed and the manure should be applied by means of broadcast distributing-machines, and chain or bush harrow into the roots of the old grass.

Fieldwork, retarded by the frosty weather of last month, should now be brought up and kept in advance. For this purpose it should be employed if the teams are unfit for the task. Sheepfolds should be laid out, so as to leave as little of the manured land as possible exposed to the weather. Thus, if the fold extends the whole length of the field, then the ploughs can work close up to the nets or hurdles at every shift. When the Turnips begin to sprout in the pits, the white etiolated vegetation should be cleaned off, as it is liable to purge and derange the bowels; then which nothing is so good for turning sheep. Where this is neglected it is not surprising to hear farmers complain, "It does not pay!" How could it? All Turnip lands for cattle, if not already cleared off, should be so without delay, and immediately ploughed.

Barley, sown on soils adapted for it—the earlier the better, in order to get the crop forward so as to cover the land before the drought of summer sets in. Half the art of growing Barley in the South depends upon getting the crop to enter the ground in April and early May, so as to retain a sufficiency of sap to mature the process of filling and ripening, which should be slow and continuous. At the same time care requires to be taken to prevent over-luxuriance and lodging in moist growing seasons. Lodging and rotting are too often due to over thick seeding, *i.e.*, too much seed. Barley requires well cultivated land and a fine seed-bed. In the old time, before thorough drainage and subsoiling, the heavier soils were ploughed and cross-ploughed before they were fit for the seed furrow, and on such soils not yet drained the old practice has to be followed, but the use of cultivators is greatly abridging the work of the plough. Where the land is properly drained and cultivated more than one furrow is seldom required to prepare the heaviest Barley lands for seeding, a turn of the cultivator being sufficient to loosen and break the clods in exceptional seasons. Not a few never yoke the heavy plough, and the heavy sowing is required to get the winter-made mould on the surface purposely to get a fine seed-bed, and one that will run together in seasons like the present after a shower when newly seeded.

Oats, sown on dry soils. This crop is also, like Barley, partial to a fine seed-bed; indeed all cultivated crops are so. A stale lea furrow, broken down by the weather, if harrowed when dry, makes a fine seed-bed. Oats dislike a very ploughed sod, generally speaking, so that most land at this season should be harrowed with a skid-mould, so to get the surface brought to a suitable mould of a uniform depth for the seed-fall. The green skid-mould also rots better thereby, producing a timely supply of food for the crop in its early stage of growth. The Oat is better adapted naturally for northern than southern climates, a very potent reason for paying greater attention in the latter to its normal requirements as regards soil, cultivation, and season.

Wheat what this year be sown in greater breadth than usual, and every occasion should now be embraced in getting the crop into the ground. Wheat, if sown at the close of the month in a good seed-bed, may be in the stackyard before that which was sown at its commencement. Much depends upon the weather after sowing, but when favourable, spring Wheat, when properly got into the ground, progresses rapidly in the early stage of growth, overtaking the autumn sown. To effect this should be the grand object in preparing, manuring, and seeding the land. When sown in autumn the frost of winter corrects many mistakes relative to the seed-bed and state of the land, but to throw in the seed carelessly and rely upon the weather correcting mistakes is highly reprehensible at this season.

Lambling of breeding flocks usually commences about this time in our southern counties, and continues to progress northwards, ending in the highlands of Scotland about midsummer. January and the early part of the current month has not been favourable for in-lamb ewe flocks; consequently, ewes and lambs will require the greater attention of the shepherd night and day. Improved breeds, which constitute the general stocks of the South, are not so hardy and well adapted for the cold, changeable weather experienced during the last month, than the heavy breeds, which in most cases in winter weather are of ordinary management. In short, they require extra attention

to food, shelter, and warmth, such being essential to the secretion of healthy milk, without which it is vain to hope for a paying crop of lambs.

Highland Sheepfolds experience this to be one of the most trying months of the year. The weather is unsettled, and the changes from snow to rain rapid. A slight thaw to-day and frost to-morrow, covers the snow with a sheet of ice almost impenetrable to the foot of the sheep, so that when much foot scraping is needed to get at the heath and coarse grass with which it is mixed, the flock becomes lame, and when the snow drifts the best feeding-ground is deeply covered; so that the sheep require to be kept on the bare places, which generally being little but hard and being much food, requires to be supplemented with hay. On less elevated grounds, where Turnips are grown, a few roots may be given, but what are they among so many mouths? In some places several varieties of the Cotton-grass spring up and freshen the bite, adding greatly to its nutritive properties. The practice prevails in some places of clothing hogs in woollen jackets, sewed on the wool, which keeps young sheep both warm and dry. *W. B.*

Notices to Correspondents.

COW FOOD. *An Old Subscriber* is giving his milk cows Pea-meal, and wishes to know if split Peas mixed with grains would answer as well, as he could do this at home, and save much trouble. [We can only say that in the case of an animal chewing the cud it is probable that grains given whole will not be wasted. The cheapest way, however, in which to give Peas to cows would be after soaking them for a day or two, or partly sprouting them.]

COWS: *S. R.* writes:—"In a local Act certain burgesses have a right to depasture upon a common, two milch cows, actually in milk, or weaned, and the question arises whether an animal can be so described previous to having a calf? my impression being contrary." [The words might properly be held to include in-calf heifers. What they would be held to include, depends on previous provisions in particular Acts, and being "learned in the law," we cannot give an opinion.]

Markets.

ENGLISH WOOL.

During the last week there has been a steady demand, and a fair amount of business has been done, which would no doubt have been increased were it not for the increased price demanded by holders, in the expectation of a large business when peace negotiations are finally concluded.

HAY.—Per Load of 36 Trucks.

SMITHFIELD, Thursday, Feb. 23.		Clover, old ..		.. 135s.	147s.
Prime-Meadow Hay, 132s. to 140s.		inferior do. ..	.. 115s.	125s.	
.. .. 110	120	Prime 2d cut do. ..	.. 126s.	135	
New Hay .. ..	..	Inferior do. ..	..	..	..
.. .. 110	120	Straw .. ..	.. 30	40	

CUMBERLAND MARKET, Thursday, Feb. 23.		Inferior Clover ..		.. 120s. to 132s.	
Sup. Meadow Hay 132s. to 140s.		Prime 2d cut do. ..	..	..	..
.. .. 110	120	Straw .. ..	.. 42	47	
Inferior do. ..	..			
Superior Clover ..	138	147			

JOSHUA BAKER.

METROPOLITAN MEAT MARKET, Feb. 23.

Best Fresh Butter .. ..	.. 20s. per dozen lb.
Second do. .. ..	.. 16s.
Small Pork, 4s. 6d. to 5s. 0d. Large Pork, 3s. 8d. to 4s. 4d. per 8 lb.	

METROPOLITAN CATTLE MARKET.

MONDAY, Feb. 20.

We have a good supply of Beasts, and trade is not quite so brisk as of late. Our highest quotation is only about 10s. for the choicest quality. Sheep are more plentiful, and trade is very dull for them; prices on the average are lower, and several lots remain unsold. We are moderately supplied with Calves, and quotations remain unaltered. Our foreign supply consists of 350 Beasts, 1700 Sheep, 1500 Calves; from Scotland there are 180 Beasts; from Ireland, 250; from Norfolk and Suffolk, 140; and 600 from the Midland and Home Counties.

s. d. s. d.		s. d. s. d.	
Best Scots, Herefords, &c. ..	5 8to 6	Best Long-wools 5 6to 8	
Best Shorthorns ..	5 4to 5	Do. Shorn ..	..
2d quality Beasts ..	3 4 to 6	Ewes & 2d quality 4 0 to 5	0
Best Downs ..	..	Do. Shorn ..	..
Half-breeds ..	5 10 to 6	Lambs ..	..
Do. Shorn ..	..	Calves ..	4 0 to 6
Beasts, 3000; Sheep and Lambs, 15,720; Calves, 130; Pigs, 130.			

THURSDAY, Feb. 20.

We have a short supply of English Beasts; there are a few more foreign than last Thursday, but on the whole choice qualities are scarce, and are readily disposed of; otherwise trade is very dull. The number of Sheep is about the same as last week, trade is exceedingly dull, and a clearance cannot be made. Choice Calves are again scarce and dear. Our foreign supply consists of 130 Beasts, 350 Sheep, and 260 Calves.

s. d. s. d.		s. d. s. d.	
Best Scots, Herefords, &c. ..	5 6to 8	Best Long-wools 5 6to 8	
Best Shorthorns ..	5 4to 5	Do. Shorn ..	..
2d quality Beasts ..	3 4 to 6	Ewes & 2d quality 4 0 to 5	0
Best Downs ..	..	Do. Shorn ..	..
Half-breeds ..	5 8 to 6	Lambs ..	..
Do. Shorn ..	..	Calves ..	4 0 to 6
Beasts, 770; Sheep and Lambs, 5560; Calves, 70; Pigs, 90.			

The Week's Work.

FEBRUARY 25.—Artificial Manure, with ashes or dry mould, should now be in store ready for mixing and application by drilling machine, or broadcast distributors. Some mix beforehand—others sift, weigh and mix as the work of sowing requires. We have tried both, and give the preference to the latter plan. The work of mixing is one of those manipulations of agricultural practice which cannot be taught by book-rule, as a dry atmosphere and a moist one have their respective requirements; suffice it to say, that the one or other fertilizer requires to be carefully mixed with the ashes, otherwise it will not be equally distributed. In other words the person who does the

GREEN'S PATENT SILENS MESSORS,

OR

NOISELESS LAWN MOWING, ROLLING, AND COLLECTING MACHINES, FOR 1871.

THOMAS GREEN AND SON, in introducing their PATENT LAWN MOWERS to the Public for the present season, take the opportunity of acknowledging the unprecedented patronage that has been accorded to them in former years, and can assure their future Patrons that nothing will be wanting on their part to maintain the confidence so long given to them.

Every Lawn Mower that is sent out by them is warranted to give entire satisfaction, otherwise it can be returned at once, free of cost to the purchaser. Our Machines have been submitted to numerous practical tests in Public Competition, and have in all cases carried off every Prize that has been given.

The following are their advantages over all others:—

- 1st. Simplicity of Construction, every part being free of access and easily managed.
- 2d. They are worked with far greater ease than any other Lawn Mower.
- 3d. They are the least liable to get out of order.
- 4th. They make little or no noise in working, as is the case with Cog-wheel Machines.
- 5th. They perform their work in a neat and smooth manner, and leave no notches or scores.

PATRONIZED BY

HER MOST GRACIOUS MAJESTY

THE QUEEN,

ON 45 DIFFERENT OCCASIONS;

H.R.H. THE PRINCE OF WALES;

THE KING OF THE BELGIANS;



THE EMPEROR OF THE FRENCH;

THE EMPEROR OF RUSSIA;

AND MOST OF THE

NOBILITY, CLERGY, and GENTRY

OF THE UNITED KINGDOM.

PRIZE MEDALS AWARDED TO GREEN'S PATENT NOISELESS LAWN MOWERS.

International Exhibition, London, 1862.

International Exhibition, Dublin, 1863.

Agricultural and Horticultural Society, Brussels, 1862.

Agricultural and Horticultural Society, Brussels, 1863.

Agricultural and Horticultural Society, Hamburg, 1863.

Agricultural and Horticultural Society, Liege, 1861.

Agricultural and Horticultural Society, Namur, 1862.

Agricultural and Horticultural Society, Laeken, 1862.

Agricultural and Horticultural Society, Gand, 1862.

Agricultural and Horticultural Society, Linneene, 1862.

Agricultural and Horticultural Society, Linneene, 1863.

The following are a few of the principal places where Green's Patent Lawn Mowers are the only Machines in constant use, and have been for a number of years giving entire satisfaction:—

THE ROYAL GARDENS, WINDSOR.
BUCKINGHAM PALACE GARDENS.
MARLBOROUGH HOUSE GARDENS.
SANDRINGHAM HALL GARDENS.
CHISWICK HOUSE GARDENS.
ROYAL HORTICULTURAL SOCIETY'S GARDENS,
SOUTH KENSINGTON.
ST. JAMES'S PARK.
GREEN PARK.
KENNINGTON AND BATTERSEA PARKS.

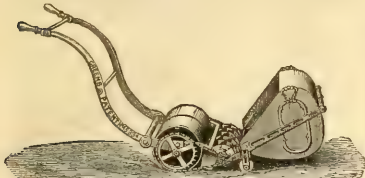
ROYAL BOTANICAL GARDENS.
ROYAL HORTICULTURAL GARDENS.
KENSINGTON PALACE GARDENS.
TEMPLE GARDENS.
ZOOLOGICAL GARDENS.
CRYSTAL PALACE GARDENS.
SOUTH KENSINGTON MUSEUM.
BERKELEY SQUARE GARDENS.
RUSSELL SQUARE GARDENS.
GORDON SQUARE GARDENS.
PARLIAMENT SQUARE GARDENS.

BRUNSWICK SQUARE GARDENS.
ROYAL HOSPITAL, CHELSEA.
ROYAL NAVAL SCHOOLS.
HYDE PARK GARDENS.
LIVERPOOL PARK.
BIRKENHEAD PARK.
PRESTON PARK.
SUNDERLAND PARK.
HALEFAX PARK.
BRADFORD PARK.
LEEDS ROYAL PARK.

NOTICE OF REDUCTION IN PRICES.

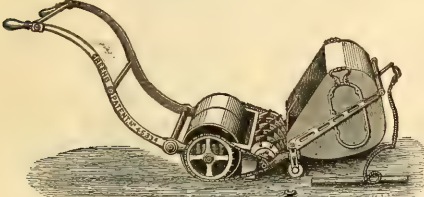
With the increased advantages and facilities we possess for the Manufacture of Lawn Mowers, we are enabled to Sell them at a greatly reduced rate on former years, as will be seen from the following Scale of Prices:—

SINGLE-HANDED LAWN MOWER.



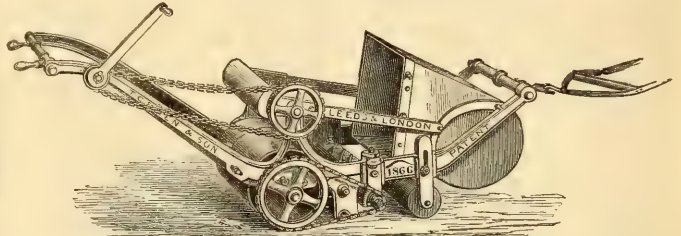
To cut 8 inches	..	..	..	Price	£2	10	0
" 10 "	..	..	..	"	3	0	0
" 12 "	..	..	..	"	4	0	0
" 14 "	..	..	..	"	5	0	0

DOUBLE-HANDED LAWN MOWER.



To cut 16 inches	Price	£6	0	0	This can be worked by One Man on an even lawn. By Man and Boy.
" 18 "	..	7	0	0	
" 20 "	..	7	10	0	
" 22 "	..	8	0	0	
" 24 "	..	8	10	0	

HORSE, PONY, AND DONKEY MACHINE.



Prices of Horse, Pony, and Donkey Machines, including Patent Self or Side Delivery Box; Cross Stay complete; suitable for attaching to ordinary Chaise Traces or Gig Harness.

DONKEY AND PONY MACHINES.

To cut 26 inches	..	..	..	£13	0	0
" 28 "	..	..	..	15	0	0
" 30 "	..	..	..	17	0	0
Leather Boots for Donkey	..	..	..	0	18	0
Ditto for Pony	..	..	..	1	2	0

HORSE MACHINES.

To cut 30 inches	..	..	..	£21	0	0
" 36 "	..	..	..	24	0	0
" 42 "	..	..	..	27	0	0
" 48 "	..	..	..	30	0	0
Leather Boots for Horse	..	..	..	1	6	0

The 26 and 28 inches can easily be worked by a Donkey, the 30 inches by a Pony, and the larger sizes by a Horse; and as the Machines make little noise in working, the most spirited animal can be employed without fear of its running away, or in any way damaging the Machine.

SPECIAL NOTICE.

Both the Horse, Pony, Donkey, and Hand Machines possess (over all other makers) the advantage of self-sharpening; the cutters being steel on each side, when they become dull or blunt by running one way round, the cylinder can be reversed again and again, bringing the bottom edge of the cutters against the bottom blade, when the Machine will cut equal to new. Arrangements are made that the cylinder can be reversed by any inexperienced person in two or three minutes.

The Handles of the Machines can be altered to suit the person using them, by either raising or lowering them.

Delivered Carriage Free to all the principal Railway Stations and Shipping Ports in England, Ireland, and Scotland.

N.B.—With the large number of all sizes of Machines we have in Stock at our Leeds and London Establishments, we are in a position to execute all Orders on the day they are received. REPAIRS are done with efficiency and despatch both at Leeds and London.

THOMAS GREEN AND SON, SMITHFIELD IRON WORKS, LEEDS; and
54 and 55, BLACKFRIARS ROAD, LONDON, S.E.

[illegible]

FRENCH PEASANT-FARMERS' SEED FUND.

LIST OF SUBSCRIPTIONS—Continued.

Collections in Kentish-beare Church, per the Rev. J. Forster-Alley	£3 4 0	Per T. L. Bury, Esq. : Mr. and Mrs. Bury ..	£1 10 0	Rev. R. Crompton Jones	£2 2 0	Messrs. Coventry, Sheppard & Co. ..	£10 10 0	Messrs. Horrowman, Philip & Co. ..	£5 5 0	Kenophon, Ralle & Son	£5 5 0
For the Rev. Jas. J. Christie, Grammar School, Rotherham :		Sums under £1 ..	2 10 0	Rev. Robert Ridsdale ..	4 12 1	J. Anson, Esq. ..	1 0 0	Messrs. W. Adams & Co. ..	5 5 0	Moroney & Co. ..	5 5 0
Rotherham Penny Readings ..	5 13 9		£4 6 6	Edwin Lovel, Esq. ..	1 0 0	H. Mongredien, Esq. ..	21 0 0	Messrs. P. & A. Darey ..	5 5 0	Coulton, Berthoud & Co. ..	10 10 0
Rev. R. Mosley ..	0 5 0	Collection in Parish Church of Guisdon		Edmund Hicks, Esq. ..	1 0 0	Messrs. Horne, Son & McInnes ..	21 0 0	F. Moberly, Jun., Esq. ..	10 10 0	Henry Vandereze, Esq. ..	5 5 0
S. Kekwick, Esq. ..	1 0 0	Collection at Moorhead Bishop, per Rev. J. J. Rowe ..	£3 4 10	per the Rev. B. G. Bridges ..	13 11 9	Mr. and Mrs. Ellerby ..	21 0 0	Messrs. C. Crokatt & Co. ..	5 5 0	Compita ..	10 10 0
	£0 18 9	R. J. Shee, Esq., Proceeds of Readings at 20, Princes Square, Hyde Park ..	19 0 0	Collection at St. Andrew's, Gen. and Mrs. Molyneux Williams ..	75 0 0	W. H. Ellerby, Esq. ..	10 10 0	Phillip Pavy, Esq. ..	52 10 0	Ionides and Rallis ..	5 5 0
Thos. Scott, Esq. ..	2 0 0	H. D. Boulton, Esq. ..	5 0 0	Collection at St. Andrew's, Gen. and Mrs. Molyneux Williams ..	75 0 0	W. H. Ellerby, Esq. ..	10 10 0	Messrs. W. Pan, Jun. & Co. ..	5 5 0	C. and M. Sevastopol ..	5 5 0
Thos. Sheppard, Esq. ..	2 0 0	Thos. J. Walker, Esq. ..	3 0 0	per the Rev. Chas. P. Good ..	20 10 0	Wide House, Esq. ..	5 5 0	Messrs. W. Muggieridge & Co. ..	21 0 0	G. H. Spallart & Co. ..	10 10 0
W. Garnett, Esq. ..	5 0 0	T. E. York, Esq. ..	2 0 0	R. W. R. ..	3 0 0	Robert Asser, Esq. ..	5 5 0	Messrs. Begbie, Young & Co. ..	10 10 0	R. L. Charrington, Esq. ..	5 5 0
Mrs. Garnett ..	5 0 0	Miss de Winton ..	0 10 0	per Corn Exchange Subscriptions received to Feb. 17, 1871 ..	20 10 0	Samuel Asser, Esq. ..	5 5 0	Messrs. Beggie, Young & Co. ..	10 10 0	M. P. Woodley & Co. ..	5 5 0
Offering in Monkton Wyld Church, per the Rev. T. B. Caum ..	2 10 8	per the Rev. A. Lawrence ..	5 2 6	Messrs. Harris Brothers ..	£52 10 0	Member of the Corn Exchange ..	5 5 0	W. T. Bond, Esq. ..	2 2 0	Rodocanachi Sons & Co. ..	10 10 0
Proceeds of a Concert given at Malpas, per Rev. C. W. Cox ..	7 1 3	R. Blanshard, Esq. ..	10 0 0	Messrs. C. J. Hambro & Sons ..	52 10 0	Messrs. Mongredien, Ellerby & Co. ..	16 0 0	Messrs. Shipper & East ..	10 10 0	Turnrows & Perks ..	5 5 0
Messrs. T. & S. Crees ..	1 1 0	Collection at Crickhowell, per the Rev. Geo. Howell ..	10 6 0			W. H. Tindall, Esq. ..	5 5 0	Henry Clarke, Esq. ..	10 10 0	Morgan, Gillbrand & Co. ..	5 5 0

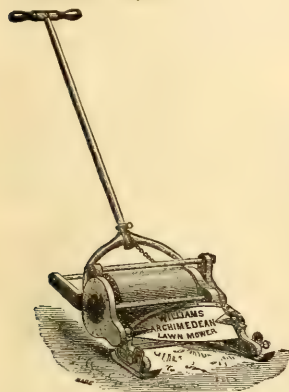
Money Subscriptions will be received, and promises of Donations of Corn and other Seeds will be registered by

B. T. BRANDRETH GIBBS, H. M. JENKINS, W. H. DELANO, *Hon. Secs.*

Donations of Corn and other Seeds should be forwarded, addressed to the Secretaries, care of JAMES ODAMS, Esq., Plaistow Wharf, Victoria Dock, E.

Subscriptions may also be remitted to the account of the "French Peasant-Farmers' Seed Fund," JAMES HOWARD, Esq., M.P., Treasurer, at the Head Office and Branches of the London and County Bank.

The Great Western and the Great Eastern Railway Companies have liberally promised to convey over their lines, *en route* to Plaistow Wharf, any donations in kind bearing the label of the French Peasant-Farmers' Seed Fund, which will be supplied upon application to the Honorary Secretaries, whilst a certain amount of tonnage will be carried free to a port in France by the South-Eastern, London, Chatham, and Dover, and London and South-Western Railway Companies.



THE "ARCHIMEDEAN" AMERICAN LAWN MOWER.

The only Lawn Mower that Cuts Wet or Long Grass
(as well as dry) without Clogging,

Leaving the Cuttings in small particles, evenly scattered, never looking untidy, serving as a Mulch to Protect the Roots from Heat and Drought, and Fertilising the Sod, which cannot fail to invigorate and beautify the Lawn. Perfectly adapted to SLOPES, UNDULATING LAWNS, RIDGES and VALLEYS; and for the CROQUET GROUND is invaluable.

NOTICE—GREAT REDUCTION in PRICES for 1871.—We have great pleasure in stating that owing to the unprecedented success our "Archimedeian" Lawn Mower met with last year, we have increased our facilities for manufacturing, and notwithstanding that several important improvements have been made in the machine, yet we have made a large Reduction in Prices for 1871.

"Far superior to any of ours."—*Vide The Field.*

"We feel bound to recommend it to our readers as one of the best Mowers we have as yet made acquaintance with."—*Vide Floral World.*

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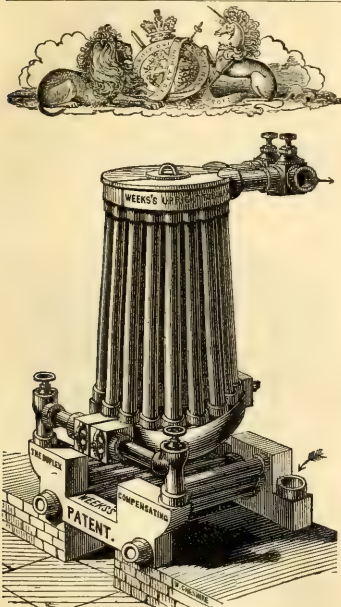
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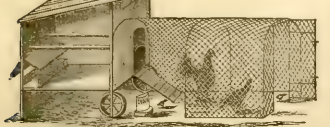
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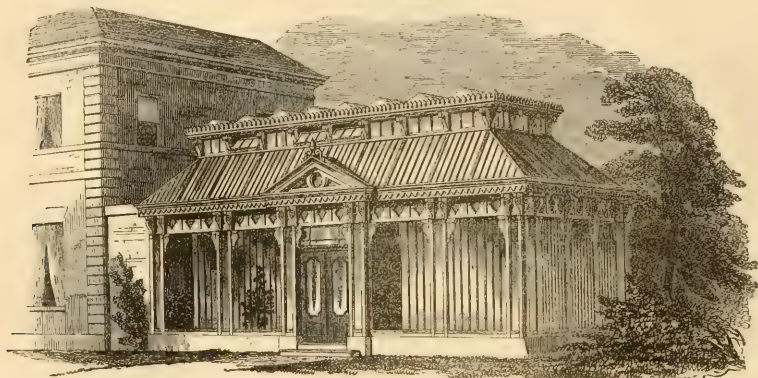
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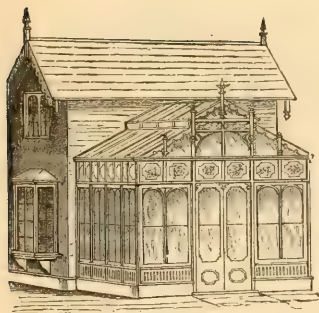
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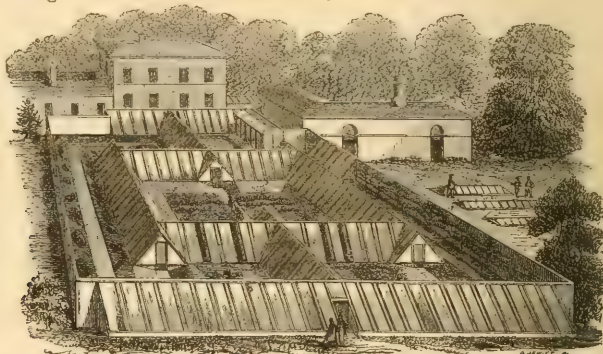
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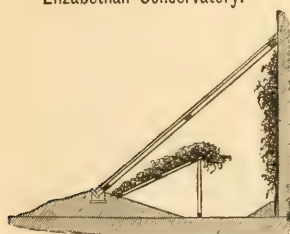
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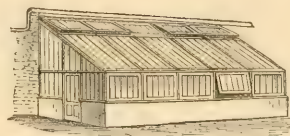
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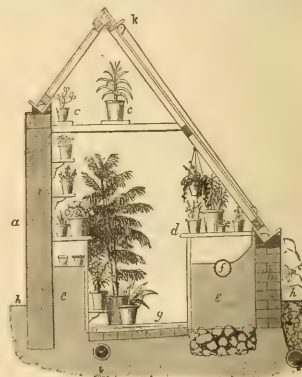
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Castle Street Nursery, Salisbury.
NEW ROSES. 1871.
CATALOGUES now ready. Fine plants in April, as usual.
JOHN KEYNES, Castle Street Nursery, Salisbury.

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EDWARD MORREN and CLEMENCE RAOUX, the two best NEW ROSES of 1869, are offered by the dozen or hundred, in Standards and Half standards, 2s. each. Tickets 4s. each.
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STANDARD ROSES, splendid plants, by the dozen, hundred, or thousand. Prices quoted (which are low), and CATALOGUES put free on application.
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PAUL and SON'S LIST of their most carefully selected collection is now ready. Plants are strong and healthy, and ready for early planting—a strong point in successful Hollyhock culture.
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LARCH.—A large quantity of fine Larch, 1-yr. seedling, two years transplanting, for SALE.
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STRONG Transplanted SILVER FIR, 1½ to 2 feet, 2s. per 100; 2 to 2½ feet, 4s. per 100.
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WYCH ELMS, 4 to 8 feet, cheap per 1000.
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First 1-yr. Seedlings.
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Price 6s. per 1000.
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WOOD and INGRAM offer the above, very fine, at 15s. per 1000, for in boxes for other Stock.
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FOR SALE, upwards of 200 bushels SPANISH CHESTNUTS.
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Easter, Beurre, Bore, &c.
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Improvement of Grass Lands, at from 4s. 6d. to 9s. 6d.
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VEGETABLE and FLOWER SEEDS, best quality, lowest price. See GEORGE EDWARDS'S descriptive CATALOGUE, post free.
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KEPT IN STOCK at CARTER'S New Seed Warehouse, 237 & 238, High Holborn, London: CARTER'S GENUINE SEEDS, carriage free.

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Economy in the Garden secured by the Use of CARTER'S COLLECTIONS of CHOICE VEGETABLE and FLOWER SEEDS, at 2s. 6d. and 6s. 6d. each, carriage free.
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SPECIAL MODERATE PRICES for the BEST and MOST GENUINE FARM SEEDS, on receipt of list of sorts and quantities ready for presentation.
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Forwards to all parts of the World.
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In sealed packets, 1s. each, only to be had of W.M. DENVER, SEEDSMAN, &c., 82, Gracechurch Street, London, E.C., where the BEST BUSINESS of the late W. IVERY is now carried on. The usual liberal discount allowed to the Trade.

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Price reduced to 10s. 6d. per bushel, cheaper by the ton. Priced LIST of other kinds on application.
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	Per packet—	d.
ACHYROCLINE SAUNDERSON—Fine ..	1	0
AGERATUM—Tom Thumb, dwarf bedder ..	6	0
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BALSAMS—Splendid double. See List.		
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VEITCHII—Rich scarlet flowers ..	5	0
BLANDFORDIA CUNNINGHAMII—True ..	6	0
CALCEOLARIA—Finest in the kingdom ..	5	0
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CLOVES—Scented, all colours ..	11	2
CENTAUREA CLEMENTEI—Distinct new ..	2	6
RAGUSINA COMPACTA Best of Silver Leaves		
CINERARIA—1st quality, from named ..	2	6
ACANTHIFOLIA—Distinct white foliage ..	1	0
CLIANTHUS DAMPIERII—English seed ..	1	0
COBÆA PENDULIFLORA—New species ..	1	0
CYCLAMEN—First-class quality ..	2	6
FERULA ASPERIFOLIA—Very elegant foliage		
GOETIA WHITNEYI—Beautiful; the best ..	1	0
GRINDELIA HIRSUTULA—New species ..	1	0
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HUMEA ELEGANS PURPUREA—Extra fine ..	2	6
LAPAGERIA ROSEA—English seed ..	1	0
LEPTOSIPHON ROSEUM—Most lovely ..	1	0
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LINUM GRANDIFLORUM ROSEUM—New var. ..	6	0
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FUMILA GRANDIFLORA—True ..	5	0
LOPHOSPERMUM SPECTABILE PUNCTATUM—New ..	1	0
MALVA MOSCHATA ALBA—Pure white ..	1	0
MIMULUS NEUBERTI—New, true, dbl. ..	5	0
TILING—New species, distinct ..	2	6
HYBRIDS—From private collection, most beautiful, 12 sorts ..	3	0
PENTSTEMON GLABER—Most lovely blue ..	6	0
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PLEROMA MACRANTHA FLORIBUNDA—New ..	5	0
PHLOX DRUMMONDI—General Grant, rich ..	1	0
Rose d'Amour, lovely; and Cardinal, brilliant, each		
POTENTILLA—New double flowered hybrids ..	1	0
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MAGNUM BONUM—Extra ..	21	6
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PETSCHERI—New, fine ..	1	0
SCHIZANTHUS PAPHIOLACEUS—Very gay		
STANTICE SPICATA—New and distinct ..	1	0
SWEET WILLIAM—Perpetual flowering, 6d. and		
THALICTRUM MINUS—Elegant Fern-like leaves		
VIOLA LUTEA GRANDIFLORA PERFECTA		
ODORATA LAUCHEANA—Perp. hybrid, ..	2	6
PUBESCENS—Clear yellow-flowered species ..	1	0

CENTAUREA RAGUSINA COMPACTA—This very effective and improved form of the well-known Ragusina (Syn. C. candidissima), being of a much nearer growth, and, as its name implies, of a more compact dwarf habit. One most desirable and prominent distinction from the original species consists, also, in its purer white leaf surfaces, by which it yields a very decided silvery feature in contrast with the more original green and chocolate coloured leaf tints. It is also free from the coarse, less observable in the mature summer growth of Ragusina. It is a beautiful for vase culture in terrace adornments, or for temporary effects in cool conservatories, this desirable plant undisturbed in the end will supersede the older form. Seed, per packet, 1s.; per 100, 5s.; plants, each 6d.; by the 12 plants, 6s.; by the 50, 25s.; by the 100, 40s.

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GEORGE CLARKE has this season secured a quantity of this very fine strain, in excellent condition, which he recommends, feeling assured that no other possesses such a robust character, with really splendid flowers—Mixed, Red and White, 21 6d. per pkt. Instructions for raising and growing sent if required. Nurseries: Streatham Place, Brixton Hill, London, S.W.; and Nottingham, Kent, S.E.

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NEW BEDDING CALCEOLARIA, PRINCESS LOUISE.—It is of dwarf bushy habit, growing from 6 to 8 inches high. The flower stems are short but stout and carry the trusses of bloom well above the foliage; trusses large and very compact; the blooms, which bear those of any other yellow bedding Calceolaria, being closely set together. Colour, pure sulphur yellow, very effective.

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LILIU AURATUM.—Fine picked Bulbs supplied by Messrs. TEUTSCH and CO., 35, Lion Walk, Colchester. Agents for Messrs. Kramer & Co., Seedsmen and Nurserymen, Yokohama, Japan. Exporters of Japanese Seeds, Plants, Bulbs, &c. A few bulbs on hand of LILIU LEICHTLIN, THUNBERGIANUM MARMORATUM, and other new kinds. Price LIST on application.

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Excellent extra cut young, as Vegetable Marrows, or ripe.

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Weights 6 or 8 lbs. when ripe, excellent flavour. Per packet, 6d.

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10s. 6d., 21s., 42s., 63s., and 84s. each.

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EXTRA STRONG

GOLDEN CHAMPION, WHITE LADY DOWNE'S, MUSCAT CHAMPION.

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Containing a SELECTION of NOVELTIES, and of all the most approved older kinds, many home-grown and others drawn from the most reliable sources.

THE WALTHAM COLLECTIONS OF VEGETABLE AND FLOWER SEEDS

Which have given such general satisfaction in past years, are still made up of the most select sorts for LARGE or SMALL GARDENS.

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SEED POTATOS. All the most approved Early and Late sorts, true, and in excellent condition.

All Seeds Carriage Free, except very small parcels.

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INVITE THE ATTENTION OF THE TRADE TO THE FOLLOWING VARIETIES OF

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EARLY SANDRINGHAM KIDNEY	EARLY DALMAHOY ROUND	EARLY KING
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WALNUT-LEAVED KIDNEY	" GOLDEN GLOBE	WALKER'S IMPROVED REGENT
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FOR EVERGREEN HEDGES.

TREE BOX, 2½ to 3 feet, 12s. per 100.

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HEMLOCK SPRUCE, 4 to 5 feet, 50s. per 100.

2 to 5 feet, 70s. per 100.

THUJOPSIS BOREALIS, 6 to 7 feet, 150s. per 100.

THUJA LORBI, 6 to 8 feet, 150s. per 100.

RICHARD SMITH, Nurseryman and Seed Merchant, Worcester.

Transplanted Native Scotch Fir.

ROY, JUN., NURSERYMAN, Aberdeen, has at present

2½ y. Seedling, on hand a large stock.

1½ y. Scotch Fir .. 2 0 1 y. Alder .. 1 6

2½ y. " two years .. 5s. " 6d. "

2½ y. " three years .. 6s. 6d. "

1½ y. " LARCH .. 1s. "

2½ y. " 3½ y. "

Transplanted LARCH, various sizes, from 10s. to 20s. per 1000.

Also large stock of fine RHODODENDRON PONTICUM, &c.,

4000 select from sizes from 8 inches to 4 feet; with general Nursery stock. LISTS may be had on application.

Veitch's Improved Early Ashleaf Kidney POTATOS, 12. 6d. per peck

Butt's Berkshire Kidney POTATOS, 12. 3d. per peck

Webb's Imperial Kidney POTATO, 12. per peck.

With a general stock of all the newest and finest sorts of POTATOS.

Seedling Forest Trees.

THE SUBSCRIBER begs to call attention of

Intending purchasers to the following healthy and well grown

stock:—

1½ y. Scotch Fir .. 2 0 1 y. Alder .. 1 6

2½ y. Spruce do. .. 2 0 1 y. Sycamore .. 2 0

2½ y. Silver do. .. 4 0 1 y. Elm .. 2 0

2½ y. Pinus austriaca .. 2 0 2½ y. Crab stock .. 4 0

2½ y. do. do. .. 4 0 2½ y. Horse Chestnut .. 15 0

2½ y. do. Lonic .. 6 0 2½ y. Spanish do. .. 20 0

2½ y. do. Weymouth .. 7 0 Irish Yew, 4 feet, 25s. per 100.

Carriage free at Dublin: on application to

MICHAEL BUCK, Drumnaman and Garradale Nurseries,

Summerhill, County Meath, Ireland.

CHEAP SCOTCH and SPRUCE FIRS, &c.

10,000 SPRUCE FIRS, 1½ to 2 feet, and 2 to 3 feet.

10,000 Strong SCOTCH FIRS, 1½ to 2 feet.

2,000 PINUS AUSTRIACA, 2 feet, and 2 to 4 feet.

5,000 COMMON LAURELS, 1½ to 2 feet.

Strong Dwarf-trained MORELS and CHERRIES.

Strong Dwarf-trained VICTORIA and JEFFERSON PLUMS.

Strong Fruiting Pyramid PEARS on Quince.

The above are all strong and well grown, and have been frequently

transplanted to ensure safe removal. Samples and prices, on application

to FREDERICK PERKINS, Seed Warehouse, Regent Street,

Leamington.

CLEARANCE OF NURSERY STOCK for Spring

Planting:—

200,000 fine Transplanted SCOTCH FIRS, 2 to 3 feet.

10,000 Standard and Dwarf-Standard ROSES.

3,000 Standard APPLES.

2,000 SILVER BIRCH, 8 to 10 feet.

1,000 ABIES MENZIESII, 1½ to 2 feet.

500 ARAUCARIA IMBRICATA, 4 to 8 feet.

3,000 THUJA WEARANA, 1 to 1½ feet.

2,000 " 2, 3, and 4 feet.

50,000 Common LAURELS, 2, 3, and 4 feet.

The above are well grown and strong, and will be sold cheap

to purchasers of large quantities, as the ground on which they stand

is required for other uses. Prices and particulars of

MAURICE YOUNG, Nurseryman, near Godalming.

Abies Douglasii, from 1 to 8 feet.

PICEA NOBILIS, 6 inches to 2½ feet.

WELLINGTONIA GIANTEA, 2 feet to 5 feet.

WILLIAM BARRON AND SON, having an immense

stock of the above splendid trees, in fine healthy and well-

rooted plants, are willing to dispose of them at a very low figure, and

beg to call the attention of planters to this opportunity for

securing a really first-class article at a nominal price. Prices on

application.

Their general stock of CONIFER and HARDY EVERGREENS,

particularly of JAPANESE PLANTS (the hardiness of which has

been thoroughly proved in the present winter), is unsurpassed.

DESCRIPTIVE CATALOGUES will be forwarded post free on

application.

Elvaston Nurseries, Borrowash, near Derby.

To the Trade.

WILLIAM BARRON AND SON, having a large

stock of the following, will dispose of them at a low price.

Prices on application.

ABIES DOUGLASII, 3 feet to 10 feet.

CEDRUS AUSTRIACA, 2½ to 4½ feet.

CRYPTOMERIA ELEGANS, 6 inches to 18 inches.

CUPRESSUS LAWSONIANA, 6 inches to 4 feet.

PICEA NOBILIS, 6 inches to 2½ feet.

NORDMANNIANA, 4 inches to 15 inches.

PINUS AUSTRIACA, 2½ to 4½ feet, seedlings, very fine.

" LARICIO, 2½ y. seedlings, very fine.

INSIGNIS, 7½ y. in pot.

RETINOSPORA, of sorts, 6 inches to 4 feet.

TAXUS BACCATA, 9 inches to 2 feet.

" AUREA, var.

THUJOPSIS, sorts, 6 inches to 4 feet.

DOLBRAT.

BEKBERIS DARWINI.

WALLICHIANA.

Elvaston Nurseries, Borrowash, near Derby.

Eaton Road Nurseries, Chester.

Messrs. RUSH AND YEATS beg respectfully to

announce that they have purchased the above well-known

Nurseries from the estate of the late Mr. George Chivas; and

from their practical knowledge as Manager and Assistant Manager

for many years to the late Mr. Chivas, they trust to be able to produce

VALUABLE STOCK, at moderate prices, and thereby to secure a

continuance of the patronage so liberally bestowed upon their

predecessor.

Messrs. R. & Y. would especially call attention to the fact that, as

all surplus and overgrown stock, which they now offer may be relied on as

being young and in excellent condition for removal.

A splendid stock of small and also grown THORNS, ranging

from good to strong and extra strong.

Specimen GREENS, for which this Nursery has now

been celebrated, These having been transplanted last spring, can now

be removed with perfect safety.

A very extensive stock of LARCH, SCOTCH FIR, SYCAMORE,

HAZEL, HORNBANE, CHESTNUT, ASH, OAK, and BEECH,

also FORTUGAL and COMMON LAUREL, RHODODENDRON

PONTICUM, and named varieties. Variegated Gold and Silver

HOLLIES, CEDRUS DEODARA, EVERGREEN OAK, AUCU-

BAS, BOX, &c.

Messrs. R. & Y. are preparing a large quantity of BEDDING

PLANTS, of all the leading varieties, to be ready in May, at reason-

able prices.

All orders addressed to Messrs. RUSH AND YEATS, Eaton Road

Nurseries, Chester, will receive their best and personal attention.

BIRD'S KING of the CUCUMBERS.—

Carriage paid to all Stations on orders of 20s. and upwards.
JOHN K. KING, Seed Grower, Coggeshall, Essex. Established 1793

RICHARD WALKER offers for cash **AMERICAN RED POTATOS**: the real **RED SKINNED FLOURBALL**, 155 per cent. - smaller quantities at the same rate. They are produced from 17 to 18 tons to the acre, and a great many of them weigh 2 lb. each. **GIANT KING POTATOS**, earliest in cultivation, 61 per cent., smaller quantities at the same rate. The Market Gardens, Ruggleswood Beds.

WHEELER'S IMPERIAL CABBAGE. **COTTAGERS' KALE**, Imported **BRUSSELS SPROUTS**, **YELLOW SAVOY**, **LONDON CAULIFLOWER**, **JINKINS' RED CELERY**, **FINEST RED BEET**, at 6d. and 1s. per packet, post free. Best prepared **MUSHROOMS**, 5s. per bushel, with directions. **FASION'S COTTAGERS' CALENDAR**, post free, 4d. **JOSEPH MAY**, Seedman and Florist, 35, Bridges Street, Covent Garden, W.C.

The Best Mangel in Cultivation is
HARRISON'S NORMANTON GLOBE, which has proved its superiority five successive seasons, and is now well known. Price 1s. 6d. per lb., cheaper by the cwt. or 5 cwt., carriage paid. (Testimonials from all parts of the country.)
From Mr. E. A. GOWING, *Farms Steward to the Right Hon. Lord Palmerston, 1869.*

"Your Normanton Globe Mangel is the best variety I have ever seen: having a small top and single root, they may be grown very close together, which is the secret of a heavy crop. My best field this year was a very heavy crop, very regular, and many bulbs weighing from 20 to 28 lb. each; my second best field yielded over 40 tons per acre."
Our SEED CATALOGUE, 44 pages, is now ready, and may be had on application, post free.
HARRISON AND SONS, Royal Midland Seed Warehouse, Leicester.

RAYNBIRD, CALDECOTT, BAWTREE, & DOWLING and COMPANY (Limited),
CORN, SEED, MANURE, and AGRICULTURAL MACHINERY.
Address, 26, Seed Market, Mark Lane, E.C.1, or Basingstoke.
Samples and prices sent free on application. Prize Medals, 1870, for Wheat, 1869, "Excellent Seed Corn and Seeds."

Special Notice. - To large Consumers of Seeds.
JAMES CARTER AND CO., having harvested their Stocks of **FARM and GARDEN SEEDS** in splendid condition, are now prepared to make special low quotations for large quantities. Messrs. CARTER'S ILLUSTRATED FARMER'S CALENDAR is in the Press.
237 and 238, High Holborn, London, W.C.

Grasses and Grass Lands.
For the BEST and MOST PRACTICAL INFORMATION HOW, WHEN, and WHAT to SOW, see **CARTER'S ILLUSTRATED FARMER'S CALENDAR** for 1871, sent gratis and post free.
JAMES CARTER and CO., The Royal Seedsmen, 237 and 238, High Holborn, London, W.C.

Grass Seeds.
BOLTON and CO., have to offer **NEW GRASS SEED MIXTURES**, prepared as required for any situation or soil.

GRASS SEEDS FOR PERMANENT PASTURE.
GRASS SEEDS FOR ORCHARDS.
GRASS SEEDS FOR CEMETERIES.
GRASS SEEDS FOR CROQUET LAWNS.
GRASS SEEDS FOR RAILWAY EMBANKMENTS.
GRASS SEEDS FOR ONE YEARLY LAY.
GRASS SEEDS FOR TWO YEARS' LAY.


BOLTON and CO., Seed Warehouse, Station Road, Wood Green, London, N.

Prompt and Careful Execution of Seed Orders.
MESSRS. SUTTON execute all Orders in rotation, and as rapidly as is consistent with the care required. Several orders have been received not having the Name or Address of the Sender attached; it is, therefore, requested that any Customers who may not have promptly received the goods ordered, will communicate such information as may enable Messrs. SUTTON to dispatch the same forthwith.
Royal Berks Seed Establishment, Reading.

CLEAN CLOVER SEEDS, at market prices, New and Unadulterated -
RED. | **WHITE DUTCH.** | **YELLOW.**
ALSIKE. | **COW GRASS.** | **WHITE SUCKLING.**
For samples and lowest prices apply (stating quantity required) to **SUTTON AND SONS**, Seed Merchants, Reading.

Early Feed for Sheep and Cattle.
SUTTON'S IMPROVED ITALIAN RYE-GRASS.
The earliest and most productive in cultivation. Should be sown in March, to produce a succession of valuable cuttings during the year. If sown alone, 3 bushels are required per acre. Price 1s. per bushel, cheaper by the quarter. Carriage free.
SUTTON AND SONS, Seedsmen to the Queen, Reading, Berks.

SUTTON'S HOME-GROWN FARM SEEDS.
Saved from carefully selected transplanted Bulbs.



SUTTON'S SELECTED YELLOW GLOBE MANGEL.

Price 1s. per lb. Cheaper by the cwt.

For prices and full particulars of other Farm Seeds, see **SUTTON'S FARMER'S YEAR BOOK** for 1871, illustrated, price 6d., gratis to customers, or you can obtain to furnish, and was in a fine state of preparation. The more generally this Manure will become known to Agriculturists, the more, I am convinced, will it be appreciated by them. - Believe me, Sir, yours respectfully, "AUGUSTUS VOELCKER."

The Secretary, REES AND CO.'S Biphosphated Peruvian Guano Company (Limited), 32, King William Street, London, E.C.

GENUINE GRASS SEEDS.



MESSRS. VEITCH & SONS,

ROYAL EXOTIC NURSERY, KING'S ROAD, CHELSEA, S.W.,

DESIRE TO DIRECT THE SPECIAL ATTENTION OF INTENDING PURCHASERS TO THE FOLLOWING VERY FINE

MIXTURES OF GRASS AND CLOVER SEEDS,

which they guarantee are not to be surpassed in quality and selection.

In ordering Grass Seeds, a description of the Land to be laid down is very necessary, so that a suitable Mixture may be supplied.

MIXTURES FOR PERMANENT PASTURES and MEADOW LAND,

Containing only the most suitable GRASSES and CLOVERS,
24s. to 30s. per acre.

MIXTURES FOR PARKS, ORNAMENTAL GROUNDS, &c.,

Specially prepared from the finest Evergreen varieties,
32s. to 36s. per acre.

MIXTURES FOR SHEEPWALKS and CHALKY UPLANDS,

Composed of kinds which thrive on poor soils, 25s. to 30s. per acre.

MIXTURES FOR IRRIGATION or WATER MEADOWS,

24s. per acre.

MIXTURES FOR RECLAIMED MARSHES or HEATH LANDS,

20s. per acre.

MIXTURES FOR GARDEN LAWNS, PLEASURE GROUNDS, GRASS PLOTS, BOWLING GREENS, &c.,

This Mixture has been most carefully prepared from the finest dwarf kinds, and cannot fail to give satisfaction.
20s. per bushel; 1s. per lb.

MIXTURES FOR ALTERNATE HUSBANDRY.

These Mixtures are formed of the best CLOVERS, FESCUES, RYE-GRASSES, &c., according to requirement, and in ordering it should be stated whether it is required for one, two, or three years' lay.
13s. to 21s. per acre.

RENOVATING MIXTURE for RENEWING and IMPROVING OLD PASTURES.

This Mixture consists of the best PERENNIAL GRASS SEEDS and CLOVERS, and will greatly improve the Pasture. Sow 10 to 12 lb. per acre. 9d. per lb.; 80s. per cwt.

MANGEL WURZEL, TURNIP, KOHL RABI,

And all other AGRICULTURAL SEEDS of finest quality, PRICED CATALOGUES of which are now ready, and will be forwarded Post Free on application.

Where large quantities are required, Messrs. V. and SONS will feel much pleasure in quoting special prices.

Eton Local Board of Health.

TO FARM BAILEYS, WORKING GARDENERS, and OTHERS.
THE above Board has been appointed to DISPOSE OF THE SEWAGE of the District by Irrigation upon Lands situated at Eton Wick, Bucks, and are desirous of engaging the services of a competent and experienced Engineer, to estimate and manage the Cultivation of the Lands upon the above principle.
A house will be provided for the occupation of the person engaged. Wages, 25s. a week. Written applications, with testimonials, to be sent to the Board Room, High Street, Eton, before 4 o'clock on the THURSDAY, MARCH 9th, 1871.
GEORGE HENRY LONG, Clerk to the Board.
 Windsor, February 25.

RENDELL'S PATENT PORTABLE PLANT PROTECTOR. - New Improved. This unique, just published, can be had gratis, on application to the Patentee, Mr. WM. EDMUND RENDELL, 68, Welbeck Street, Cavendish Square, W.

THE LONDON MANURE COMPANY (Established 1840), have now ready for delivery, in fine dry condition -
PURE TOP-DRESSING BONES.
CONCENTRATED AMMONIACAL MANURE, for Top-Dressing.
PURKES' BONE TURNIP MANURE.
SUPERPHOSPHATE OF LIME.
NITROPHOSPHATE.

PERUVIAN GUANO (as imported by Messrs. Thomson, Bonar & Co.), NITRATE OF SODA, SULPHATE OF AMMONIA, &c. **EDWARD F. REES**, Secretary, 110, Fenchurch Street, E.C.

REES AND CO.'S BIPHOSPHATED PERUVIAN GUANO (Registered Trade Mark, Flying Albatross), is now ready for delivery in condition and is well known to be the best Artificial Manure yet produced. Its base is Peruvian Government Guano; it contains 31 per cent. of Soluble Phosphates, 5 to 7 per cent. of Ammonia with Salts of Potash. The results speak for themselves. I can therefore hardly say anything in commendation of the high fertilizing character of this valuable Artificial Manure. The samples examined by me contained only 10 per cent. of moisture, and half the percentages of soluble and insoluble phosphates which I understand you guarantee to furnish, and was in a fine state of preparation. The more generally this Manure will become known to Agriculturists, the more, I am convinced, will it be appreciated by them. - Believe me, Sir, yours respectfully, "AUGUSTUS VOELCKER."

REPORT and ANALYSIS by DR. A. VOELCKER.
Consulting Chemist to the Royal Agricultural Society of England.
"Analytical Laboratory, 21, Salisbury Square, Fleet Street, E.C."
London, January 15, 1870.

"Sir, - Enclosed you will find the results of a careful analysis of a sample of your Biphosphated Peruvian Guano. The results speak for themselves. I can therefore hardly say anything in commendation of the high fertilizing character of this valuable Artificial Manure. The samples examined by me contained only 10 per cent. of moisture, and half the percentages of soluble and insoluble phosphates which I understand you guarantee to furnish, and was in a fine state of preparation. The more generally this Manure will become known to Agriculturists, the more, I am convinced, will it be appreciated by them. - Believe me, Sir, yours respectfully, "AUGUSTUS VOELCKER."
(Signed)
The Secretary, REES AND CO.'S Biphosphated Peruvian Guano Company (Limited), 32, King William Street, London, E.C."

GUANO.

Guaranteed Uniform Analysis.

"I NEVER have had in my hands a Manure which, in regard to the best proportions and abundance of efficacious soluble component parts, was to be compared to the Phospho-Guano. The Phospho-Guano surpasses most certainly, by its more correct and constant composition, the best sorts of Peruvian Guano, and of its superior efficacy there can be not the slightest doubt."
"JUSTUS VON LIEBIG."

"I am of opinion that Phospho-Guano is a uniformly prepared, highly concentrated, and more generally useful Manure than the higher-priced Peruvian Guano. For Root Crops it is, as I have before said, by far the most valuable fertilizer, whether natural or artificial, which yet has been offered to the Public."
"J. J. GUSTAVUS VOELCKER."

Composed of Guano imported from islands at the equator in the Pacific Ocean, richer in phosphoric acid than any other known Guano, and in proof of its power and fertility, has invariably produced a greater maximum weight of produce in bulk as well as in specific gravity.

Though so entirely soluble, it is in an easy dry condition for spreading on the land, and being highly concentrated, much money and labour are saved in cartage and handling.

The application of Phospho-Guano restores to the soil in the cheapest form the weight of fertilizing properties extracted by the crops, chiefly because it contains such an excess of phosphoric acid, and because it is a true Guano, the deposit of sea birds, and a condensed equivalent to farmyard manure.

Delivered at every Railway Station, 6s. per ton, cash.
PHOSPHO-GUANO COMPANY, LIMITED.
General Agents - **PETER LAWSON and SON**, 20, Budge Row, London, E.C.; and Edinburgh; also of the Local Agents throughout the country. A List of whom may be had on application.

ODAMS'S NITRO-PHOSPHATE or BLOOD MANURE.
ODAMS'S DISSOLVED BONES.
ODAMS'S SUPERPHOSPHATE OF LIME.
ODAMS'S NITRO EL-PHOSPHATE (or prepared) **GUANO.**

MANUFACTURED BY THE

PATENT NITRO-PHOSPHATE or BLOOD MANURE COMPANY (Limited), consisting of Tenant-Farmers occupying upwards of 80,000 Acres of Land.

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Samuel Jones, Chishall Grange, Essex.
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Several Hundred Thousand Tons of the Manure have been supplied to the Agricultural Public, and the increasing demand that exists for them is the best proof of the appreciation in which they are held.
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Chief Offices - 109, Fenchurch Street, London, E.C.

"The advantages of procuring Seeds direct from the Growers cannot be overestimated."

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CARTER'S MIXED CLOVERS and GRASSES

For alternate Husbandry. Per acre.—s. d.

CLOVERS and RYE GRASS only for One Year's Lay	13	6
CLOVERS and GRASSES for One Year's Lay. 14	6	
CLOVERS and GRASSES for Two Years' Lay. 18	0	
CLOVERS and GRASSES for Three or Four Years' Lay	22	0
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CLOVERS only for One Year's Lay 13s. to 14	0	

ITALIAN RYE GRASS.

CARTER'S SUPERFINE IMPORTED ITALIAN RYE GRASS, as supplied to the Metropolitan Sewage Company, heavy and very clean	8	0
ITALIAN RYE GRASS, English Seed, 6s. 6d. to 7	0	
ITALIAN RYE GRASS, in Bales as imported: per cwt., 44s. to 60s.; per bush., 8s. to 10	0	

THE ROYAL SEEDSMEN

CARTER'S

FOR ALL SOILS

GRASS SEEDS

Descriptive Lists
Gratis Post Free

CARRIAGE FREE

CATTLE CABBAGE. Per lb.—s. d.

ROBINSON'S CHAMPION DRUMHEAD, the largest	2	3
CARTER'S IMPROVED OXHEART, very early, will produce a very heavy crop, if transplanted so inches apart	2	6
CARTER'S SELECTED ENFIELD MARKET GIBSON'S DWARF DRUMHEAD	2	6
FLAT DUTCH	2	0
THOUSAND-HEADED	2	0
COTTAGER'S KAIL	3	6
LARGE DRUMHEAD	2	0
EARLY BATTERSEA	2	6
DRUMHEAD SAVOY	2	6

PARSNIP.

HOLLOW-CROWNED, the best	2	0
LARGE JERSEY, a great cropper	1	6
LARGE CATTLE	1	3

CARTER'S CHOICE POTATOS CARRIAGE FREE.

PATERSON'S BOVINIA POTATO.

Price 10s. per bushel.

Much cheaper in large quantities.
Contains a large amount of farinaceous matter.

The enormous quantity of 20 tons per acre can be grown on land where finger-and-toe destroys the Turnips, also on land where Mangel cannot be grown profitably.

With extra culture, 40 tons per acre have been grown.

This Potato keeps in good condition for 12 months, and is excellent for table use.

CARTER'S COLLECTIONS OF VEGETABLE SEEDS.

Will insure a constant supply of the best kinds of Vegetables "all the year round." The Collections do not include Potatos or Culinary Plants.

CARTER'S No. 1 COLLECTION OF VEGETABLE SEEDS (Carriage Free), 12s. 6d.

CARTER'S No. 2 COLLECTION OF VEGETABLE SEEDS (Carriage Free), 21s.

CARTER'S No. 3 COLLECTION OF VEGETABLE SEEDS (Carriage Free), 42s.

CARTER'S No. 4 COLLECTION OF VEGETABLE SEEDS (Carriage Free), 63s.

CARTER'S No. 6 COLLECTION OF VEGETABLE SEEDS (Carriage Free), 30s.

No Charge for Packing.
Detailed List of Contents forwarded Free on application.

THE RED-SKINNED FLOURBALL POTATO (True).



A Special Certificate was awarded to CARTER & Co. for this fine Potato, by the Royal Horticultural Society, December 7, 1870.

THE RED-SKINNED FLOURBALL POTATO.

Price 10s. per bushel.

Much cheaper in large quantities.

We have purchased a stock of this fine Potato from the original raiser.

Too much cannot be said in its favour, as it is the heaviest cropper and best cooking late Potato in cultivation; especially valuable for late use and winter storing, and producing tubers all of uniform size, which are very large.

CARTER'S COLLECTIONS OF CHOICE FLOWER SEEDS.

Will produce a brilliant display in the Garden and Conservatory.

COLLECTION A., 10s. 6d.	Carriage Free.
COLLECTION B., 15s. 0d.	
COLLECTION C., 21s. 0d.	
COLLECTION D., 42s. 0d.	
COLLECTION E., 63s. 0d.	

CARTER'S PRIZE FARM SEEDS—CARRIAGE FREE.

CARTER'S GENUINE FARM SEEDS,

HARVESTED ON THEIR OWN SEED FARMS, FROM CHOICE PRIZE STOCKS.

PRESENT PRICES. Per lb.—s. d.

YELLOW GLOBE MANGEL	0	7
CARTER'S IMPROVED MAMMOTH PRIZE LONG RED MANGEL	1	4
CARTER'S WARDEN PRIZE YELLOW GLOBE MANGEL	1	0
CARTER'S NEW CHAMPION INTERMEDIATE MANGEL	0	10
Ordinary stocks at reduced rates.		
LIVERPOOL SWEDE	0	8
CARTER'S IMPERIAL HARDY SWEDE	0	10
CARTER'S LONDON SWEDE	0	10
SKIRVING'S PURPLE-TOP SWEDE	0	10
CARTER'S CHAMPION GREEN and PURPLE TOP HYBRID TURNIP	0	10
CARTER'S IMPROVED PURPLE-TOP MAMMOTH TURNIP	1	0
Ordinary stocks at reduced rates.		

Much Cheaper by the Bushel or Cwt.

"COMPARISON INVITED." "THE ROYAL SEEDSMEN"

THE ROYAL SEEDSMEN

CARTER'S

PRIZE MEDALS
PARIS, 1867. LONDON, 1862.
HAMBURG, 1868. WIGAN, 1870.
BLACKFOL, 1870. &c. &c.

GENUINE SEEDS.

DESCRIPTIVE LISTS
GRATIS, POST FREE
5 PER CENT DISCOUNT
FOR CASH.

CARRIAGE FREE

237, & 238, High Holborn,
LONDON.

Special Notice,—Immediate Despatch.

J. C. AND CO. having fitted up most extensive NEW PREMISES, are prepared to execute Orders immediately on receipt.

CARTER'S GRASS SEEDS

FOR ALL SOILS,

CARRIAGE FREE.

FOR PERMANENT PASTURES.

FOR ORDINARY SOILS, best quality, 27s. to 30s. per acre; second quality, 20s. to 24s. per acre.

FOR HEAVY SOILS, best quality, 28s. to 31s. 6d. per acre; second quality, 20s. to 26s. per acre.

Reduced Rates for quantities of more than five acres.

CARTER'S GRASS SEEDS AT ALDERSHOT CAMP.

Col LAFAN, Commanding the Royal Engineers, reports as follows, under date February 1, 1871.

"Col Laffan, R.E., presents his compliments to Messrs. Carter, and begs to inform them that all the Grass and Clover seeds supplied by them to the War Office for use at Aldershot last year and the year before have succeeded admirably. Last year a very fair crop of excellent hay was produced on what had previously been a barren sand."

For the best information on Laying-down Land to Grass, see CARTER'S ILLUSTRATED FARMER'S CALENDAR for 1871; gratis and post free to purchasers.

'We would propose that every nurseryman place prominently in his establishment a subscription list, which

should be called to it on all available occasions. The Parisians call our nation "the good English," out of gratitude for what we as a nation are sending them; let us, as horticulturists, endeavour to deserve the same good name amongst those with whom we are more immediately brought in contact by business relations."

We have only to add that another meeting will be held in the Royal Horticultural Society's rooms on Tuesday next, at 3 P.M., when we hope to hear that the good work thus inaugurated has made satisfactory progress.

WHAT an abomination to all honest tradesmen is the system of giving to customers' employees a PERCENTAGE on the amount paid for goods supplied. We are particular to specify "honest" tradesmen, because there is just now such a lack of morality amongst so many people who live by business, and who very materially subsist upon the weaknesses of those with whom they trade, that it is necessary to mention this proviso in discussing a question of so important and yet delicate a nature. The "honest" tradesman, when he sells certain articles to a customer, charges for them that which he believes will be to him a fair remuneration, and no more. He knows that their production has cost him so much money, or money's worth, and that it is necessary, to make his business a paying one, that his charges to his customers should be fairly proportionate to the actual prior cost of the article. Where the monetary account between a buyer and seller is a running one, or in other words one of long credit, it is but fair that the tradesman should make a small advance on his ready-money charges, that he might not be the loser in the end; and to this arrangement no buyer having credit should object. No honest tradesman will, in making out his list of prices, take into consideration the selfish interests of the go-between, who possibly will have the paying of the purchaser's bills at some future time, whether that go-between be the butler, gardener, coachman, bailiff, or major-domo,—is all the same, as any such demand for percentages on the amounts paid that are nearly sure to come from such quarters can only be met (if conceded to) either by the placing of an additional charge upon the goods supplied, or else out of the tradesman's own pocket, to his loss and detriment.

Now, in all branches of trade alike, but particularly in the horticultural department, there are to be found tradesmen who actually foster this abominable practice—ay, and will even outbid each other in the amount of percentage returned to gardeners under their customers, in the hope and expectation that it will lead to a continuance and even increase of their business connections. Our readers will understand that in thus denouncing a practice fraught with so much that is immoral and dishonest, we are not alluding to any special case, nor do we wish to lay the blame upon the gardeners. Our horticultural tradesmen, both in the nursery and seed trades, have connived at and fostered the system; they have taken pattern from the questionable doings of some members of other trades whose measures are short and bills long; and with the hope of attaching to their respective houses the custom and support of this or that nobleman or gentleman, have not scrupled to hold before the eyes of the gardener a promise of something payable besides thanks when the account is paid. The whole system is rotten, and needs a sharp and effectual reform. The honest man, whose soul abhors all such modern trickery, has left to him one of two alternatives: either to adopt himself the payment of percentages, and so hold his own, or by determined refusal divert all the gardener's influence to the side of some less scrupulous brother in trade.

There are some upright men to whom these remarks, of course, do not apply; but the exceptions are, we fear, few and far between. Gardeners, it must be remembered, are but mortal, and they are liable to the same desires and temptations that assail other men, and it would be altogether beyond the range of possibility to expect them not to fall victims to the temptation on seeing an opportunity of adding to their not usually too liberal salary. The practice arises materially from the credit system. If purchasers paid down ready cash themselves, instead of placing the amount in the hands of their gardeners to pay the account several months hence, the great temptation to uphold the percentage system on both sides would not exist; but if the credit is to be continued, as we presume it will be, for an indefinite period, then

the only remedy for the evil that can be seen is for gentlemen to pay their accounts in person, and so obviate the necessity of tradesmen's doing wrong by striving to purchase the continuation of patronage through the gardener's influence, and at the same time rid the unwilling tradesman of importunities to which he might otherwise be subjected. Did a really honest desire exist upon the part of the trade to abolish this system, no doubt it might soon be accomplished by an entire combination of all those who are under its influence. Whether actual sufferers or not, they should feel themselves bound earnestly and religiously to follow the rules and regulations of such combination. Will seedsmen, nurserymen, and gardeners move in this matter? Many that we know have felt the evil results of this system, and wish it to be removed. Is it not time that an influence was brought to bear, through the medium of the Press, or otherwise, upon all who live by the profession or trade of horticulture, so that it may at once free itself of a crying evil and raise itself from the taint of business immorality that threatens just now to contaminate all our commercial transactions?

WE HAVE to record several changes in the SUPERINTENDENCE of the PARKS, under the control of the Office of Works. The death of Mr. MANN created a vacancy in the department of Hyde Park and Kensington Gardens, which we are glad to learn will be filled by Mr. GIBSON, since it will afford him a new and more important field for the display of those artistic talents which have gained for Battersea Park the position of the first ornamental garden of the metropolis. Mr. ROGERS will replace Mr. GIBSON at Battersea Park, and if we may judge from what he has lately done at Berry Hill, we may hope to see no falling off in this most interesting garden. The Superintendence of Victoria Park falls to Mr. MACINTYRE, who is, we believe, an old Kew employee.

The following intelligence, received from M. NAUDIN, respecting the family of Count JAUBERT, a well-known botanist and formerly Minister of State under LOUIS PHILIPPE, will be read with horror. We can only hope there is some exaggeration in the details, though we have heard from other sources of the death of M. HIPOLYTE JAUBERT:—

"Your botanical readers are doubtless well acquainted with the name of Count JAUBERT, Member of the Institute, the Mécènes of French botanists, and himself an eminent savant, and known by his publications on the plants of the East; a man, moreover, loved by all who knew him. These circumstances will secure for him the sympathies of your botanists, when they learn the frightful misfortune which has befallen him. His son, a well-known country house near Lille, was killed by blows from the butt end under the eyes of his wife; and because he endeavoured to save the Prussians an unfortunate village priest whom they were about to shoot. His wife died from the shock and fright, but what is most horrible, is that their four little children, left alone in a country house from which every one had escaped, all died for starvation."

The latter part of the story is almost too horrible to be believed, but we may ask, if such things happened in the case of the wealthy, what must have been the fate of hundreds of families among the poorer classes? and how great are the claims of the survivors on our aid and good feeling?

The deputation appointed by a committee of the seed trade to wait on the Postmaster-General on the subject of the SAMPLE POST, had an interview with that gentleman on Friday last in conjunction with a similar deputation from the Manchester Home Trade Association. The deputation was a very large and influential one, and was accompanied by several members of Parliament. The injurious restrictions now in force were commented on, as also the impossibility of determining what is, or what is not a sample in the case of seeds. The establishment of a light parcels post, and sundry reforms in the rates for money orders, &c., were urged by the deputation on the attention of the Postmaster-General, who in reply informed the deputation for the information afforded him, that the deputation had not asked for, and that the requirements of the representatives of the members of Commerce would be met so far as practicable.

THE MAXIMUM TEMPERATURES of the air in England during the week ending February 25 ranged from 56° 2 at Nottingham to 52° at Newcastle, the mean of the highest recorded temperature at each station being 54° 5, or 0° 1 above the mean for the different stations in Scotland, where the extremes were 61° 7 (at Glasgow) and 51° (at Greenock). THE MINIMUM TEMPERATURES in England were much lower than those in Scotland, for while in the former recorded the lowest temperature in the latter was 32° (at Paisley), and at Edinburgh (the minimum temperature was 41°, followed by 40° at Glasgow and Greenock,—these being several degrees above the highest in England, viz., 35° 2 (at Liverpool): the mean for England was 31° 6, and for Scotland, 38°.

MEAN TEMPERATURES.—The mean temperatures in England were unusually uniform, the extreme range being only 2° 8, which was the difference between the minimum, 43° 1 (at Hull), and the maximum, 45° 9 (at Leeds). In Scotland the range was 5°, caused by the high mean temperature at Glasgow, viz., 48° 9, and 43° 9 at Paisley. Taking the means of the several stations in the two countries, it will be seen that Scotland was much warmer than England, the values being 46° and 44° 3 respectively. In the southern country the eight southern stations—including Nottingham—was 1° 1 colder than the eight northern, and the latter were 0° 8 colder than the eight Scottish towns. UNLIKE the falls of the two previous weeks, those of the week ending February 25 were none of them remarkable, the largest in England was 0.28 inch, and the mean for the whole country was 0.12 inch, and in Scotland, with a fall of 1.55 inch at Greenock, and 0.90 inch at Paisley, the mean for the country was raised to 0.54 inch. (See Mr. GLAISHER'S Tables in our present issue.)

At the meeting of the Royal Horticultural Society to be held on May 17, prizes will be offered by G. W. G. RICKETTS, Esq., for erect and drooping flowered Gloxinias, and also for Carnations. We are also requested to state that the prizes offered by the Society for six hardy Primroses will be competed for on April 5, and not on May 3, as announced in the schedule.

The roots of a plant, known in Borneo by the name of *Tuba* or *Toora*, are said to be very valuable in that country for the destruction of vermin on plants or animals. Some of the roots are thrown into water and allowed to stand a short time, after which the water is ready for use, the animals or plants being washed in it. Its effects are said, by Europeans who have used it in its native country, to be sure and instant, and while fatal to insect life it does not in the least degree injure either the plants or animals to which it is applied. The roots are used when fresh, and evidently lose their property in drying; for having received some in this last state, a strong decoction was made, and applied to some plants affected with vermin, without the slightest effect either upon the plants or the insects. That the roots, however, must be poisonous, is proved by the constant use the natives make of them for poisoning fish in streams or pools. The plant is said to be leguminous.

THE GRAND YORKSHIRE GALA FLORAL EXHIBITION is this year fixed to take place at York, on June 14, 15, and 16. This, as our occasional reports have shown, is one of the most attractive of the flower shows held out of London, the management being spirited, and the prizes good and well contested. We notice in the schedule, recently issued, that a prize of £15 is offered for the best and most attractive plant—a class generally well contested at York, £12 for 12 show Pelargoniums; £5 for six new and the plants; £12 for 15 Roses in 8-inch pots; £6 for 48 cut Roses; £5 for a collection of six varieties of fruits, &c. Something good ought to be shown in the above class for 15 Roses, there being four prizes of the respective value of £12, £8, £4, and £2 10s. Mr. B. S. WILKINS claims a prize of £5 to the exhibitor who contributes most to the embellishment of the show, by staging plants in accordance with the schedule. This is the thirteenth year of the show.

During the week ending February 25, paintings, sculpture, engravings and photography, architectural designs, tapestries, carpets, embroideries, designs for decorative manufactures and reproductions of nearly 2000 objects of pottery, specimens of woollens and worsteds and educational appliances, making in all a total of about 3500 objects, were delivered at the LONDON INTERNATIONAL EXHIBITION galleries. Foreign objects arrived from Belgium, the German Empire, Portugal, Russia, Spain, Hong Kong, and Tunis.

Our correspondent "W. T.," whose taste in the matter of floral decoration is unquestionably good, sends us, for the use of our late subscribers, the following remarks upon the adaptability and utility of ORCHIDS for the HAIR:—"It is now a common practice amongst ladies to fasten their hair with pins, upon the head of which is an imitation, in silver or gilt, of a butterfly with its wings expanded, the insect being placed upon a piece of fine wire twisted like a corkscrew, so that the least movement of the wearer causes the insect to oscillate in a more or less life-like manner. Now that the three largest species of *Phalaenopsis* are coming into bloom, I wish to suggest the use of single flowers of these lovely moth-like Orchids in a similar manner. They can be procured from florists in Covent Garden Market for a shilling a bloom; they are not at all difficult to mount on a hair-pin, and with care will last well for two or three evenings. Ladies who have worn them once are not likely to care about artificial butterflies while these Orchids can be had in their place."

In the copious and interesting history of the Library Companies, in the new "City Directory," published by Messrs. W. H. and L. COLLINGRIDGE, it is stated that the FRUITERS' COMPANY obtained its charter of incorporation from JAMES I. January 9, 1606. It was re-incorporated by JAMES II.

on June 12, 1686, "but this was in the next reign annulled." It appears to have been but few charities, and for any commercial or pomological purposes is doubtless as useless as if it were non-existent.

REV. M. J. BERKELEY, F.L.S.

THE initial letters, M. J. B., must be almost as familiar to the readers of the *Gardeners' Chronicle* as the title itself. For many years,—from the establishment of this journal up to the present time, Mr. Berkeley has been one of the most frequent, as he has been one of the most valued, of our contributors. His love of horticulture, his special knowledge of vegetable physiology and pathology, his unrivalled acquaintance with cryptogamic botany, and his large and singularly varied acquirements in most branches of natural history, have rendered him an invaluable member of our staff, the more so as his services have always been placed as freely at the disposal of the correspondents as of the Editors of the journal. While, then, the world of science in general owes its tribute of gratitude to Mr. Berkeley, the *Gardeners' Chronicle*, in particular, may well feel under a special obligation to him,—an obligation which we are pleased to have this opportunity of publicly acknowledging.

As a man of science, Mr. Berkeley began his career by the study of the Mollusca, but is best known for his researches among the so-called flowerless classes of plants, and specially the Fungi. British botanists may well be proud of one who has been described as "by far the most eminent living authority" in this department of knowledge. When Mr. Berkeley began his career, it was not so clearly seen as it is now, that if we would understand the complex physiology of the higher organisms, we must first study those of simpler construction. The enormous value of a knowledge of the mode of life of the cellular organisms, Algae and Fungi, was not so fully recognised as it is now; and hence we find that so late as 1857, in the preliminary observations attached to his *magnum opus*, the "Introduction to Cryptogamic Botany," Mr. Berkeley thought it necessary to make some remarks in vindication of the importance of the study of cryptogamic botany. If such a vindication were really necessary, we must not forget that the necessity was imposed by that still too numerous class of botanists who occupy themselves exclusively with the description and discrimination of species, confining their attention to mere outward form and appearance, passing by unheeded the laws and conditions by which those forms are regulated, and still more completely ignoring the relationship between the form of a plant or of a part of a plant, and the office it has to fulfil. What should we think of one who would pull apart sundry pieces of mechanism, ascertain their construction, measure them, describe them accurately, compare them one with the other, and there stop, without an attempt to ascertain either the principles upon which they were constructed, their mode of action, or the probable uses to which they were put? And yet something very like this was the practice of many so-called botanists, and one which tended to lower the science in the eyes of bystanders. These remarks, if true of botany in general, were of special application to cryptogamic botany, till such men as Berkeley, Tulane, Thuret, De Bary, Pringsheim, and others broke away from the wearisome mill-horse work of mere species or specimen describing; and vegetable physiology at once made so grand a stride forward that the term "cryptogamous" became in a great degree inappropriate, inasmuch as in certain groups, at least, of the flower-

less plants the process of fertilisation is more clearly made out than in the case of the so-called higher flowering plants. Nor have Mr. Berkeley's labours been confined to points of pure science; far from it. No man has done more to show demonstratively the enormous importance in a practical point of view of the study of the lower Cryptogams, and of their mode of growth. We need not now enter into the vexed question of the "germ" theory of disease in the human subject, beyond saying, that as yet the case is "not proven;" but when we come to look into the literature of such subjects as the causes of epidemic diseases in general, and the acknowledged parasitical affections of plants and animals, such as bunt in Wheat, the Vine Fungus, the Potato disease, the host of moulds that infest our plants, the muscardine of the silkworm, the fungoid forms accompanying certain skin diseases, then we find, first, how very important and often fatal a part these low organisations play, and next we learn how very large a share Mr. Berkeley has

course, often been had recourse to by our authorities in time of need; as, for instance, on the occasion of the outbreak of the Potato disease, when Drs. Lindley, Kane, and Playfair, appointed by the Government as a commission to inquire into the subject, were only too glad to avail themselves of Mr. Berkeley's invaluable assistance.

Besides the articles on Vegetable Pathology above alluded to, a series of admirable articles on the larger and more important Fungi, including both the edible and poisonous species, from Mr. Berkeley's pen, have also appeared in these pages; moreover, scientific literature, and the Transactions of the learned societies, are indebted to him for descriptions of many new Fungi.

Of Mr. Berkeley's services to the Royal Horticultural Society, as Botanical Director and Editor of its Journal, there is the less reason to speak, as our readers have, for the most part, ample opportunity of judging for themselves; suffice it to say that no better exemplification of the variety and extent of Mr. Berkeley's attainments can be had than in the manner in which he contrives to convey solid information *de omnibus rebus*, one might almost say, to the frequenters of the general meetings; while the increased fluency, the kindling eye, the animated manner, the smile-bewitched face instantly assumed when he has occasion to descant on Fungi, all indicate how thorough is his familiarity with them, and how dear to him is their study. Amongst Mr. Berkeley's publications on this subject, we may specially mention his "Outlines of British Fungology," in which a brief account, illustrated by coloured plates, is given of our native Fungi.

If we compare the position of a Continental man of science of the same status with that enjoyed by Mr. Berkeley, we shall find reason to be humiliated. It is not creditable to the University of Cambridge on which Mr. Berkeley confers so much lustre, nor to the church in which he has for so many years been a devoted labourer, latterly as Rector of Sibbertoft, near Market Harboro', that the value of Mr. Berkeley's services should so long have been suffered to pass without due recognition. More pleasant is it to record that of late years a Royal medal—the bestowal of which is the highest honour that the highest scientific body of the country has to grant—has been conferred on him by the Royal Society, and that other more substantial recognitions have of late fallen to his share. Mr. Berkeley is a Fellow of the Linnean and many other scientific societies of this country and the Continent, and till recently he held the office of Examiner in Botany in the University of London.

THE AMATEUR GARDENER.

Broccoli and Winter Greens.—This winter has been quite unique in our experience in regard to the destruction of the whole of the Brussels Sprouts in our garden, though it is surrounded by high walls, and otherwise protected from the most severe winds. We began the winter with about 400 strong and well-grown plants, consisting of the following kinds:—Brussels Sprouts, Savoys, common Cabbages somewhat advanced, and purple sprouting Broccoli, all of which we have found to stand the rigour of ordinary seasons. Of spring Broccoli we had the following:—Knight's Protecting, Chappell's Cream, and Grange White; of the latter there were but few plants, as they are not expected to live except in a mild winter. Of all these not one remains, except the Brussels Sprouts, and even these are so cut as to be of little use. This loss is the more remarkable because the crops were in various situations, some in the open compartments, but



REV. M. J. BERKELEY, F.L.S.

taken in accumulating and diffusing information on them, and how often he has, happily, been successful in devising means of arresting, preventing, and even curing their ravages.

Our own pages, and those of the Journal of the Horticultural Society, team with articles on these subjects, from the pen of Mr. Berkeley. A whole series of articles on Vegetable Pathology, extending over several of our volumes, attest the truth of our statements—a series of articles the more important as they constitute the only complete treatise on the subject in the English language. It is a matter of infinite regret that these articles were never collected and issued as a separate work. Foreign botanists of far inferior pretensions, and much less cautious in their scientific habits, have rushed into print with crude information and hastily formed speculations, which would hardly have seen the light had their authors had the opportunity of perusing the articles in question. Even the Catalogue of Memoirs recently published by the Royal Society omits all reference to this unique and most valuable set of articles; so that, save to comparatively few, their very existence is unknown.

The special knowledge of Mr. Berkeley has, of

others under the shelter of walls and with a southern aspect.

This catastrophe is felt by all of us to be a heavy blow and great discouragement, as we pride ourselves on having "greens" of some kind as the year round but it would be unjust to lay our lack to the blame of this wholesale disappointment of our hopes. We have known former winters equally severe without the great protection of such a covering of snow as we had here for nearly six weeks of the frost, and yet our losses were not equal to the present. We will tell our brother gardeners how this happened, so as to furnish to them the salutary warning for the future which we feel it to be to ourselves.

The fact is, that a succession of mild winters made us forget the mighty power which our recently mild friend Jack Frost is able to wield. Impunity begets carelessness, as men often find to their cost in the explosions of powder mills and coal mines. Some years back the protection of Broccoli for the winter was an important and necessary part of our gardening, which we confess to have altogether neglected during the past autumn. Every discreet gardener knows that he ought not to leave his Broccoli standing upright in the open air, but to dig up the plants, cutting inwards and sharp frosts during the winter months. Our former practice was to dig out a good spit of the soil on the northern side of every plant, to lay down the plant into the hole thus made, and return the soil upon it, so that the crown of the plant, the most sensitive part, was sufficiently protected, and the advancing heart kept from the injurious effects of the rays of the sun in bright frosty weather. Let our readers take care to do this in future, as we promise ourselves shall be the case, and, in most instances, the Broccoli will be preserved. But care should be taken not to injure the roots in this process of laying down, for, if that is done, the plants will be less able to resist the attacks of hard frosts. Growers of Broccoli for the early market, to whom time is money, take up the plants carefully, and lay them thickly together in trenches under south walls, and protect them with mats or straw. The heads are not so large when thus treated, but the want of bulk is amply compensated by security and an earlier crop.

Many ex-pedients will suggest themselves to those who value a succession of greens and Broccoli in the winter and spring. Some gardeners, slaves of neatness, take off all decaying leaves from Brussels Sprouts, whereas every one should be left on to hang over the young buttons. Early Cabbages with something of a heart are a great luxury, but a winter more often than not does them too much injury to allow them to become fit for the table. We have found an effectual remedy for this in placing branches of Fir and Laurel between the rows, after the plants have been earthed up as high as possible without letting the mould into the heart. As to Broccoli, a grand preservative against severe winters is a healthy development of the plants. Sowing should be early to secure this object, and we have just put the seeds for next year's crop into the ground with the protection of a frame. We may add that for young Cabbage plants, in the winter, it is better to keep them in the open air, and we intend to make up for our losses in some degree by getting a hundred or two more put in and drawing them young. We can thus tide over the interval until the Asparagus season. *H. B.*

THE GARDENERS OF FRANCE.

I AM glad that something special is about to be done for our brethren of the spade across the Channel. War cripples other industries—it ruins horticulture; it drains its springs dry at their source. The very rumours of war are fatal to gardening pursuits. Being mostly a luxury, it is the first thing given up, and the last resumed when the curse of war has passed away. And during war, horticulture is literally trodden under foot. Who can forget the vivid word-painting that we have had by correspondents of the beautiful villas and châteaux of Paris, and in other parts of France, battered, smashed into confused masses of ruins; with heartbroken, bewildered proprietors trying to find the whereabouts of their once happy homes by the landmark of some favourite tree or conservatory now riddled with shot or wrecked by shell. And beneath this low depth of suffering there is a lower depth still, which the correspondents, as far as I remember, have not in any case tried to fathom: that is, the state of the tenderer to whom these gardens were happily returned to bread. The very place of their labours has passed away amid the grim havoc of war. Gardens public and private, commercial and market, are destroyed by the thousand, and those who dressed and kept them are idle and starving. The establishment of peace will bring work or bread to others; but it will take months, it may be years, to restore the ruined industry of gardeners. True there will be demands for vegetables and fruit, and market gardeners may speedily return; but nurserymen, florists, and private gardeners will continue to suffer, no one can say how long. For years France must be short of capital, and money is the sinews of gardening. The terrible struggle has been most exhaustive. The requisitions and indemnity will still further impoverish the nation. This poverty will starve gardening as effectively as war has

wrecked the Jardin des Plantes, the Bois de Boulogne, and other beautiful scenes happily photographed for us when in their glory in M. Alphonse's "Promenades de Paris," and to some extent in Mr. Robinson's "Parks, Gardens, and Promenades of Paris."

There may even be other trials in store for the gardeners of France. It is to be hoped they may be spared the further suffering arising from an unstable government or civil commotion among themselves. But the mere risk of such contingencies will hinder the revival of gardening, and should prompt us to come to their assistance in a true spirit of fraternity—and the liberality of brothers in adversity. If motives are needed to free generosity, surely more than enough may be found in the past misdeeds, present state, and future prospects of the gardeners of France—commercial and others. All the gardeners of Great Britain and Ireland should hasten to their succour, and give help as gardeners. This, I think, would give a peculiar value to the gifts bestowed. That simple inscription on the first consignment of provisions for famished Paris was more pathetic than the highest outburst of eloquence—I confess it brought tears to my eyes when I read the story of the city of the starving. This message of love and good-will and help will do more to knit the hearts of the two nations together than all the efforts of diplomacy. Let us imitate this perfect example, and send our offering from the gardeners of Britain to the gardeners of France.

Then comes the question of what shall we send. Briefly, money, cuttings, seeds, plants. As far as private gardeners are concerned, their contributions must chiefly be in money, and their chief object will naturally be to line the pockets of the State. But "Many littles make a mickle," and if all resolve to give something, an amount will be raised that will astonish the donors, and succour many thousands of those who are most needed. I trust no one will be ashamed to give a shilling. The moral effect of our gifts will be as much influenced by the numbers who subscribe, as by the amount given. Every gardener should resolve to have a share in the good work. All can sympathise with them as gardeners, and have nothing to object to as Frenchmen. We have nothing to do with the origin or conduct of the war. Be it ours to dry some of the tears it has caused to flow as a river, to give sympathy and help to our suffering brother gardeners, and thus cement union and promote good will between two neighbouring nations.

Many private gardeners, with the consent of their employers, will likewise send cuttings, seeds, and spare plants. But this would be chiefly the province of our nurserymen, seedsmen, and florists; their contributions might be given in kind, and part of the money of private growers could be expended upon purchasing goods at trade prices for distribution in France.

But private gardeners will need assistance in money, plants or seeds are of no use to those out of situations. They are starving for bread, without work, homes, money. The work of relieving such is one of great difficulty. It can only be done by Frenchmen or Englishmen thoroughly conversant with France. Where it should be left to some of the committees already in existence, or a special committee should be formed, I must leave to others to decide; but our relief should be distributed only to gardeners. It is, or ought to be, a special effort for a special class—to horticulturists and their friends. It is one of those good works in which, I trust, every employer of gardeners will gladly take part—for are not many of them also gardeners of the highest class?

It occurs to me to suggest that we have in our horticultural societies organisations ready formed, that might undertake to collect money and funds for this object. They almost cover the country horticulturally, and this work would be quite legitimate business for them. It would be impossible, perhaps, for them to use their influence to better account for the advancement of horticulture than in succouring its votaries in a neighbouring nation, who have been stricken to the earth by the scourge of war. *D. T. Fish, Feb. 27.* [See announcements in another column. Eds.]

Home Correspondence.

Button-holes for the Boat-race.—If I were asked to name two flowers which would make choice little bouquets for the coat at the coming contest for the Blue Riband of the Thames, I should pick *Scilla bifolia* for "Dark Blue," and *Scilla sibirica* for "Light Blue," the former to be made up with fronds of *Adiantum Capillus-Veneris*, the latter with *Adiantum cuneatum*. In the event of these flowers not being obtainable, the following list may be culled from—Oxford colours—Russet and other Violets, Crocus, Hyacinth, Cineraria, *Muscari racemosum*, Cambridge colours—Neapolitan Violets, *Muscari botryoides*, Cineraria, Hyacinth, and (if there be no wind to blaise it) *Eranthemum pulchellum*. Of the last, racing folk may report that "it won't stay," but the colour is undeniable. *W. T.*

Sweet Lemons.—In answer to your note to my observations on the Sweet Lemon, allow me to add a few lines to complete the description? In the specimen of Sweet Lemon I mentioned, at p. 237 of your paper, as peculiar from having two of the carpels pale-

coloured and sour, whilst the remainder of the fruit was orange-coloured and sweet-flavoured, the variation in colour was entirely confined to the inside of the fruit. Externally, the rind appeared of similar colour and texture over the whole surface, not varying in any way over the (internally) variously-coloured carpels nor differing, save perhaps in being a little paler in tint, from the other specimens of Sweet Lemon sent at the same time. *E. A. O.* [A very interesting case, on which we may have occasion to comment at another time. Eds.]

French Horticulturists' Relief Fund.—Like Mr. William Paul, I shall be happy to subscribe £10 10s. towards a fund for the relief of French horticulturists; and I cannot help repeating the suggestion, which I made in your columns last week, that perhaps a branch might be added to Lord Vernon's committee to organise this relief. Mr. Paul also corroborates my opinion that the small market-gardeners were those who were likely to suffer most. The larger firms will, I hope, in time recover. The inhabitants of Paris would feel very keenly any continued scarcity of flowers, fruit, and vegetables, which they use in great abundance. I am sure if we could assist in enabling the markets to be again well supplied, we should not only help the producer in his hour of distress, but gain the gratitude of many more, from the grisette who decorates her garret window with a pot of flowers, to the family whose health depends on their fresh vegetables. *Grimsley, Admiralty, St. Katherine's Lodge, Regent's Park, Feb. 28.*

The Exhibition at Nottingham.—I am anxious to learn, as I doubt not do others, are if the committee of the Royal Horticultural Society intend making any alterations in their arrangements with regard to the fruit that may be exhibited at the Nottingham show this season. Is the fruit to remain till the last day of the exhibition, or will there be any indulgence granted, in the way of allowing the fruit to be removed before it wastes? Two or three days is as long as fruit will stand in the middle of summer, to be at all presentable afterwards. I sent 20 dishes of fruit of Scotch soil, and the exhibitor in 1866, which included 20 lb. weight of Pine-apples, 16 lb. of Melons, about 20 lb. of Grapes, 3 dozen Peaches and Nectarines, Figs, Cherries, Strawberries, &c. On the last day of the exhibition, I could only dispose of the Pines at one-fifth of the price I could have procured for them had they been in the same condition they were when first staged. The Grapes were quite unrepresentable, either for the market or home use. Many of the berries had been picked off, and two bunches of Black Hamburgs were stripped completely of every berry. Many of the Peaches had also disappeared, which did not matter much, as the only things worth removing were the Pines and what remained of the Grapes; all the other fruit was useless. The result was the same at Oxford last summer. I could only dispose of the Pines and Grapes for a mere trifle. Melons, Peaches, and other things were rotten. I am not grumbling about the mere money value of the fruit, for we prefer bringing in home produce to anything else. I simply make these statements to show the sacrifice that must be taken into account at intending exhibitors. I would willingly be an exhibitor at the forthcoming exhibition, but I am not likely to be if the arrangements are the same as formerly. I would gladly have handed my fruit over to the Society as a contribution to the dessert at the horticultural dinner, rather than it should have been wasted. I should then at least have had the gratification of thinking that it had been eaten, and probably appreciated. *An Exhibitor.*

Hardy Broccoli.—Before the time comes for sowing Broccoli and other vegetables supposed to be hardy, I propose to make a selection of the most reliable, and to give the comparative hardness of the different varieties, with a view to diminishing the number of names in the catalogues. I have only grown three varieties this season for late use, viz., Dalmeny May, Carter's Champion, and Improved Wilcox. Of Dalmeny May a few are saved so far, of Carter's Champion a less number, and of Improved Wilcox none at all, the conditions being about equal. The earlier varieties, I do not state, as we could not expect to save them without protection through the very severe weather we have had. I should be thankful to learn the name of any variety of Broccoli that has stood better than Dalmeny May, and where it may be seen at the present time. *Wm. Taylor, Longlatton, Warrminster.*

Carter's Prizes for Vegetables.—As you have made some allusion to this question, at p. 199, permit us to make a few observations in reply. We grant freely that you may construe our offer in the light of an advertisement, because we are seed growers and get our living by selling seeds; at the same time, we would say that our motive is not wholly made up of selfish motives, and that our primary object was the desire to advance an important branch of horticulture, which up to the present time has been very inadequately represented at the shows of the Royal Horticultural Society. We are aware that in making out the schedule, we included many varieties originated or sent out by ourselves; at the same time, with one or two exceptions, these articles are in the hands of persons of the trade besides ourselves, therefore, by specifying

particular sorts, we have created no monopoly, although to the uninitiated it might appear as if we had. We yield to no one in liking more truly the interests of horticulture at heart, and we look forward with considerable interest to the success of this idea, which cannot altogether be claimed as original on our part, as the *Gardeners' Chronicle* has been in the habit of offering a very handsome prize for vegetables and fruit annually through the Royal Horticultural Society, and we presume the proprietors are actuated by the same motives for the advancement of horticulture as we are. Should there be a spirited competition for the prizes by gentlemen's gardeners, thus producing an exhibition worthy of the Royal Horticultural Society, as we fully anticipate, we shall be prepared, if we are permitted, to largely increase the value of our prize list in future seasons. *James Carter, Dunnett St. Boile.*

Crocus Imperatorius.—I can fully endorse Mr. Barr's statement (p. 203) as to the identity of *Crocus Imperator* of Tenore—[not *Imperatorius* (see follow Herbert)], as this plant was in flower in my garden on February 4, having shown its flower-buds during the intense frosts of January. Can you tell me if this species has been figured? Steudel gives as a synonym *C. recurvus* of the gardens, but this latter name is as unfamiliar to me as Tenore's name of *C. Imperator*. A description of this species will no doubt be found in Tenore's "*Flora di Napoli*," but I have no means of access to this expensive work. I am indebted to the kindness of Major T. Clarke for the specimens which I possess. *Giles Munby, Alice Holt Forest, Hants.* [*C. Imperatorius* or *C. Imperator* is figured in Bot. Mag. t. 3871, and in Bot. Reg. t. 1993. Eds.]

Raising Vines from Eyes.—In the *Gardeners' Chronicle* of Feb. 18, your correspondent, "A. D.," after expressing the pleasure he derived from reading Mr. Simpson's very sensible article on the above subject, adds, "Significantly enough, a great Vine authority from beyond the Tweed has just recently put forth the system that Mr. Simpson has had in operation so long, as one of his own origination, having tried it one season." Now the readers of the *Journal of Horticulture*, and some of the other magazines, must know perfectly well that I am the person who loosely composed passage is aimed at. They will also have observed that the system I set forth as mine, had nothing in common with that adopted by Mr. Simpson, except the accident that we both grew the plants on turf; he carefully preserving the points of the roots, I cutting them off, root-pruning them, this leading to the formation of a host of young, active, though small roots, which, when planted in the border, ramified themselves in it more like a Beech or Box tree than a Vine grown in the ordinary way does, and I submit that the sample of the wood I enclose [almost as solid as Oak. Eds.] is sufficient proof to any unprejudiced mind capable of judging such a subject, that it was no way necessary to wait for years to be able to pronounce on a system which has produced such results. The root-pruning of Vines, the first year of their growth was the system I set forth as new. Their growth on turf I could not set forth as new, seeing I had done this in the first edition of my work on the Vine—not however from eyes; they were one year old plants cut back, and their roots spread out on sheets of turf, and started, previous to their being permanently planted. Of this Mr. Simpson had cognisance, for I think he was here at the time I practised the system. "A. D." should take a trip of the parish he has been born in, and become tired of something more of a cosmopolitan, and get rid of the wretched provincialism that would save or ban a discovery either in art or science because of its geographical origin, than which I can conceive of nothing more contemptible. *W. Thomson, Dalkeith Park, Feb. 24.*

The Liverpool Horticultural Society.—Looking over the rules and regulations of our next Hyacinth show, I find in Rule 5, that "all exhibitors remaining in the hall after 11 o'clock will be disqualified." I think the exhibitors ought to be forced to obey the above rule—not only one or two of them, but all of them. There are three or four exhibitors (committee men) who remain in the hall during the time the judges are at work, which, I think, ought not to be allowed. If Mr. Ker will in future strictly enforce this rule, he will greatly oblige me and many others around Liverpool. *An Amateur.*

Conservatory Glazing, &c.—Having last year erected a large house on the span-roof principle, with lantern at top, I was much concerned to notice last autumn that many of the panes of glass had slipped, the putty having given way. The next high wind that blew, so displaced these panes that some of them slipped down to the gutter. I wrote to the architect who had planned the house, and he sent down the London builder who had erected it, and the panes were restored, but the architect and builder attributing the cause to the exposed situation, I suppose they restored the putty, but throughout this very cold winter I have had the constant annoyance of first one pane slipping and then others, and with the greatest difficulty I have succeeded in saving my bedding plants. They now lie in the slipped panes with strips of lead, saying, the great heat of last summer prevented the putty setting, but still other panes continue to slip, and

at each restoration there is a great breakage of glass, and each pane costs 7s. Can any of your readers tell me what is the course usually adopted (besides putty) to secure such panes? *T. N. M.*

Gardener's Cottage at Rendlesham Hall.—I send you herewith plans (figs. 58, 59) of the head gardener's house at Rendlesham Hall, near Woodbridge, Suffolk; together with a slight sketch of the elevation (fig. 57). It is a plain brick building

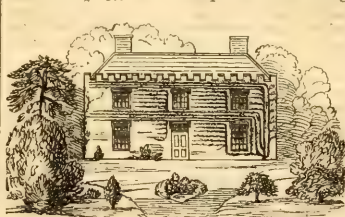


FIG. 57.—VIEW OF COTTAGE AT RENDLESHAM HALL.

with battlemented parapet, surrounded by shrubberies, and built upon the site of the old mansion, which was burned down 40 years ago. It has plenty of cellar room underneath, and is fitted up with

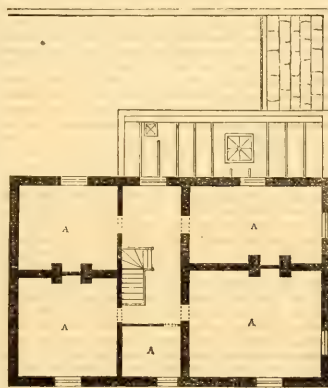


FIG. 58.—BEDROOM-FLOOR PLAN.

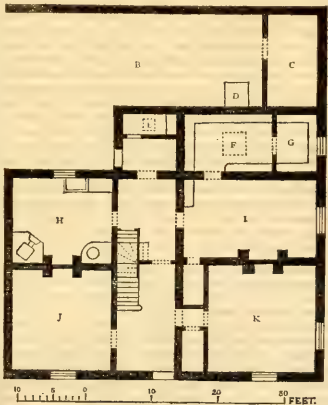


FIG. 59.—GROUND-FLOOR PLAN.

References to Plans: A, A, bedrooms; B, yard; C, coals; D, to cellar; E, W.C.; F, pantry; G, larder; H, scullery; I, kitchen; J, parlour; K, dining-room.

both water and gas. The ground-floor rooms are 9 feet 6 inches high, and the bedrooms 9 feet. It is occupied by Mr. W. Allan, who has been head gardener here for many years. *W. T. T.*

The Winter in the Channel Islands.—One of the greatest advantages to be derived from the climate of these islands has always been held to be a comparative immunity from loss among plants in greenhouses, in which they are nearly all stored. These structures have, of late years, immensely increased; they are generally built solidly to resist the wintry gales, and

are thus less liable to cool down than fragile span-roofed houses. To lose, therefore, any appreciable amount of plants is rare, but the present winter has been exceptionally severe, and our losses resemble those of England. From what I gather, about 1/4 of our stock was felt, while snow lay for weeks more than a foot in thickness. The Potatoes planted in my own orchard-houses are nearly all destroyed, while Cabbages, Broccoli, and Kale in the open gardens have been much injured. The export of Broccoli and of early Potatoes has of late been greatly developed, but seasons like the present are a serious check. In this emergency, nearly simultaneously with myself, many persons here, and leading nurserymen also in Jersey, have turned their attention to some cheap artificial protection, and this we hope to find in such things as Mr. Rendle's ingenious protectors, a large cargo of which arrived here this week. I mention this fact as being a rather rare occurrence in these favoured islands, and it clearly shows that so great is the present competition in trade, that it is hopeless now to expect success without the assistance of every mechanical contrivance in our power. Mr. Rivers often said to me that ground vineries would be remunerative in these islands; and no doubt he is quite right. These protectors seem to me to be admirably adapted to resist high winds, and to forward the early crops, and I am going to try to grow Maize by their assistance, as, according to Mr. A. Corsyth, Maize transplants badly. I have not found this to be the case; still, it would be well for intending growers of Maize this season to try some such method, which, at any rate, would much hasten the growth of this plant. As Maize is now sold by some of the leading London houses, and is becoming much in request, should any uncertainty as to its culture occur, I shall be glad to advise. Having introduced the plants, a certain responsibility is incurred which must not be shunned. I am going to sow some seeds shortly in the open ground under Mr. Rendle's protectors, being much in advance of my usual practice, and shall report the result. *T. C. Brehaut, Richmond House, Guernsey.*

Boilers and the Frost.—I have a conservatory attached to my library, containing at one end, where the boiler is, a good many stove plants, at the other end Camellias, Epacris, &c. The house is 100 feet in length, 27 feet in width, and 18 feet high. I have one of Mr. Meiklejohn's patent cruciform or webbed boilers, No. 1, which does its work capitally. There are about 800 feet of 4-inch pipes, and all through this most severe winter, the thermometer going down to 20° Réaumur (about 10° below zero Fahr. !). It has been a pleasure to see this boiler working: never longer than 11 o'clock in the evening had I the fire going, the temperature of the house being 7° to 8° R. (about 50 Fahr.), and in the morning I had still 4° to 5° R. (about 45° Fahr.), which by-the-by is quite sufficient for a great many stove plants which every one cultivates in hothouses—*Theophrasta imperialis*, *Franciscas*, *Imantophyllum*, *Stephanotis*, &c. The boiler consumes little fuel, and is the best that I know. It is guaranteed by Mr. Meiklejohn to heat 2000 feet of 4-inch pipe, and I have no doubt but that it will do it. *John Booth, Filditch, near Hamburgh.*

Ice Houses.—The ice house in use here is quite a temporary affair; the walls consist of a framework of wood, to which 1 foot thickness of straw is sewn firmly on. It is half-sunk in the ground, provided with good drainage, and perfectly shaded by trees from the summer sun, being situated on the north side of a wood. Ventilation is not necessary, the walls being sufficiently porous to allow any damp air that might accumulate to escape. As the ice is being stored, I think it of great importance to line all round the inside walls with a good thickness of clean dry straw, also to put 2 or 3 feet thickness on the top of the ice. The house above described answers the purpose better than any house I have ever known, and never fails to supply the establishment with ice in abundance. *Robert Sowerby, Gr. to Sir George O. Wombwell, Bart., Newburgh Park, Easingwold, Yorkshire.*

Visitors to Nottingham.—A few short months will bring to us the Royal Horticultural Society's show at Nottingham, and from the interest already shown no doubt there will be a great gathering of my horticultural brethren from all parts of the kingdom, as its central position, as regards railways and otherwise, added to the well-known spirit of the Nottingham folks themselves, will almost surely make it a most successful meeting. Almost 20 years ago, when living in a neighbouring county, came to see the show at the flower show, then held in the Arboretum, and I have a lively recollection of the splendid things I saw staged there, as also in the county town of Derby. Finer or better grown fruits, plants or vegetables, I do not remember to have seen exhibited anywhere, not excepting London itself. It is a rich horticultural district, rich in some of the first places in the gardening world, rich in number and quality of plants at resident gentry, and rich in everything that is needed to constitute a most successful show. To this classic ground I intend, if all be well, to repair the last week in June next, in the anticipation of gaining much instruction and deriving some pleasure. As gardeners have so few opportunities of meeting as a body, I am very anxious to make the most of a long and expen-

sive journey, to renew old acquaintance and to perchance make new ones—to see and hold converse with as many of my compereers as possible, and to return to my somewhat isolated place in Ireland all the better pleased for having done so. I would suggest, then, to the authorities at Nottingham, the desirability of securing a room, in which, when the gardeners can no longer spend their spare time and enjoy each other's society before they again separate and return to their homes and their isolation. Of course, I do not know how far the hospitality of the town, as mentioned in last week's *Gardeners' Chronicle*, will extend,—whether it will be upon a broad basis or be for only the favoured few; but this much I should like, that some recognised centre should be fixed on, where real members of the craft could meet for social intercourse, and as the good effect of fraternal feeling. *Kalmia*. [This has been the great want on previous occasions, and one which will, we hope, be supplied in future. Eds.]

Cool Treatment of Orchids.—The very practical argument adduced by Mr. Anderson (p. 171) in supporting the cool treatment of Orchids—a theory which he has always been a most firm but temperate and consistent advocate,—must carry with it a powerful degree of conviction to all cultivators who are willing to profit by the experience of their co-workers, and is a thorough proof that the high temperature maintained by many growers in the management of this highly prized family, although frequently successful, will be considered a blunder, when the instance recorded in the following correspondence “G. H.” (p. 76), need not be considered an essential item in their requirements. The advocates of cool treatment have had many difficulties to contend with in their efforts to disseminate and secure the extension of the principle embodied in their practice, and if in some instances extreme notions have brought their punishment on those who have unwisely carried the system to an injurious extreme, that influence cannot be held in any way to affect the principle itself. Many Orchids will not only live but flourish more luxuriantly in the temperate heat now allowed them, than in the stifling atmosphere and high temperature to which in former times they were subjected. May I be allowed to ask “G. H.” whether he has tried the cool system, as recommended and practised by its supporters? If he has not, and I do not remember ever having read that he has, is it not possible that with the amount of care and attention he evidently bestows on his pets, his efforts might in their results have adopted it? Surely he can have no objection to give it a fair trial before bestowing on it his unqualified condemnation; and if he does, I am sure he will become as warm a supporter of the cool system as he is at present its determined opponent. I can hardly see the weight of the argument embodied in the temperatures he gives of the different localities from which Orchids are received, as certainly it provides a basis for guidance, but does not in itself prove daily in abundance of instances that might be quoted (notably in that of the Vine, which is never subjected in our forcing-houses to the intensity of the heat of its native habitats, and yet the quality of the growth and of the products are incomparable), that many plants grow to greater perfection under cultivation, and in more moderate temperature than that of their native land, than they have ever yet been known to attain in their native soil. It has been found possible to plant cultivation to improve upon Nature, that it must be folly to follow too rigidly in her footsteps, unless where experience has proved it to be the most successful course; but in this case we have not only the reiterated opinion of our most eminent men, but we have the signal success of their practice to show us that in many instances we can do better by studying the requirements of the plants for ourselves than by too literally following the guidance of Nature, which is no doubt it will be a difficult matter to convince those who have not the means of personally witnessing the results of the mode of treatment under discussion. Could they do so, I have no doubt they would become willing converts to the views advanced in its favour. I believe it is to the discussion elicited by the mention of Mr. Salt's *Dendrobium Falconeri* that we are, in the first instance, indebted for the interesting communication of “G. H.” and I am sure that the same will be true of many others. I saw a short time ago, not one, but two, but over a hundred fine young bulbs of *Odontoglossum Alexandre* (Bluntii), all in the most perfect health, with the fat plump bulbs and glossy green unspotted foliage, which gladden the heart of the true plant worshipper, besides many other fine specimens of cool Orchids, in a house where the minimum temperature during the late severe weather would average from 45° to 45°.

Leaf-soil.—I am glad to see that Mr. Pearson speaks out so plainly as to the use and merits of the Belgian leaf-mould. A year or two ago my present employer engaged an Orchid grower from a celebrated Orchid growing establishment on the Continent, and by him was induced to send an order for peat to a

party in Belgium; but, as Mr. Pearson observes, the Belgians being in all possibility themselves short of that article, returned, instead, a quantity of rich, black leaf-mould. This soil has since been used with the greatest success for a great variety of plants, as *Camellia*, *Hydrangea*, *Heath*, *Azalea*, *Geraniums*, *Camellias*, and, more especially, for *Caladiums*, *Alocasias*, *Anthuriums*, and other soft-wooded plants. The leaves in this instance were thoroughly decomposed, and evidently rotten sticks, roots, and such-like rubbish, had been removed by sifting. The thrifty Belgians are certainly much more particular in the preparation of this useful article than we ourselves. *F. W. B.*

Forcing the Fig.—My Fig tree was now showing for a good crop of fruit. It is now six years since I planted the house, the trees being then of a good size, which enabled us to have fruit soon, and in quantity. The sorts are the *White*, *Marcelle*, *Black*, *Brown Turkey*, *Brunswick*, *Castle Kennedy*, &c. The *Brown Turkey* bears more freely with me than any of the others; it keeps on fruiting the longest, and if not pinched too close at the latter part of the season, it is the first to fruit again. By looking at our garden book, I find that this house has kept the dessert going regularly from April to November, and on two occasions I have gathered them in December; but it is not often profitable to keep the same trees fruiting so late, as it sometimes is the cause of the first crop being longer in coming to maturity in the following season. When the trees are allowed to go to rest and the leaves fall off, all the green fruit above the size of Peas are picked off. The house is a lean-to, one lot of trees being planted against the back wall, their roots being confined in a narrow border with a brick wall and a concrete bottom, with an opening or two for drainage. The front part of the house is furnished with trees in pots, planted in the border in two rows, one row in 12-inch pots, the rest the front glass, and the other row in large-sized pots along the middle of the house, and this has answered every purpose in the way of fruitfulness. As to pruning and pinching, I adopt both systems, but at different seasons. Those trees on the back wall I generally thin or cut well back during their resting season; by adopting this system for the trees on the back wall I secure a better successional crop, in a great measure at the sacrifice of the first crop.

Those trees pinched in the summer, I give the first crop for my first crop of Figs, simply by pinching and stopping the leading shoots according to their strength, say every four or five inches, or just as [they require it, during the summer months, thinning out with the knife all thin and weakly shoots, to admit the full influence of light amongst the fruit and leaves, and likewise thinning the fruit at times when they come in clusters. During the resting season, all old top-dressings are cleared away, and the new ones are put in, cutting back all the roots which come in the way. The pots have never been lifted since they were first plunged six years ago, and I have given them the same yearly clearing away of old soil, and top-dressed them afresh any time during their resting period, with a good mixture of strong loam and well-rotted cow or sheep-dung, say half-and-half of each, filling the pots well with the compost, and making it tight by ramming down the sides. I give the fresh soil round the outside of each pot, to hold the top-dressing given in summer, and which is principally composed of fresh sheep droppings. The spaces between the pots are well mulched with the loam and cowdung, and during the growing season fresh roots are soon seen ramifying amongst the rich top-dressings, which give size to the fruit and health and vigour to the trees and foliage. Frequent applications of tepid water from the syringe throughout their whole growing season will keep the roots and free from any spore. Copious supplies of chilled liquid water will assist in the swelling of the fruit, and prevents it from dropping off. *J. Miller, Workshop Manor.*

Horticultural Boilers.—That was an important paper on this subject by Mr. Baines (printed at p. 235). I have said on this subject before, of form, size, or setting of boilers, most of us will heartily subscribe to his three tests, of efficiency, durability, and cost, as the vital ones wherewith to determine the merits of all. These three tests, again, are reducible to one, cost,—of first purchase, of fuel, and of labour. Of course it is presumed that the boiler will do its work; otherwise it is a sheer waste of money from first to last. The matter, then, is reduced to all that is required of a boiler with least, or more expense. Anything that will keep water without boiling over, and has a flow and return pipe attached to it, will heat so much pipe with a certain consumption of fuel. Still, the constructors of boilers have proceeded from the beginning on the assumption that certain forms extract more heat out of the coal with less water than others. Your correspondent, for instance, claims the economy for the flueless boiler, and the good form, but it means prepared to affirm that it is the best. Possibly the best form is yet a desideratum. Twenty years ago I could have dogmatized upon the matter, but unfortunately a wider experience has not confirmed my faith, but set me adrift on the troubled sea of speculation about the relative heating merits of flames or currents of caloric—vertical, horizontal, angular, curvilinear, &c. The questions are, or

seem to me to be, at what angle should the caloric hit the boiler to leave most of its heat in the metal, or rather in the water that it holds? Again, what velocity of strokes, angles—how to open it, is most penetrating? That the fierceness of the fire, or, in other words, the violence with which it hits the metal, affects its penetrating force, few, I suppose, will doubt. Possibly I may be safe in affirming, that the greater the velocity of the caloric the more penetrating it is; just as express speed overcomes the dead weight of the train with more ease than the speed of the parliamentary. Presuming that the actual dragging force is equal in both cases, the fire would stop at the latter would not arrest the former. It may be the same with slow combustion. My own experience is, that it is the most extravagant mode of consuming fuel. The fire lacks penetrating force, and a great portion of the heat generated does not reach beyond the boiler itself. Much of it never reaches the water. But caloric in rapid flight and in a state of glowing energy is very difficult to deal with. It is sure to be off at once; and here we meet with the greatest practical difficulty in heating a fixed body like a boiler. Having developed a great heating power we wish to utilise it to the utmost before we let it go. We are not anxious to heat the world in general with our hothouse fires, but these glasshouses only. The problem given is the development of the greatest amount of heating power from a given quantity of fuel, and its complete exhaustion upon the substance of the boiler before it escapes. Hence all the systems of checks—twistings, turners, angles—that have been devised. These are simple traps to catch caloric before it reaches the other world. The worst of it is, that like all other traps they fetter freedom of action; the captive, struggling to be free, becomes exhausted—the very thing we want. As Mr. Baines explains about his flued saddle boiler, the pit got little heat after the fuel boiler was used. It is of course assumed that what the pit lost the boiler gained. But this is not the case. The boiler, if it is to be a good boiler, must be energetic, and if so, less penetrating. Energetic combustion without loss into the open air is the great desideratum needed to ensure economical heating. Many of our checks so much insisted on simply save fragments of caloric at the extremities while robbing the heart—the fire—of its heating force. That boiler that keeps the heart glowing, while husbanding the fragments, ought to be the most economical. I have said that the whole matter turns on cost. The price of the boiler is, however, the least important factor in that term. This is a great deal too much thought of. A good boiler is cheap at any price, a bad one is worse than money borrowed at 200 per cent. interest. The cost of labour and fuel are the vital elements of expense. These are constant, and every reduction of either tells every day for ever after, hence all real improvements in heating centre round these two items, labour and fuel. The first has been less considered, and the second, I am glad to see Mr. Baines give it due prominence. The waste of labour on bad boilers by day, and the waste of sleep by night, and consequently of working power next day, is something fearful. A good boiler ought to be capable of doing its work for ten hours at a stretch unattended, under ordinary circumstances. The fuel question has been more studied, but it is yet far from solved. We are a nation of fuel wasters, and even horticulturists are not yet learned the simple art of conserving their own heat, nor of getting all the heat out of their fuel. Most of our boilers are like a team of three horses, tandem fashion, with a bungling whip on the box. Very often only one of the three horses is drawing, the other two are either idle, or all over the road, hindering the other one. I fear that even with our best three-teamed boilers one horse at least is always idle. We need the whip as well as the curb; by using the latter only—check fuel, damper—how we drag the whole team to the haunches. This must be carefully guarded against. But how? Well, chiefly by regulating the admission of air and the escape of heat, that is, by striking a balance in favour of heating force between draughts and dampers. The larger the surface of the boiler exposed to the fire, so regulated, the more heat will be got out of the fuel. Most of the more recent improvements in boilers have proceeded on this assumption. The entire surface outside and in, as far as possible, has been exposed to the fire. A perfect torrent of flame has been swept through and coiled around the sinuosities of the multi-tubular boiler. In others, curved lines have been traced for the fire. In all the fire has been brought to bear against it at every available point. Gardeners as well as boiler-makers have turned their attention to this point. Mr. Thompson has erected a boiler of his own construction at the Great Vineyard, and Mr. Monro invents the cannon boiler. Many other gardeners have lent me plans and suggestions at various times, and I saw what seemed to be a good useful boiler at Ely last year, the invention of Mr. Grix, the clever grower of orchard-house fruit, and gardener to E. Harlock, Esq. Possibly it may be worth the attention of some of our horticultural engineers. At present, I believe, it is only used by Mr. Grix. He considers it more economical than the flue boiler, only burning about half as much coal as the best. Through the kindness of Mr. Grix I am enabled to

present your readers with a sketch or two, which will pretty well speak for themselves. Fig. 60 is a section, showing furnace, flue, boiler, brick setting, and ash pit; the inner ring shows the water, which has the fire inside it, with a flue running all round outside, with brick divisions, checking and guarding the current of the flame. It will thus be seen that the furnace is surrounded with a water jacket, while the latter is again enveloped in a coat of fire. The water, which is only about 3 inches thick, has thus a hot time of it. Fig. 61 is an end elevation, and Fig. 62 a longitudinal section of this boiler and furnace, 1, as already stated, is the brick division in the flue; 2, furnace bars; 3, furnace doors; 4, ash pit; 5, entrance to flue from furnace; 6, flow; and 7, return pipe. A very simple arrangement. These boilers are small, as I understand Mr. Grix—only some 18 inches wide, and 25 high inside; and he calculates, I think, that such a boiler would heat 1000 feet of pipe, to maintain forcing temperature in an early vinery, with the consumption of a chaldron of coke a week. At the present time the house has two large divisions of the large vinery, and orchard-house and pit—nearly 3000 feet of 4-inch pipe—attached to one boiler, and the consumption is about two chal-

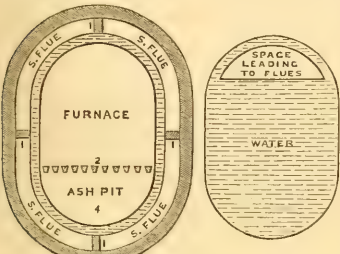


FIG. 60.

FIG. 61.

drons of coke per week. Of course very much depends upon the temperature maintained, but I think these vineries are forced early, and if so, the doings of Mr. Grix's boiler seems to eclipse the flued saddle of Mr.

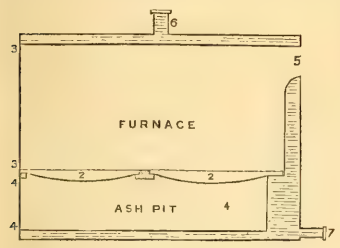


FIG. 62.

Baines, though I think the latter did remarkably well. With saddles and bells of various forms, I fear I cannot by any means equal in economy either of these examples; for this reason, should like to write across Mr. Grix's boiler, "Wanted, a maker," and to ask Mr. Baines whose saddle he employed. D. T. Fish. [This boiler looks as if it should work both efficiently and economically. EDS.]

Foreign Correspondence.

MENTONE, FRANCE: *Vegetation on the Genosse Riviera, in January, 1871.*—The seven weeks' frost which reigned in the north of Europe with unusual severity was felt on the Genosse Riviera. At Mentone we had not had frost and snow for more than a day or two, on the 24th and 25th of December, and even then the frost did not reach sheltered localities, such as my garden, but the temperature was much lower than usual during December and January, especially the night temperature. The average night minimum for January, 1871, was 40° 2, and the average day maximum 51° 6 instead of 42° 9, and 52° 8—my averages for the last ten years. The snow which fell on December 24 not only covered the amphitheatre of mountains 4000 feet high, which form the Mentone shelter from the north, but even fell on the sea-shore to the depth of half an inch or more, and did not melt until the next day, a fact which I had not seen before in the course of twelve winters' experience. This snow has remained ever since on the higher mountains, thus surrounding us with an alpine girdle of snow for nearly six weeks. This I have also never seen before, as usually when snow falls on these higher mountains in winter, which it often does, it is melted by the sunshine the next day, or thereabouts.

Notwithstanding this rather low temperature my garden, which the frost never reached, continued to flourish, and on January 22 I made a list of plants in flower, which I reproduce, as calculated to be of some little use to those of your readers who cultivate winter flowers in cool stoves. All the plants named were covered with half an inch of snow on December 24, so it is clear they can stand a temperature of 32°, not only without dying but without the flowering process being interrupted thereby. On the day which followed the snow there was a grey sky with a south-westerly wind and comparatively warm rain. This saved the Lemon crop and, no doubt, many of my flowers. Had there been the usual ardent sun after the snowfall, the trial and the danger would have been much greater:—*Antirrhinum*, *Arabis sempervivens*, *Primula sinensis*, *Linum trigynum*, *Heliotrope*, *Eriocarpus africanus*, *Cassia tomentosa*, *Verbena*, *Medicago arvensis*, *Jasminum nudiflorum*, *Kennedia lilacina*, *K. alba*, *Tacsonia mollis*, *Salvia involucrata*, *S. Heeriana*, *S. gesnerifolia*, *S. venusta*, *Geranium*, *S. aurea*, *Senecio mianianus*, *Hesperis maritima*, *Silene pendula*, *Cobaea scandens*, *Rose* (monthly) *Gloire de Dijon*, *Bengal*; *Polygala*, *Abutilon*, *Sida arborescens*, *Camellia*, *Carnation*, *Alyssum*, *Habrothamnus elegans*, *Sparmannia africana*, *Tobacco*, *Justicia*, *Solanum Pseudo-Capsicum* (berries), *Laurustinus*, *Chrysanthemum*, *C. frutescens*, *C. segetum*, *Veronica spicata*, *Lemon*, *Ionopodium acule*, *Fetunia*, *Ageratum arzum*, *Bignonia capensis*, *Pandora*, *Geranium* (various), *Lavender*, *Rosemary*, *Bougainvillea Weissiana*, *Marigold* (large), *Lavatera*, *Lachenalia quadricolor*, *Narcissus*, *Polyanthus*, *Hyalanthus*, *Crocus*, *Stocks*, *Aloe arborescens*, *A. frutescens*, both very beautiful; *Mesembryanthemum roseum*, *M. linguifolium*, *M. molle*, *Crassula punctata*, *Echeveria metallica*, *E. racemosa*, *E. reflexa*, *Mammillaria quadrispina*, *M. pyramidalis*, *M. barbata*, *Pachyphyllum bracteatum*.

Some of these, such as the *Linum trigynum*, the *Arabis*, the Chinese *Primula*, the *Senecio*, the *Eriocarpus*, the *Aloes*, the *Sparmannia*, are flowering with the greatest profusion. Often, in sheltered parts of England, wonderful lists of flowers are produced up to Christmas, if the winter frosts have not set in, but not after they have taken place, by the middle or the end of January, nor after many weeks of such severe weather as we have had this year. The *Tacsonia mollis* is by far the hardiest. Fast-flowering plants which I met with it. It has flowered freely all through this cold weather, and is still flowering (I enclose a specimen). The *Passiflora ignea*, which grows with me with wild luxuriance, flowered freely until the middle of December, and will do so again in March; but January and February are too much for the flower even here, although the leaves and plant are uninjured, and flower-buds survive.

The history of the *Bougainvillea* here may help to clear up the question as to treatment lately discussed in your columns. *Bougainvillea spectabilis* flourishes vigorously in the open air on the Genosse Riviera, and flowers profusely on walls in March or April, according to position; with me, at Mentone, in March, at Nice and Cannes in April. It thus flowers after passing through the cool weather of winter with an average night minimum of 44° 3 in December, 42° 9 in January, 43° 5 in February, 44° 5 in March. Therefore it is clear that it can flower under cool treatment. But in this region the summer heat is great and continuous, and the bracts are formed in summer and autumn, for I find them in a rudimentary state on the plants early in the winter; they appear to remain dormant in the cold months to flower early in spring. I enclose two twigs of *B. spectabilis* picked on February 1. In one the bracts are still rudimentary, in the other the branch had crept between two large stones for about an inch, and the slight increase of heat has developed the bracts. I have a *Bougainvillea*, labelled *Weissiana*, which came from Algiers 18 months ago, and had large bracts at Christmas. I send you a specimen, as also a second of the same plant (grown on an open wall) picked on January 22. The bracts have grown much larger during the cold weather, and are faintly coloured. In March the bloom is most profuse, and the colour is rather better than in England. Fast-flowering plants which I met with it. It has flowered freely all through this cold weather, and is still flowering (I enclose a specimen). The *Passiflora ignea*, which grows with me with wild luxuriance, flowered freely until the middle of December, and will do so again in March; but January and February are too much for the flower even here, although the leaves and plant are uninjured, and flower-buds survive.

The Schima, *Molle*, or *Mulli*, as you write it, the Pepper tree, grows freely and luxuriantly on the Riviera. In the garden of the house in which I live are trees 30 feet high, and with trunks 1 foot in diameter, the growth of about 12 or 14 years. I found it also generally cultivated as an ornamental tree in the more protected parts of Spain, as also in Algiers. It bears the summer drought wonderfully, and produces its fruit in the autumn. In the autumn, I saw a French merchant, to whom I showed it, casually remarked "that there was clearly a fortune to be made in these parts through the adulteration of pepper by means of the said berries!" It is a very graceful tree, and much appreciated on the Riviera. *Henry Bennet, M.D., Feb. 1.*

Societies.

ROYAL HORTICULTURAL: *March 1.*—Major Trevor Clarke in the chair. At the termination of the usual preliminary business of the meeting, Mr. Bateman proceeded to make some comments upon several novelties among Orchids which had just been introduced to a committee of Masdevallia from the gardens of S. Rucker, Esq., named *elephanticeps*; but on comparing it with a coloured illustration of that species and of *M. coccinea*, copied from a drawing made by Professor Reichenbach, it was found to bear so strong a likeness to the latter, that it is probably only a variety of it, so that the true plant was still a desideratum. Masdevallias, said Mr. Bateman, are eminently cool Orchids, being natives of the highest mountains of Peru and New Grenada, and also eminently minute, representing in most respects all sorts of ferns; and he would strongly urge upon those who intended visiting those parts or had friends there, to do their best to introduce them, and he need only mention that a cigar-box would hold enough to be worth £100, to show them that they would be amply repaid for their trouble. Mr. Bateman's specimens of *Odontoglossum retusum* var. *latro*, a strange plant, both in its colour and in its ways then came under review, and, in connection therewith, it was mentioned that a plant of the same species, in the society's collection, three years ago, had refused to flower, continued to make renewed efforts to flower, from time to time, but never came to perfection. The top of a strong healthy specimen of a *Mahonia*, which a few days before bore a splendid golden coronet of flowers, was shown, the flowering branches remaining, and it was the only way to obtain handsome plants was to lop off the tops as soon as they became high enough. Mr. Bateman then alluded to the distress which has fallen on the horticulturists of France, and which would be fully recognised when he told them that the land which the many gardeners occupied round Paris, and that which was most trampled upon. A committee had been formed to consider the best means of rendering assistance, and the Council had also offered to send any spare seeds which they might have on hand, and to assist in other ways. There was also to be a meeting of the whole of the condition of the Jardin des Plantes, in which he was sorry to say that the whole collection of Orchids was annihilated. With the consent of the Fellows it was proposed to assist in the replenishing of these by sending all the duplicates of rare and interesting species which the Society possessed, and the Royal Gardens at Kew would also assist largely in this direction. He would feel thankful if those who have more than one specimen of any rare Orchids would lend a helping hand and send their name, with a list of the names of the plants, to the secretary of the committee at South Kensington. He also mentioned that a bazaar, under the patronage of Princess Teck, will be held in the conservatory during the first week after Easter, when such things as were sent would be sold for the relief of the suffering French people (horticulturists?) and invited contributions of small articles for sale, and especially of bouquets.

The Rev. M. J. Berkeley said, that after carefully examining the *Gastroneura*, shown at the last meeting, in conjunction with Dr. Thomson, at Kew, they had come to the conclusion that it was probably only a variety of *G. sanguineum*, or *Cyrtanthus sanguineus* of the "Botanical Magazine," and that it would now be known by the name of *G. sanguineum* var. *flammeum*. Mr. Ware's beautiful collection of hardy flowers then came under notice, special attention being directed to *Leucodermis*, which appeared in it. A small plant of a *Wigandia* was shown to the meeting, as appearing to be attacked by precisely the same disease as that which is so fatal to *Verbenas*, and which he attributed more or less to the unsatisfactory condition of the roots, which on examination he found to be in a bad state, and he was further of opinion that unhealthy roots was the cause of many of these forms of disease. A paper was then read which had been communicated to the Agri-Horticultural Society of India, describing a method of reducing the size of stones in fruit by breaking the branches and scooping out the pith, and afterwards marching, by which means the stones became less after each operation. Mr. Berkeley said he had been informed by Dr. Hogg that a similar method had been mentioned by one of the old authors—but he pressed himself to be very incredulous of the success of the process.

The Chairman then read some remarks on the points to be taken into consideration when giving marks to plants illustrative of the phenomena of hybridisation, and said that as soon as he could arrive at a definite conclusion on the subject he would communicate the result to the horticultural journals.

Scientific Committee.—G. F. Wilson, Esq., F.R.S., in the chair. Rev. M. J. Berkeley stated that the *Snowdrop* bulbs included at a meeting at Kew, and obtained by the same species of *Rhinanthus*, as yet undescribed, and concerning which further information was promised. Specimens of dendritic spots on paper were again shown, under the impression that a deposit of copper was in some way connected with the production of the dendritic spots. An imperial was exhibited, the young leaves of which were affected with the disease known as "Black Top" in the case of *Verbenas*. The disease appeared suddenly, without previous warning, and was considered to be due to some faulty condition of the roots.

Mr. Masters mentioned that *Aucuba berries*, partly ripened in the open air in his garden, and injured by frost, show no trace of the injury externally, but the seed was completely blackened and disintegrated. In the examination of the non-ripened seeds (rather passing from the first to the seed, and which were quite unripe).

Mr. Alfred Smeed exhibited fronds of *Todea superba* affected with a species of mould (*Polystichum*), which caused the fronds to decay half-way down.

Major Clarke suggested the use of a chemist's dropping-

TEMPERATURE OF THE AIR AND FALL OF RAIN AT DIFFERENT STATIONS.

DURING THE WEEK ENDING SATURDAY, FEBRUARY 25, 1871.

TEMPERATURE OF THE AIR.

NAMES OF STATIONS.	Highest.		Lowest.		Range of Week.	Mean of Highest.		Mean of Lowest.		Mean Daily Range.	Mean.		FALL OF RAIN.
	Deg.	Deg.	Deg.	Deg.		Deg.	Deg.	Deg.	Deg.		Deg.	Deg.	In.
Portsmouth	54.8	31.9	22.9	22.9	31.9	38.7	22.9	22.9	22.9	15.8	31.9	22.9	0.18
Blackheath	54.8	31.9	22.9	22.9	31.9	38.7	22.9	22.9	22.9	15.8	31.9	22.9	0.18
Bristol	54.8	31.9	22.9	22.9	31.9	38.7	22.9	22.9	22.9	15.8	31.9	22.9	0.18
Birmingham	54.8	31.9	22.9	22.9	31.9	38.7	22.9	22.9	22.9	15.8	31.9	22.9	0.18
Wolverhampton	54.8	31.9	22.9	22.9	31.9	38.7	22.9	22.9	22.9	15.8	31.9	22.9	0.18
Leeds	54.8	31.9	22.9	22.9	31.9	38.7	22.9	22.9	22.9	15.8	31.9	22.9	0.18
Norwich	54.8	31.9	22.9	22.9	31.9	38.7	22.9	22.9	22.9	15.8	31.9	22.9	0.18
Nottingham	54.8	31.9	22.9	22.9	31.9	38.7	22.9	22.9	22.9	15.8	31.9	22.9	0.18
Sheffield	54.8	31.9	22.9	22.9	31.9	38.7	22.9	22.9	22.9	15.8	31.9	22.9	0.18
Liverpool	54.8	31.9	22.9	22.9	31.9	38.7	22.9	22.9	22.9	15.8	31.9	22.9	0.18
Manchester	54.8	31.9	22.9	22.9	31.9	38.7	22.9	22.9	22.9	15.8	31.9	22.9	0.18
Salford	54.8	31.9	22.9	22.9	31.9	38.7	22.9	22.9	22.9	15.8	31.9	22.9	0.18
Bradford	54.8	31.9	22.9	22.9	31.9	38.7	22.9	22.9	22.9	15.8	31.9	22.9	0.18
Leeds	54.8	31.9	22.9	22.9	31.9	38.7	22.9	22.9	22.9	15.8	31.9	22.9	0.18
Hull	54.8	31.9	22.9	22.9	31.9	38.7	22.9	22.9	22.9	15.8	31.9	22.9	0.18
Newcastle	54.8	31.9	22.9	22.9	31.9	38.7	22.9	22.9	22.9	15.8	31.9	22.9	0.18
Edinburgh	54.8	31.9	22.9	22.9	31.9	38.7	22.9	22.9	22.9	15.8	31.9	22.9	0.18
Glasgow	54.8	31.9	22.9	22.9	31.9	38.7	22.9	22.9	22.9	15.8	31.9	22.9	0.18
Dundee	54.8	31.9	22.9	22.9	31.9	38.7	22.9	22.9	22.9	15.8	31.9	22.9	0.18
Perth	54.8	31.9	22.9	22.9	31.9	38.7	22.9	22.9	22.9	15.8	31.9	22.9	0.18
Dublin	54.8	31.9	22.9	22.9	31.9	38.7	22.9	22.9	22.9	15.8	31.9	22.9	0.18

JAMES GLAISHER.

Miscellaneous.

ZINC WATER-PAIN.—The unpleasantness of occupying a newly-painted house may be avoided by the use of zinc-water-paint. The white oxide of zinc (which may be heated with a little Potato starch, if more "body" be wanted) is combined with the desired mineral or vegetable colour, and with this an aqueous solution of chloride of zinc, to which some tartarate of potassa has been added, is then mixed; the water-paint thus formed being applied with a brush on the surface to be coated. In half-an-hour this paint will be perfectly dry, and the object of the alkaline tartarate is to make the drying process less rapid. The advantages of using the water-paints are very numerous: they are more durable than oil paints, do not blacken by exposure to sulphurous vapours, are devoid of odour, dry quickly, resist dampness and the action of water, can be cleansed with boiling water and soap like oil paints, and preserve the wood to which they are applied from decay, and render it less combustible. *Scientific Review.*

Garden Operations.

(FOR THE ENSUING WEEK.)

PLANT HOUSES.

Those handsome inmates of our stoves, *Epiphyllum Rosellianum* and *E. truncatum*, with the many beautiful hybrids obtained from them, should, as soon as they commence to make their annual growth, be encouraged to complete the same as vigorously as possible. They should be pushed along in a high temperature, in which there is also an abundance of humidity, and be freely exposed to the summer sun when the growth is made. *Strophocarpus* into fruit pots, and for a compost an admixture of fibrous peat, leaf-mould, fibrous loam, and a free sprinkling of silver sand. Give water subsequently with great caution, and always, if possible, with the chill taken off. Some species, like *F. calycina* for instance, make rather strong shoots, but very few of them, and in consequence these should always be pinched back beyond every fifth or sixth leaf, to induce a greater number to form, so as eventually to produce a more bushy plant. *Epiphyllum* plants, which are more aquatic, *Victoria regia*, should be potted off singly into small pots as soon as they have formed four or five small leaves. Do not overpot them at first, employ a tenacious loam to grow them in, and place some small stones upon the surface of the soil to insure the plants from being injured, or the roots from being washed out of the pots by the wave-like action of the water. Some good stiff fibrous loam should also be got in readiness wherewith to form the mound in the tank, into which finally to transplant the strongest of the seedlings—about a dozen wheelbarrow loads packed neatly together will suffice. Good loam, such as may be produced in the lowlands and from the vicinity of running streams is the best, providing it be so chopped up as to dry and become more or less sweetened by the action of the air before use. Specimens of *Euphorbia*, *Clerodendrons*, *Aplodandras*, *Altamandas*, &c., which have passed freely into shallow pans and transplant them when somewhat advanced in growth into their flowering-pots. A very light soil, consisting of two parts of

peat, one of moderately decomposed leaf-mould, and one of silver-sand, will suit them for the present. Do not water them yet, nor place them into heat, if they are not required in bloom until the autumn.

FORCING HOUSES.

Persist, now that early *Vines* are growing freely, in stopping back subterminal shoots which may continue to form. Grow them neatly, and with the utmost care not to snap off in the operation, the young shoots upon those *Vines* which have attained to a sufficient length, and are showing prominently for flowering. Do not stop back the young growing points of the shoots in too hurried a manner, but rather permit them to form a moderately substantial existence before this is done, which, besides aiding in the formation of a more powerful shoot at this stage of the Vines' infancy, is also an incentive to greater root formation. When the other hand all tendrils and abortive bunches should be removed at the onset. Physiologists say that a great waste of strength accrues from the unnecessary production of either. Thin out the bunches of early Grapes rather by anticipation than after the berries have attained to any size, so as to preserve to the utmost all the inert strength which the plants are possessed of. Syringe freely with nice soft tepid water in the morning and afternoon. Where Muscats are approaching the blooming stage, gradually increase the heat to a fair mean, so as to be able to maintain the necessary degree when the *Vines* are in flower without having to resort to a sudden rise of temperature to meet the requirements. In regard to *Pines*, in all stages of growth, advantage must be taken of fine periods to forward the operations of potting and top-dressing, and in giving the necessary attention to the bottom-heat. When the sun shines out brightly, persist in damping over the surface of the tan, the walks, walls, and all cool internal surfaces, maintaining by these and all similar means as congenial and salubrious a temperature as possible, with the all-important addenda of a good supply of fresh air. Give to *Strawberries* swelling off their fruits frequent waterings, alternately with pure soft water and liquid manure. Do not mind now whether the balls appear wet enough or otherwise, but give, and give freely.

HARDY FRUIT GARDEN.

Fruit trees which are not yet nailed should now be attended to, and the operation be pushed forward vigorously at every favourable opportunity. Where many insect pests had a lodgment last season, it will be advisable to paint the trees over with a deterrent mixture so soon as they are nailed in. This may be made as follows:—To about a peck of cow dung and tenacious loam add a fourth of its quantity of fresh slacked lime and a pound or two of flowers of sulphur; adding water, and making all into a thick liquid paste capable of being applied with an ordinary whitewash brush, and yet to be perfectly adhesive. A little size may be added, the mixture may be made so thick as to need propelling from off the brush on to the walls by jerking it. This last is a very good method where the walls are old and contain many nail-holes, within which the enemy take refuge during the colder months. There need be no fear of injuring the bloom-buds, as they will come forth even more vigorously after the application.

KITCHEN GARDEN.

Thin out *Cauliflowers* when more than four or five exist under hand-lights, transplanting all others which need it—on to good rich soil. *Broccoli*, *Harb*, by this time, should be planted in rows, such as are not so divided. Transplant any *Pots* still maintained in boxes, &c., into permanent quarters. Prepare beds for fresh transplantings of *Asparagus*. Cut the long, straggling crowns off stools of *Seakale* where no further need of any exists, or such as have already been forced, to induce a dwarf, sturdy growth next summer. Regarding a proper rotation of crops, to which I referred last week, it is a good chance to plant *Early Savoys*, &c., as *Carrots*, *Beet*, *Pumpkins*, &c.; and *Pas* following *Celery*, and *vice versa*. *Cabbages* do well upon *Onion* beds. *Potatoes* always produce most abundantly upon ground first dunged and laid in fallow for at least two months of frosty weather. *Broad Beans* need only a deep stiff soil and firm, whilst *Scarlet Runners* and *Dwarf French Beans* always produce best where an incessant latent moisture is assured at the root. *W. E.*

TOWN GARDENING.

THERE is no plant that, to my knowledge, does so well in town as the *Chrysanthemum*, if properly cultivated. The old stools should now be divided into separate plants, cutting away all the old roots, and leaving only the little fibre attached to the young shoots. These should be planted three in a patch, be tied to sticks as they progress in growth, and if occasionally watered with liquid manure, will produce as fine a bloom as in the country. If dwarf plants are required, never top them, but as soon as the plants are 6 inches high peg them down, repeating the operation as they advance in growth. The *Pompon Chrysanthemum* is admirably adapted for the front row, or for massing in beds, and should be divided in the same way as the *Tree* varieties, and pegged down if required dwarf. *The Iris germanica*, the well-known old Blue Flag, is a typical plant of a genus which, if more known, would be more grown, for there are many charming varieties

which will do well in any town garden, provided they are planted now in a soil composed of two-thirds of fresh loam and one-third of rotten dung and old brick rubble. Towards the end of the month sow half-hardy annuals in a frame, or on a warm border arched over with hoops, so that at night or in bad weather they may be covered with mats. The sorts that will succeed by this method, and which do well in town, are the following:—German and Ten-week Stocks, French and African *Marigolds*, *Indian Corn*, and the Castor-oil plant. The best method of sowing such seeds is to draw shallow drills 3 inches apart, sow the sort separately, and not too thickly; cover the small seeds lightly, and the larger ones about a quarter of an inch. *Hardy Annuals* should likewise be sown in the borders in rings; the plants do not get so crowded, and many may be sown round the bulbs, which will make the most of the borders. *Carnations*, *Pinks*, *Candytufts*, *Campanulas*, *Catananthes*, *Fraxinella*, *French Willow*, *Galegas*, *Pyrethrums*, *Rockets*, *Spiderworts*, *Veronics*, and many other perennials, will do well if planted now in fresh soil, with a small portion of dung dug in. *Wallflowers*, *Canterbury Bells*, *Sweet Williams*, and *French Honeysuckle*, will flower well if planted now with plenty of fibrous roots. The beautiful *Gladiolus brenchleyensis* and *Gandavensis* will make a grand show in the autumn if planted now three in a clump in fresh soil, 3 inches deep, with a little silver sand placed at the bottom of the roots. *Gas* is a very good soil, and necessarily it does not only makes the surface firm, smooth, and clean, but it renders the grass much easier to mow. The edging should likewise be trimmed with the edging-iron, preparatory to dressing or regravelling the walks, which should be done at once. *J. D.*

Notices to Correspondents.

BASKET OF VEGETABLES: Amateur. We would select from the following: 1. Peas—Laxton's Superb, or Defender, or Victoria, or 2. Potatoes—Superb, or Paterson's Victoria; 3. Dwarf Kidney Beans, or Scarlet Runners; 4. Tomatoes; 5. True Vegetable Marrow, or Custard Squash; 6. Cauliflower Walcheren; 7. Cabbage—St. John's Day; 8. Lettuce—White Parris rolled; or New York; 9. Celeriac; 10. Turnips; 11. Carrot—Intermediate; 12. Cucumbers. **BOOKS: A. E. Hooker's** "Students Flora" (Macmillan), for wild plants. There is no good work in English containing an account of garden plants. DeCandolle and Mouton's "Flora des Champs et des Jardins de la France," if you read French, but its scope is necessarily limited. **EUCHARIAS AMAZONICA: A Subscriber.** You will find directions for the culture of this plant at pp. 10, 78, in our last year's volume.

FRUITS: Apple. November was the very worst possible season for potting. This operation should have been delayed till spring, just when the plants are starting into growth. To have dried them would have been equally injurious. Without knowing what the species are, we can give you no more than a general remedy.

INSECTS: F. G. The green caterpillars which have attacked your young Ferns, Cobaeas, and Clematis, are immature specimens of the larvae of the Angle Shades Moth, *Noctua meticalosa*. We do not think they were imported with the plants, but were bred from eggs deposited by the parent moth on the plants whilst accidentally confined in the house. Hand-picking, especially after dusk, is the only remedy. *I. O. W.*

LIST OF SELECT FRUITS: M. W. Vines: Frankenthal Old Black Hamburgh, Lady's Finger, Lady's Finger, Seeding, Alicante, Madresfield Court, Royal Muscadine, Buckland Sweetwater, Trebbiano, Royal Ascut, Muscat Hamburgh. *Peaches:* Early Beatrice, Early York, Acton Scott, Bellegrave, Royal George, Grosse Mignonne, Noblesse, Barrington, Walbourn Admirable, Late Admirable, *Nectarine:* Hunt's Tawny, Elrige, Violette Hâtive, Balgown, Pitmans Orange. *Plums:* Rivers' Early Frolic, Jefferson, Prince Englebert, Winesap Gate, Green Gage, Reine Claude de Bay, Cox's Golden Wonder, Reine Claude de France, *Walnuts:* Apple, *Desert:* Early Harvard, Oslin, Kerry Pippin, Cox's Orange Pippin, Adams' Pearmain, Hicks' Fanc, Gordon Harvey, Cockle Pippin, Braddicks' Nonpareil, Scarlet Nonpareil, Beauchamp, Rosemary Russet, *Apples:* Adam's Superb, *Sweet Apples:* Pippin, Waltham Apple Seeding, Cellini, Mère de Ménage, Dumelow's Seeding. *Pears:* Doyenné d'Été, Williams' Bon Chrétien, Louise Bonne de Jersey, Fondante d'Automne, Beurré d'Amanlis, Suffolk Thorn, Marie Louise, Comice, Louise, Thompson's Seedling, Beurré Diel, Glog Moreau, Marchal à la Cour, Doyenné du Comice, Madame Treve, Beurré Rance, Winter Nelis, Easter Beurré, Josephine de Malines, Bergamotte d'Espèren.

PLANT GROWING UNDER VINES: W. T. You are quite right in saying that the plants you mention cannot be grown in a satisfactory manner under Vines; a good practical gardener would always prefer to grow them in cool frames during the summer months, and in the winter to have them in a hot bed, or in a greenhouse. **RHODODENDRON GRATING: A Subscriber.** We shall shortly publish an illustrated article on this subject. **ROOTS: T. H.** asks how long after a fruit tree (say a Mulberry) has been cut down will the roots of it remain in the soil, and how long it will be necessary to wait before enough to enable a person skilled in woods to distinguish to what species of tree the roots belonged?

CATALOGUES RECEIVED.—Ellwanger & Barry (Rochester, N. Y.), Descriptive Catalogue of Fruits.—James Cocker, Descriptive Catalogue of Flower, Vegetable and Agricultural Seeds, Garden Implements, &c.—

As Supplied to the

As Supplied to the



SUTTONS'



CARTER'S NEW GRASS SEEDS

PERMANENT PASTURES

Are now ready, carriage free.

For Ordinary Soils—Best quality, 20s. to 20s. per acre.

Second quality, 20s. to 20s. per acre.

For Heavy Soils—Best quality, 25s. to 25s. 6d. per acre.

Second quality, 20s. to 20s. per acre.

Reduced rates for quantities of more than Five Acres.

From Lady CARBERY, Castle Frick, Feb. 1, 1871.

"Lady Carbery is glad to say all Messrs. Carter's Seeds (Grass and Green Crops) have proved excellent, and been much admired in her results."

JAMES CARTER and Co., THE ROYAL SEEDSMEN,

27 and 28, High Holborn, London, W.C.

For **TRADE PEDIGREE MARK.** Seed.

BARLEY, and Black and White **OATS**. Apply to Captain HALLETT, Brighton.

MR. JAMES FRASER (of the late Firm of 1 & 7, Princes Bridge Road), undertakes **HORTICULTURAL VALUATIONS** of every description. **SALES** by **AUCTION**, &c.—Maylands Farm, Romford, Essex, E.

WANTED TO RENT, a good Garden, near London, with Glass Structures, suitable to establish a Local Business. Address particulars to **JOHN CLIFFE**, White Lion Hotel, Chippenden, Wilts.

To Gardeners and Florists. **TO BE SOLD, THE BUSINESS OF A SEEDSMAN** and **FLORIST**, with good Jobbing Business.—Most commanding position in one of the principal thoroughfares in the suburbs of London, and doing an excellent Trade.—C, 2, Milford Place, Vassall Road, Brixton, S.W.

FOR SALE, an old established **NURSERY** and **SEED BUSINESS**, within a few miles of London, containing about 14 Acres of General Nursery Stock, numerous Glass Structures, Grass Seed, Dwelling House, &c. For particulars apply, by letter only, to G. H. H. C., 47, Bessborough Gardens, Finsbury, S.W.

To Market Gardeners, Cowkeepers, Nurserymen, &c. **THREE ACRES OF GROUND**, well stocked with Fruit Trees, together with Cottage Residence, situate at LEAMING, LEAM and BUSNESS to be DEPOSED OF by **MESSRS. CHESTERTON and SON**, Auctioneers and Surveyors, 22, Lower Philipine Place, Kensington, W.

TO BE LET, by Tender, about 500 Acres of good **MUD LAND**, situated near Gosworthey, Hants, and within a mile of the Railway Station, and within easy reach of Four good Market Towns.

The above Lands have just been Reclaimed and Enclosed from Tidal Waters, and are a portion of several hundred acres adjoining the Chichester Harbour, now being reclaimed by the late Mr. Landowners' West of England and South Wales Land Drainage and Inclosure Company.

The Lands will be Let for a term of three years, in Lots of 50 Acres, from Lady Day next.

A Plan of the Lands marked off in Lots of about 50 Acres, can be seen on application to Mr. Harrison, the Foreman of the Works, who will furnish forms of Tender.

The Company do not bind themselves to accept the highest or any Tender.

Tenders for one or more Lots to be sent on or before March 17, addressed to the Company at their Head Offices, Castle Street, Exeter. Exeter, March 2, 1871. **FREDERICK BRODIE, Secretary.**

SALES BY AUCTION.

Annual Sale of Handsome English-grown Camellias, consisting of the finest named and coming into bloom in the **AZALEA INDICA**, of sorts, well set with buds; a superb assortment of clean-grown Standard and Dwarf **ROSES**; selected **FRUIT TREES**, choice **AMERICAN PLANTS**, and **SHRUBS**, **GLADIOLUS**, **LILIU**, &c.

MESSRS. PROTHEROE and MORRIS will sell the above by **AUCTION**, without reserve, at the **FRANCIS Auction Rooms**, 38, Gracechurch Street, City, E.C., on **FRIDAY, March 10**, at half-past 12 o'clock to the minute.

On the morning of Sale, Catalogues may be had at the Rooms as above, and of the Auctioneers and Valuers, Leytonstone, Essex.

Stratford, E.

IMPORTANT SALE OF NURSERY STOCK. **MESSRS. PROTHEROE and MORRIS** are instructed by Mr. G. H. Bunney, to **SELL BY AUCTION**, on the Premises, The Nursery, Maryland Plot, Stratford, Essex, on **MONDAY and TUESDAY, March 13 and 14**, at 11 to 12 o'clock, precisely, without reserve, a portion of the ground being required for other purposes, a large quantity of valuable **NURSERY STOCK** comprising thousands of fine Evergreens, many of which are handsome specimens, consisting of 10,000 Green and Variegated **HOLLIES**; 2 to 2 feet—4,000 bushy **ACACIAS**, 1 to 2 feet; fine **PHILLYREAs**, **Rhododendrons**, 300 Green **BON**, 300 Arbor-vitae, of sorts; Common and Portulacal **LAURELS**, Cedars, **ARAUCARIAS**, **FIRUS**, of sorts; **ANDROMEDA floribunda**, 15 to 3 feet; and thousands of other useful Shrubs; Scarlet and Horse Chestnuts, quantity of Limes, and other Forest and Ornamental Trees, Standard **ROSES**, and Fruit Trees. May be viewed two days prior to the Sale. Catalogues may be had on the Premises, and of the Auctioneers and Valuers, Leytonstone, Essex, E.

Park Bury Nursery, Colney Street, near St. Alban's. **36 SPAN-RUPY PLANT** and **FORCING HOUSES**, with the **BOLLERS**, **PUMPS**, **BRICKS**, &c., together with the **PRACHES**, **NETCARINES**, and **VINES**, all well cultivated, and in a bearing state, will be **SOLED** by **MR. FREDERICK GOUGH**, without reserve, on the premises, on **WEDNESDAY, March 8**, at 2 for 3 o'clock in the afternoon.

The above Property is offered to the Public in consequence of the ease of the premises having expired.

May be viewed the day of Sale, and Catalogues had of Mr. **FREDERICK GOUGH**, Auctioneer and Appraiser, London Road, St. Alban's.

Consignment of Plants and Bulbs from Ghent. **MR. J. C. STEVENS** will **SELL BY AUCTION**, at **WEDNESDAY, March 8**, at half-past 12 o'clock precisely, choice **CAMELIAS**, **AZALEAS**, **ROSES**, **SHRUBS**, **FRUIT TREES**, and other greenhouse Plants from Ghent; Standard and Dwarf **ROSES**, **FRUIT TREES**, **MAPLES**, **CONIFERS**, **CURRANTS**, and **GOOSEBERRY TREES**, from a well-known Nursery in Surrey; **CARNATIONS**, **PINKS**, **CLEMATIS**, **Especially Fruit Trees**, &c. **CATALOGUES** had of the Auctioneer and Valuers.

On the morning of Sale, and Catalogues had.

Important Sale of Very Rare and Select Orchids. **MR. J. C. STEVENS** will **SELL BY AUCTION**, at **THURSDAY, March 9**, at half-past 12 o'clock precisely, an importation of **ORCHIDS** from the Continent, consisting of the finest **MADEIRAS** ever imported, both as to size and condition, Fine plants of **Odontoglossum Bluntii** Alexandre from the original locality (Facho), and others. Also many other choice and very fine healthy plants; amongst them will be found **Odontoglossum Philadelphia**, O. Lindleyana, O. Pescatorea, &c., and a few rare **Moulinian Orchids**.

On the morning of Sale, and Catalogues had.

Second Periodical Sale of Gloucestershire Stock. **MR. JOHN THORNTON** will **SELL BY AUCTION**, without reserve, on **THURSDAY, March 9**, at 1 o'clock, at the Home Farm, Ham, near Berkeley, Gloucestershire, between **TWENTY and THIRTY HEAD** of **FUR-BRED SHORTHORN** yearling **BULLS** and **HEIFERS**, the property of the Right Hon. Lord Fitzharding, and also a number of first-class **BULLS** of the highly fashionable **Bates** blood, from pure-bred Dams from the famous **Hollers** of the Second Duke of Devonshire. The young **BULLS** are of good size, with fine hair, quality, and good shape. The **HEIFERS** are from Dams possessing great Dairy properties.

The small **SELECT HERD** belonging to the late Mr. A. Bourne, of Ashdon, Wilts, which has been sold, as well as several fine **GOATS** for some years, will also be **SOLED**, as well as several fine **YOUNG HERKSHIRE PIGS**, from the John Thornton Stock.

Catalogues, with Pedigrees, may be had of Mr. OCTAVIUS LVOG, Berkeley Castle, Gloucestershire; or of JOHN THORNTON, 15, Langham Place, Regent Street, London, W.

Important Sale of Shorthorn Dairy Cows, &c. **MR. JOHN THORNTON** will **SELL BY AUCTION**, without reserve, on **MONDAY, March 13**, at 1 o'clock, at the Home Farm, Ham, near Berkeley, Gloucestershire, between **TWENTY and THIRTY HEAD** of **FUR-BRED SHORTHORN** yearling **BULLS** and **HEIFERS**, the property of the Right Hon. Lord Fitzharding, and also a number of first-class **BULLS** of the highly fashionable **Bates** blood, from pure-bred Dams from the famous **Hollers** of the Second Duke of Devonshire. The young **BULLS** are of good size, with fine hair, quality, and good shape. The **HEIFERS** are from Dams possessing great Dairy properties.

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Wicken Park, Stony Stratford, Bucks. **MR. STRAFFORD** is honoured with instructions from the Right Hon. Lord Penrhyn to **SELL BY AUCTION**, without reserve, at Wicken Park, on **TUESDAY, May 2** next, **FIFTY HEAD** of valuable **Fur-Bred Shorthorn** yearling **BULLS** and **HEIFERS**, prominent amongst them will be found several descendants of **Duchess Nancy**, **Duchess of Lancaster**, **Queen of Hearts**, **Gardens**, and **Victoria** tribes. The **BULLS** include **Cherry Dukes**, **Oxford**, **Waterloo**, and other famed sorts. Sires of the purest **Kilgobbin** blood have been used; the young stock are chiefly by **3d Duke of Wharfedale** (25,618), **11th Grand Duke** (25,849), and **Cherry Duke** (25,757).

Catalogues, with Pedigrees and other particulars, are in course of preparation, and will be shortly announced.

Having Park Farm, Essex. **MR. STRAFFORD** begs to announce for **SALE BY AUCTION**, without reserve, on **WEDNESDAY, May 3** next, at the Having Park Farm, near Epping, a fine selection of **THIRTY HEAD** of **SHORTHORNS**, bred by, and the property of, **N. McIntosh, Esq.** of the same blood as the younger portion of which are by his superb **Bull**, **3d Duke of Genua** (35,735).

Catalogues, with Pedigrees and further particulars, will appear in due time.—London, 25, Abchurch Lane, E.C. 4, 1871.

MILK.—The **AYLESBURY DAIRY COMPANY** (Limited), St. Petersburg Place, Haymarket, W., are prepared to receive **TENDERS** for the **SUPPLY OF MILK** for a month, commencing on **April 1** next, delivered at **Fauldington, Epsom, E.**, **Fancars**, or **King's Cross**. Forms of Tender may be had on application to the Secretary.

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

WOLVERHAMPTON MEETING, 1871.

STOCK and IMPLEMENT PRIZE SHEETS are now ready, and will be forwarded on application to

H. M. JENKINS, Secretary,

12, Hanover Square, London, W.

GARDENERS' CHRONICLE and the AGRICULTURAL GAZETTE. The VOLUME of 1871 is now ready. Price, 1s. cloth, 5s. 6d. f. w. RICHARDS, 43, Wellington Street, Strand, W.C.

The Agricultural Gazette.

SATURDAY, MARCH 4, 1871.

MEETINGS FOR THE ENSUING WEEK.

MONDAY, March 6 { London Farmers' Club (Mr. E. Tattersall, at the Supply of English Cavalry Horses), at Salisbury Hotel, 11 A.M.
TUESDAY, March 7 { Central Chamber of Agriculture, at Salisbury Hotel—11 A.M.

THE CATTLE "CORDON" round the metropolis has almost become an institution: whatever of good there is in the arrangement is thus thankfully accepted, and the annoyance which it entails is endured with the ordinary amount of grumbling. Persons engaged in the cattle trade protest against the continuance of the restriction, on the ground that it is no longer necessary, as the majority of

For nearly forty years we have given the subject of laying down land to Pasture our most careful attention, and from a long and practical experience of the Soils of this and other countries, we are enabled to prepare Mixtures for every description of Soil, which need only be mentioned in sending the order.

FOR PERMANENT PASTURES,

Prepared for the following Soils and purposes:—

STIFF CLAYS | **LIGHT SANDY SOILS**
HEAVY LOAMS | **SHARP GRAVELS**
MEDIUM LOAMS | **CHALK SOILS**
LIGHT LOAMS | **SHEEP DROPS**
GOOD BLACK PEATY SOILS.

BEST QUALITY, 28s. to 32s. per Acre. Carriage Free. Two Bushels of Grass Seeds and 12 lb. of Clovers supplied per acre.

SECOND QUALITY (good), 20s. to 26s. per acre. Special Estimates given for large quantities.

UNSOLICITED TESTIMONIALS,

SHOWING THE SUPERIOR QUALITY OF

SUTTONS'

PERMANENT PASTURE MIXTURES,

20s. to 32s. per acre. Carriage Free,

From J. J. MECHI, Esq., *Tiptree Hall, near Kidron.*
February 5.—"Your Grass Seeds are so pure and well selected that I have often spoken of them to those who required them."

From L. L. WILLIAMS, Esq., *Boyne View, Nassau, West, Ireland.*
March 30.—"Last year I got from your Permanent Pasture Grass Seeds for 10 acres, with which I had down one-half of a 30-acre field (Irish). I am very much pleased with the way the Grass Seeds have answered, and I now want to lay down the other half of the field in the same manner."

From J. WARD, Esq., *Round Oak, Greenham, Newbury.*
July 4.—"The Permanent Grass Seeds for about 20 acres, supplied by your last year (the greater part sown with Harb), have given me great satisfaction, and produced a crop (this dry season) of about 45 tons of good hay, 4½ acres of which have fed five head of cattle during the spring."

FOR PARK GROUNDS, &c.

18s. per bushel (2½ bushels per acre), carriage free.

From Mr. HENRY AWOCK, *Agent to Lady Geary*.—"The Grass Seeds you sent last year, for seven acres in the middle of Oxen Heath Park, is the best herbage I ever saw."

FOR IMPROVING PASTURES.

Sown at once 6s to 12s. per acre.

5d. per lb., 80s. per cwt., carriage free.

From S. BRIDGLAND, Esq., *Surry County Asylum*.—"The appearance of the Grass after cutting gives the best evidence of the advantage of using your Renovating Grass Seeds. Our meadows are the admiration of all who look at them."

FOR 1, 2, 3, or 4 YEARS' LEY.

13s. 6d. to 22s. 6d. per acre, carriage free.

From E. H. NICKSON, Esq., *Foxley*.—"The Clover and Rye-grass supplied by you I have not seen equalled in this neighbourhood."

Special Estimates given for Large Quantities.

LAYING DOWN NEW, OR IMPROVING OLD, GRASS LANDS.

FOR THE BEST PRACTICAL INFORMATION ON

THE ABOVE SUBJECT, SEE

PERMANENT PASTURES,

a New Illustrated Work,

By M. H. SUTTON, F.R.S., &c.

"If you want to grow the right sorts of plants, you must know the right sorts of seeds, and you cannot do better than read Mr. Sutton's paper on Laying Down Grass, which you will get by sending to Reading."—*Agricultural Gazette.*

Opinion of Professor Buckman.—"I do not know of anything to equal it." Price, 1s. post free. Customers gratis.

SUTTON and SONS,
SEEDSMEN TO THE QUEEN, READING, BERKS.

foreign cattle are now landed and slaughtered at Plaistow Wharf, and there is ample accommodation for all the foreign beasts which are brought into the port of London on the same premises, pending the completion of the new foreign market at Deppford. It has been, however, all along understood that it should be maintained until the new market is in action, and there does not seem to be any very pressing necessity for anticipating, by a few months, an event which will happen in the ordinary course.

Whether or not the removal of the cordon will be beneficial to the sanitary condition of stock in the country, we do not now intend to consider; that the restriction is injurious to trade in its many ramifications we do not doubt, and it is equally evident that it presses hardly upon dairymen and feeders of stock, who may wish to remove their animals out of the metropolitan district to grazing land in the vicinity. To meet this last difficulty an Order of Council, which has been in force for some considerable time, provides for the removal of cattle which have been in the owner's possession for more than 28 days. The routine of the proceeding is not very elaborate or onerous, but it necessitates a certain amount of expenditure of time, and the adherence to certain forms which are so distasteful to a people who usually believe in the right of every man to do what he likes with his own. So little has the privilege to which we refer been appreciated, that many owners of animals in the metropolis are up to this moment ignorant of the existence of a way of escape for their imprisoned cattle, other than the straight but perilous course of running the blockade, as delinquents playfully entitle the act of driving cattle over the cordon in defiance of the law and in the absence of its administrators.

Avoiding this summary process, the law-abiding dairyman gives notice to the Board of Works in Spring Gardens, that he wishes to remove a certain number of cows or calves to a certain place outside the boundary; the Board, on receipt of this communication, direct the veterinary inspector of the district to visit the shed and examine the animals. If he find them free from infectious and contagious disease, he is expected to take such a mental photograph as will enable him to recognise each individual on the occasion of his next visit, at the expiration of 28 days from the time of the first inspection. If the cattle are all well on the second examination, the owner receives a clean bill of health, under which he may drive the animals named therein across the imaginary line which has hitherto kept them in. Naturally the prevalence of an infectious disease among any of the cattle on the premises prevents the obtaining of a certificate of removal, or, rather, should prevent it; but there is nothing to hinder the owner from sending away all the diseased animals before the inspector's visit, and taking the chance of escaping an outbreak among the remaining animals for the next 20 days. In the case of pleuro-pneumonia this trick often succeeds. In one particular case we remember it failed miserably, owing to the inspector detecting a recently recovered animal; and this instance stands out as a most remarkable one on account of the owner desiring to remove the cattle from the infected premises to his establishment in the country, where the cattle were free from lung disease. Fortunately for himself, his device was not successful. The provision relating to the removal of cattle from the metropolis will cease to be of use in a few months, always providing that the long-talked-of foreign market shall be completed; but we call attention to the arrangement, meanwhile, as the season is approaching when it may be desirable to take advantage of the opportunity which offers of getting animals out of London, at least for a time.

It will be understood that the restriction of the cordon only affects cattle in the metropolis. Sheep go free from the port of London under ordinary circumstances; but just now the exceptional state of the Continent in respect of the prevalence of cattle plague has rendered it necessary to slaughter all sheep and goats, as well as cattle, from Germany, France, and Belgium.

WE learn from Dr. VOELCKER's report to the Council of the Royal English Agricultural Society that Messrs. THOMPSON, BONAR & Co., the Peruvian Government agents for the sale of guano, have recently acquainted their customers that they have no more Chincha Island guano for

sale in London. The GUANAPÉ GUANO, which is, we presume, the only remaining Government Peruvian guano, is quoted at £12 a ton. Dr. VOELCKER warns his readers that it varies in composition even to a greater extent than the Peruvian has lately done. And how much that has degenerated of late is illustrated by the analysis of a sample sent by Mr. JOHN BAKER, of Hargrave, near Kimbolton, which, though a genuine guano, was two-fifths earth and water, and contained but 10.6 per cent. of ammonia, or only about two-thirds the amount of ammonia which Peruvian guano of fair average quality would contain. Dr. VOELCKER's advice should be carefully observed; the purchasers of Peruvian guanos now should insist upon being supplied by the dealer with an analysis guaranteeing the quality of the particular cargo of guano which is offered for sale. Like other guanos, varying in composition, Guanapé guano should not be sold at a uniform price, but at rates corresponding with the intrinsic commercial value of different lots, which can only be ascertained by an analysis, that may fairly be expected to be presented by the dealer to the intending purchaser.

CATTLE PLAGUE still rages in the northern departments of France, and at present it seems probable that it will be equally destructive in the West. War and peace have had their share in the propagation of the plague; in the first place the necessities of the commissariat caused the movement of large numbers of cattle from Eastern Europe, where the rinderpest has a chronic existence; from Hungary, Poland, and Galicia, infected herds were sent to Prussia and France. The disease accompanied the marching armies, and leaving the Prussian States comparatively free, it quickly extended from the North to the West of France. Belgium and Luxembourg soon suffered from the visitation, and in both those countries the disease continues to spread. It is reported that cattle plague was introduced into the eastern part of France by a large herd of Silesian and Hungarian beasts which were brought by railway to Wissembourg, and then travelled by road to Nancy, where they remained for several days—until, in fact, many of them died from the disease. The remaining animals were sold in small lots and sent towards the centre of the country, carrying the plague with them wherever they went. Stringent precautions are being taken by the Prussian Government to arrest the spread of the malady, but in the disturbed state of the country where cattle plague is most rife, it is hardly fair to expect that the measures of repression will be effective. The stamping-out system is infallible in regard to the extinction of cattle plague when it can be properly carried out, but it requires prompt and united action, cessation of the movement of cattle, and the almost undivided attention of the authorities, none of which can it yet receive at the seat of the scarcely ended war.

THE subject of LOCAL TAXATION was made the subject of a resolution, moved in an excellent speech by Sir MASSEY LOPES, M.P., before the House of Commons on Tuesday evening. It was met by Mr. GOSCHEN on the part of Government, who declared their intention to bring in a Bill on the subject. He coincided in that portion of the motion which stated that every species of property should contribute to the national burdens. The Government had recognised the duty of inquiring into the incidence of Imperial as well as local taxation, and they hoped soon to place the whole of the information they had collected before the House. It was their ambition and their desire to inaugurate a new era on this subject. He was not so much an opponent as a competitor of the hon. baronet, therefore he thought it much better to deal with the subject by Bill at once than to refer it to a committee. He concluded by moving the previous question, which was carried by a majority of 46 in a House of 436. The following is an abstract of the speech of Sir MASSEY LOPES:—

Sir M. LOPES moved:—"That inasmuch as many of the existing and contemplated charges on the local rates are for national purposes, and that it is neither just nor politic that such charges should be levied exclusively from one description of property (viz., houses and land), this House is of opinion that it is the duty of the Government to inquire forthwith into the incidence of Imperial as well as local taxation, and take such steps as shall ensure that every description of property shall equitably contribute to all national burdens." Having shown that local taxation amounted to 20 millions annually, while Imperial taxation, exclusive of the interest of the National Debt, is

only 40 millions, he contended that the whole course of legislation had been to increase the former, and to annually reduced the latter. The whole income of England and Wales was 700 millions, but 100 millions of that income paid the whole of our local taxes. Of the local taxes, 12 millions were levied for Imperial purposes, and 88 millions for purposes which were purely local. The collection of Imperial taxation was fair and equitable, whilst that of local taxation was simply chaos, and the basis upon which it was levied had not altered for 300 years. Worst of all, he believed that the burden of local taxes fell most heavily upon the poorer classes, and he estimated that since 1835 upwards of twenty millions of Imperial taxation, and of local taxation not one iota. In 1834, when the present Poor-law was established, only one-tenth of the whole amount levied was expended for purposes not connected with the relief of the poor, and the remainder of the whole was so applied. Of the £12,000,000 raised for the relief of the poor, £7,500,000 levied upon the poor-rate assessment was expended solely for the use of the poor; £1,000,000 levied upon the same assessment was expended for purposes unconnected with the poor; £3,500,000, levied upon the county-rate assessment, was also devoted to other purposes than the relief of the poor. He agreed with Sir GEORGE CORNEWALL LEWIS, that all income ought to contribute to the maintenance of the poor, and the House of Lords which he sat in had reported that the object was not one to which every description of property ought to contribute. The poor rate was, after all, only a police rate, and was essential for internal defence against the dangerous classes, as the army and navy were for external defence. But of all the taxes under which the poor are taxed, the most onerous cost of maintaining lunatics being thrown upon real property alone. Last year £711,000 was paid out of the Poor-law assessment, and in addition to that £310,000 was raised by county rates for building lunatic asylums. Legions of poor were unemployed, and the Government national responsibility and a national charge, and he was glad to be able to refer to the acknowledgment of that principle by the Prime Minister, who two years ago proposed to apply a part of the surplus of the Irish Church property as national property to fund lunatic asylums, reformatories, and hospitals. When the Act of Elizabeth imposed upon real property alone the burden of maintaining the poor, but it must be remembered that at that time there was no other property, and accumulations of capital had been created since by the labour of the poor man. When the Corn Laws were repealed, and England was engulfed in the ocean, the Government gave a year's pay to their widows and orphans, and the public liberally contributed to the same benevolent object, but when that money was gone they must go to the poor-law union, where the poor were maintained. When, as it maintained discharged soldiers and sailors, and the widows and orphans of those who sacrificed their lives in the service of their country. Of the £1,000,000 raised by the poor-rate assessment, and applied to purposes unconnected with the poor, £77,000 went to defray the cost of the registration of births and marriages, £64,000 for vaccination, £71,000 for Parliamentary registration, and £660,000 for highways. The three first items every one would admit were national objects, and they ought to be charged upon all descriptions of property. For the maintenance of roads alone upwards of £2,500,000 were raised last year. They used to be called the Queen's highways. Why should not all the public pay for them? But the present system of imposing local burdens was full of anomalies, inconsistencies, and inequalities. The incidence of the property now exempted being made as liable to those local burdens as the owners of real property? But the manufacturing and commercial class did not pay their fair share. It was said, if your rates increased, your real property increased in the same proportion. How had real property increased? By the investment of the proceeds of personal property. Rent was composed of two parts—one natural, the other artificial. The natural part was the produce of the soil, but the artificial part was obtained from the investment of capital. He should like to know why they taxed that more than any other property. During the last 14 years the increase upon land had been 16 per cent., on houses 28 per cent., and upon professional incomes 77 per cent. No policy was so fatal as to tax the industries employed in the cultivation of land and in the building of houses, and to make the owners of the worst of property dwellers for the poor, and the herding of people together in a way that was a disgrace to the large towns of the country. When he moved on this subject in 1869 he got a committee from the right hon. gentleman, but all it suggested as a remedy was, that the ratepayers should be asked to contribute to the relief of them, which reminded him of the illustration of his hon. friend the member for West Norfolk, that it would not relieve the donkey of any part of the burden merely to divide it into portions.

THE supply of English Wheat to Mark Lane on Monday was small; but its condition being bad, last week's prices could not be exceeded.—At the Metropolitan Cattle and Sheep Trade, on Monday, the supply so brisk as on the previous Monday; and on Wednesday, the supply being again in excess, prices were still lower.—There is a good trade doing in seeds. MESSRS. SHAW report that the range of prices is so great, varying with qualities, that any figures they might give would be only misleading. For red Clover seed, for example, they are now making from 38s. to 98s. per cwt., according to sample. They are therefore bound to be satisfied with merely noticing the rise and fall of prices.

Our readers will have seen, with satisfaction, that two sums of £5000 have been voted by the Mansion House for the relief of the unemployed seed sowers in the devastated districts of N.E. France. The agents of the committee who administer the PEASANT

FARMERS' SEED FUND are two.—MR. SARTORIUS, at Amiens, and Col. ELPHINSTONE, at La Beaune. The committee has now sent, or are sending as fast as possible, £5,000 worth of seed corn to each, and they have bought for distribution £8,000 worth more. The actual purchases have been,—spring Wheat, 3,400 qr.; Barley, 1,500 qr.; Oats, 3,000 qr. They also granted £500 worth of corn to the Seed-corn Committee of the War Victims' Fund, for distribution in the Metz district. Let it be borne in mind, now that Peace is declared, that subscriptions for the relief of the French are now certain to reach their destination. No one need fear to send a quarter of Oats for seed lest it should go to feed the Uhlan horses.

The Warwickshire Chamber of Agriculture recently discussed the administration of the JURY SYSTEM, out of which hardships and nuisances often befall country residents. After a paper by Mr. ROBBINS, in which he objected to the system as at present worked, mainly because of (1) the number of consecutive days' attendance forced upon jurors; (2) the uncertainty and expense consequent upon such attendance; (3) the necessity of jurors leaving the business of jurors, attending; (3) that more than one partner in a firm should by law be liable to be summoned to act as a juror; (4) the fact that the allowance to jurors in civil cases was only 10s., and £1 1s. to special jurors, with a prospect of even this allowance being repealed; while (5) in criminal cases no allowance whatever is made to jurors; Mr. CALDECOTT submitted the following resolutions, which were adopted, and are to be brought under the attention of the Central Chamber by the deputation attending the meeting of the 7th inst.

"That Grand Jurors, both at Assizes and Quarter Sessions, are no longer needed as a safeguard to the liberties of the subject, are more calculated to impede than to forward the ends of justice, and therefore should be abolished. That the number of jurors for every jury is unnecessarily large, and especially in ordinary civil cases, seven would be ample, and would relieve the jurors from the trouble, annoyance, and protracted attendance at the courts. That, from the experience of the members of this Chamber, there has been great irregularity in the summoning of jurors, and no means are available to ascertain whether the jury list has been exhausted before a juror has a second summons in the same year. That this meeting is of opinion that the list should be printed by the Clerk of the Peace, and copies sent to all Boards of Guardians, and also purchasable at a reasonable price by the public. That this meeting is of opinion that the jury lists should have a column added to them, setting forth those jurors who had been called upon by the Guardians and Overseers, with the dates of service. That it would be a great advantage to the public, if the 21st section of the Juries Act, 1870, was repealed, and the panel so divided as to allow of relays of jurors being provided every second day, instead of compelling the whole of the jurors to attend from the commencement of the Assize. That the jury ought to be paid, and delivered to the Attorney-General, and he should be empowered to introduce a Bill upon the subject, no immediate action on the part of this Chamber is required."

The Society of Arts are distributing specimens of an envelope, giving a writing surface 8 inches by 4½ inches, of which the paper is to be found by free trade, and sent to be stamped, or stamped by an adhesive stamp, which it is proposed should be substituted for the post card produced by Government monopoly and unnecessary interference with trade. And the question is asked—If the Post Office is able to supply a card, so simple, so handy, and deliver it to any part of the United Kingdom, why cannot the Post Office stamp an envelope weighing less than the card, and supplied by the public, thus saving the cost of the card, and discouraging impertinent curiosity, and deliver it like a letter? Every Member of Parliament who understands administrative economy is advised to ask the Postmaster-General this question in Parliament until it is satisfactorily answered.

At the annual meeting of the Belfast Chamber of Commerce, on the 16th ult., the report presented some interesting details respecting the great export trade in pigs there carried on. The provision trade is one of the most important, and has been so since the Treaty of Commerce, in 1763, and the high price of pigs have largely induced farmers to pay attention to a class of stock,* so that this season there is an increased

supply of the raw material, and a very extensive business has been transacted in Belfast. One very important matter referred to in the report is, that for several years curing in summer by means of ice has been carried on in the southern curing marts of Waterford, Cork, and Limerick, with great advantage.

An excellent letter on the subject of premiums for horses at agricultural shows has been addressed anonymously to the *Ipswich Journal*, in which the complaints of "An Old Subscriber and Exhibitor," about an alleged undue preference being given to thorough-bred stallions, are very effectively answered. The following is an extract:—

"An Old Subscriber and Exhibitor" says, "undue preference is given to thorough-bred stallions, two prizes being last year offered, while only one was offered to the half-breds, &c." What is the fact? Of five premiums offered for stallions (amounting to £55), two only are confined to "thorough-breds" (amounting to £20), and of the other three (amounting to £35), two must be half-bred, and the other is open to either; and if this last is generally won by a "thorough-bred" it is simply because, in the opinion of the judges, it is a better animal than the half-bred. I have no objection to show weight being only to such as these to remedy the acknowledged scarcity of "weight-carriers," I can only say, "God help us." Did any one ever see a good "weight-carrying hunter" that was not got by a thorough-bred sire? never did, and I have the same objection to the matter when I see a good one. I generally try to ferret out his pedigree. Look at the highest priced horse at the late wonderful sale of Lord HENRY BENTINCK's horses (where they averaged over 200 gs.), Sauterne, 640 gs., was got by the "thorough-bred" horse Sauterne, and the next four highest priced horses were all by thorough-bred sires. Go into Leicestershire and spot the best looking "weight-carrier" you can see, and ask his pedigree, and it is a hundred to one you find his sire in the Stud Book; or, to come nearer home, ask Mr. M. SEXTON what that magnificent weight-carrier is got by, and you will find it is a thorough-bred sire. I can tell you, by Lord DERRY's Paletot, a thorough-bred horse. Or ask Mr. SHEPHERD what those long-legged stepping coach horses are by, so full of blood, which alone sell now-days, and he will tell you the name of the sire, and you will find it is a thorough-bred sire. And a hack of all things, must have blood, either to use or to sell. Again, to quote a country instance, ask Mr. BADHAM what his nearly invincible Eclipse is by? Wetherden, a thorough-bred horse. He was beaten only by the Birnie, and was won by a thorough-bred horse. Another thorough-bred horse—good enough for Lord WESTMINSTER since to give 200 gs. for. Can the wretched specimens that "An Old Subscriber and Exhibitor" so bemoans as standing neglected and undervalued at the solid sires at Sudbury get such horses? To keep such horses is simply infatuation, much more to expect other people to use them."

In a recent action, "RAYNBER and others v. GOULD," tried at Westminster before the Lord Chief Justice, to recover the sum of £132 12s. 4d. for sacks and for Tares alleged to have been purchased by the defendant, the counsel for the plaintiffs—Messrs. RAYNBER, CALDECOTT, BAWTREE & Co. (Limited), corn and seed merchants, carrying on business at Basingstoke, and elsewhere—stated that he understood the defendant was relying on a technical objection to the Statute of Frauds. The statute required that, in order that an agreement for the purchase of goods of the value of £10 and upwards may be a valid one, there must be one of three things, either the contract must be in writing, or there must be a part payment, or there must have been an acceptance of the goods. The defendant had ordered them to be delivered in a particular manner to a third person; that direction had been complied with; and there had been an actual receipt and acceptance of such goods.

After evidence had been given, counsel for the defendant cited authorities for the purpose of showing that there had been no acceptance of the goods by the defendant.—The Chief Justice overruled the objection. Counsel had raised just enough doubt as to the law with regard to the acceptance of the goods to warrant the judge in granting leave to move the Court above to set aside the verdict on that ground. At the same time, the general defence was up and the jury and dismission. A verdict was then taken for £132 12s. 4d., with leave to the defendant to move the Court above to reduce the amount to £1 13s. 4d. (the value of the sacks) on the question of law.

The following paragraphs, relating to next week's Shorthorn sales, are condensed from Mr. THORNTON'S Circular:—

The pedigrees of 43 cows and heifers and 19 bulls are contained in the catalogue of a selection from Col. KINGSOTE'S herd, to be sold at Kingscote, on Wednesday, March 8, by Mr. STRAFFORD. The herd at Kingscote is a large and old-established one, having been founded by Col. KINGSOTE's father, who was advised by the late Earl DUCIE. There are eight tribes among the cows and heifers, comprising those families at Kingscote; they are generally known as Earl DUCIE'S Cows (by DUKE OF CORNWALL, (5947) MR. WILKINSON'S Hebe (by SPECTATOR (2688), Lord SHERBOURNE'S Lily (by Lord JOHN (4257), Mr. LADD'S Seraphina (by STRATON (5336), Mr. DUDING'S Camellia (by SPECULATOR (2599), Bowley's Gervase (by BRUNEL (7857), and Mr. ABBEY'S Victoria (by PRESTON (4908), two Darlings, one Ursula, and one Garland, are also among the cows and heifers. Besides the bulls bred from these tribes there are several descended from Mr. THOS. BELL'S cows, the crosses of which are of Bates

blood. A white yearling Oxford bull will be offered, subject to a reserve, and there is also a pure Wild Eyes bull, Lord REID 2D (24,460), and one of the Kirklevington tribe, 2D EARL OF WALTON (19,679).

The sire first sold at Kingscote was built either in use or bred at Tortworth, and they were succeeded by GRAND DUKE OF OXFORD (16,184), DUKE OF WHARFEDGE (19,648), and 2D DUKE OF WETHERBY (21,618). These bulls, all bred by Capt. GUNTER, are of the Oxford and Shropshire blood, and the animals all, however, by 3D DUKE OF CLARENCE (33,727), a very fine Duke bull, bought at Wetherby for 500 gs. The stock at Kingscote is much esteemed throughout the county; as a large quantity of cheese is made, the greatest attention is paid to the dairy properties, and the animals are also of large size, versatility, and of good quality.

The second periodical sale at Berkeley Castle, Gloucestershire, of bulls and heifers belonging to the Right Hon. Lord FITZARDING, will take place on Thursday, March 9, by Mr. JOHN THORNTON. The list includes 20 young bulls and half-a-dozen heifers, bred from good cows, selected from the stock of Messrs. BOWLY, RICH, and HOLLAND. Since the sale last year, the herd at the Castle has been increased by the purchase of a few of the best animals that were offered at Capt. OLIVER'S sale last year. The sale will consist of three of the finest cows, Lady Wild Eyes 2d, Countess, and Bractel 2d, by that noted sire GRAND DUKE 7TH (19,877). Lord WILD EYES 2d (26,726), a pure Bates bull, who is the sire of many of the young animals, is similar to the best in the country. The herd at the Castle has been established for the improvement of the stock throughout the famous district known as the Vale of Berkeley; milking properties are especially cultivated, and the fine character of the stock, coupled with their good blood, makes them very desirable animals.

THE SERVITUDE OF LABOUR.

Your criticism of my last communication, on the whole, so far as it goes, must be taken to the credit of the plain, simple little boys swallow a powder when mixed with a great deal of jam.

Will you permit me to make a few remarks on the general question of labourers and their duties, and also to refer to the excellent letter of your lady correspondent, in which your friend pictured her dairy, with the careful housewife and her assistants entering upon their morning duties at an early hour. She has shown by a few touches—using her pencil with true feminine delicacy—that there have been 24 years during which these duties have neither been neglected, nor made a subject of complaint. I have been looking at her letter, and I say, "now that our family are mostly grown up, and can share in the work, I do not find it very burdensome."

There is nothing despondent in your correspondent's tone, and the chord of sadness that vibrates manifestly, as she writes of the past, is not a jarring discord like the harsh resonance of years mispent. This same tone, sober and a little sad, is the key-note of all Nature's chords, and the melody of her music is the same tone—whether for the better or for worse. Heaven only knows at present, but they cannot alter Nature or her voice. There is a gentle melancholy in the lowing of the herd, and the wind among the Fir trees murmurs in the same key. All our machinery cannot change the tones in which Nature speaks. They are sad and solemn, as though addressed to serious, thoughtful ears and hearts; they have been so from the beginning; they will continue to be so for the future. And it would be well to pause often in the midst of the peculiar labours of these times, while we are engaged in the mechanical task of adapting means to ends with more economy, to consider that all these improvements and modifications are on the surface of things, and that if we improve our cheeses, and at the same time injure the character of our cheese-makers, we shall have done badly.

I hope your gentle friend will write more letters, and form society on some of those great social questions that stand in the pathway of our progress with dark and menacing aspect. "The heart sees further than the head," for an open, loving heart reflects the ways of mankind by virtue of its depth of human sympathy; while, too often, the image one sees reflected on what men call their hearts, is but the picture of that miserable creature—self.

Your friend remarks, "I have been thinking of the arrangements of a country dairy, and how they should be, there would be no need for making cheese twice a day, and then it would be much lighter both for mistress and servant." This accords with what I pointed out in my last letter, and have again observed more recently, on revisiting a great dairy district. I hope, my lords and gentlemen, owners of dairy farms, will instruct your agents to attend to these details. A little expenditure might perhaps lighten those labours which may to the dairy farmer be a "servitude." "Charity begins at home," and without the medium of a cheese factory you might erase the prefix in the word over-work, which lies at the root of the whole matter, for it is not work which your tenants complain of, and I am convinced it was not work, but over-work, which Lord Vernon deprecated.

His lordship's protest against the excessive labour to which the household of a great dairy farmer are subjected was not in praise of his honour, but its meaning should be rightly understood, for there is no doubt that false notions on the subject of work are rife among those who live by handcraft. They draw dis-

* The number of pigs returned in the public Agricultural Statistics of Ireland during the last five years has been—(1866) 1,497,274, (1867) 1,235,191, (1868) 869,578, (1869) 1,082,224, (1870) 1,449,622.

tinctions as to the credit attaching to different kinds of labour which have no existence in fact, and which have only recently existed in imagination. Your correspondent says of her servants, "they have an idea that the work is not only very heavy, but less respectable than mere house-work." I have travelled much of late years in country districts, amongst a class who must be known well to be understood, and on my own homestead, now a scene of the past, there were many who laboured with a fidelity and confidence that came of long years and made them my friends. And I have seen much of the poor, though at a greater distance, in cities, and especially in the greatest city in the world, and everywhere I have observed the same spirit which makes the responsive spirit among our domestics. These tones of "don't like" and "ought to," sometimes followed by "can't" and "won't," are disorders to which, I am sorry to say, we are becoming accustomed. The power of mechanics has to a great extent broken the ties that bound the poor to the class above them; it has done much to destroy the ancient virtue of fidelity between master and man, by isolating the labouring classes, and ranging them in masses apart from their employers.

No one denies the benefits, moral and material, derived from steam, but they remind one of the old saying, that where Providence has placed one benefit there an unfriendly power has fixed two evils.

One of these evils I have stated, and it is one which has not yet been grappled with, because, hitherto, we have been intent on the practical utility of modern improvements, and we have had no time or inclination to observe their effects on the character of the labourer. Another effect of mechanics, for which I fear there is no remedy, is the individual helplessness which necessarily overtakes the mechanic who waits upon machinery till he becomes personally useless, except as a cog in a wheel, and only in that particular wheel to which, poor wretch, he belongs. I am, therefore, a little jealous when I see machine work introduced into the domain hitherto held by handicraft; and I am sorry to see the decay of several rural arts which could be named.

Another evil is the preference for manufactured goods, even when bad, over the homestead, if they come from a distance. I hope I need not apologise for reminding your readers of the labourer's gaberdine, that respectable garment derived from the coat of his Saxon forefather, and called in some districts a "round-frock." No labourer's garment is so cheap and comfortable, and none so neat and elegant when closely fitting to a good figure, yet he has cast it off, and wears now a noisy, fusty, musty *slop*, *i. e.*, made of iron-look and ill-fitting—a vile garment for comparison, but a novelty made by machinery in some big towns, where reigns one of those great Fire-gods which we have all of us, thoughtlessly perhaps, by precept and example, been teaching our smock-frocked brethren to gaze at and kneel before. The worship of the Fire-imp has become a settled creed in our generation. Our fathers were wiser, but we have completely confounded material progress and the improvement of humanity. Wealth, comfort, convenience, and virtue have become, in some quarters, synonymous terms. Old men just now are rather apt to discount, not that we really honour them less, perhaps, but we pity their ignorance and despise the times when they were born. If a head, grey with years, and stored with experience and knowledge of many things, is observed to be shaken doubtfully at some glaring domestic or social innovation, quite outside of mechanics, and quite insufficient to measure, the words "steam and progress" as they do, all the moral sentiments?

In the present age no greater power than steam, none half so great, has been visibly manifest among men upon earth. It has bestowed upon this country unexampled wealth and power, and has scattered broadcast in society a thousand amenities and comforts. These factories, with milk pans scoured by steam, as they cleanse and sweeten tubs in the great brewing towns, which have no window overlooks, will probably be added to the number of our conveniences and reliefs from the dangers of our star good. These are great benefits; still, the Fire-imp is one of the powers of earth after all, a mighty utility pressed into the service of man by great inventors and a succession of active improvers. He helps us with his wheels and contrivances to cut down cost, to abridge space, and to save time. He makes the world more seductive, but has he improved the human character, and does he do better to withstand temptation? It is no more his mission to do that than it is the mission of the wind and water, the other motive powers. And the image of the Fire-imp, which has been set up like that of Baal in times of old, must be overthrown. *Handcraft.*

MEAT AND CORN.

MR. MECCHI asks some questions, and makes some remarks on my article about this matter. He must bear in mind that the farm I took as an illustration is land of purely hypothetical. That grain consumed on the land to produce meat should pay a great deal more than if sold in manure. It does not seem to me contrary to sound reason. Grain grown in a hill country has to

be sent a long way to market, subject to heavy expenses, and when it gets there is sold at the lowest or "feeding" price. Meat, on the contrary, from a hill country, sells quite as well as any other meat. I cannot give

Mr. Mecchi details of capital in an establishment which does not exist. Mr. Mecchi, however, will see for one thing, that the fat sheep are sold just as they are, say for the bullocks which are bought in during October. I think Mr. Mecchi, in his calculations about farm capital, reckons that a farmer pays for everything the moment he gets it, that his rent is paid the moment it is due, his seed and manure paid for the instant they are bought and before they are put into the land. Now, this is not so. Farmers have credit on a great many things, and credit is capital. A landlord does not get his rent the moment it is due, his manure and seed bills and tradesmen's accounts in general are paid every six months, sometimes indeed only once a year; and if a farmer is doing well by his farm, and his landlord knows that certain sales of produce take place only at certain seasons of the year, he will usually let his rent lie over until those periods come round. £1 per acre for rent, rates, tithes, and taxes, may seem low, but I can assure Mr. Mecchi that a man's hundred thousand acres of good useful ploughable land in Wales, which the landlords would be glad to let at a price that would not exceed £1 per acre for all those things. Tithe falls principally on corn land, and when the tithe was fixed corn land in Wales was only in patches.

Sixteen shillings per acre is a very fair rent for land in a hill country. Five or six shillings per acre for land in a state of nature is an ordinary rent, and considering the state and cost of the ordinary land on which for buildings, fences, draining, liming, and breaking up, will put a landlord a very fair percentage; and 4s. per acre will more than cover rates, taxes, and tithe. Now, if we take the capital in the month of September, we shall have—

Sheep, 1000 ewes	£1500
Putto fat stock, 1000	2000
Wages 9 months, say	550
Seed, 4000 bushels	1000
Manure	150
Rent and taxes, 3 months only ..	250
Interest on £10000 at 4 per cent ..	400
Sundry expenses, 9 months	100
Implements, say	500
Living expenses, 9 months	375

£9445

—which comes pretty nearly to my estimate. I only put down three months' rent, for it is usually pretty nearly six months in arrears.

"Leisurely" objects only to the assumed profit of £10 per head in cattle kept five months, and his objection is that he only got £3 5s. per acre of corn. Now, for several years I was in the habit of buying bullocks in Wales in October, and sending them down to a small place I had in Sussex. I usually sent from 30 to 40, according to the food I had there. They never got anything but straw with a very few roots (we could not grow roots properly), and what little hay remained over after feeding the horses. The quantity of hay would not have averaged 1½ lb. per day, or say, 200 lb. per head, and some years they got none. My gross profit then, for five months, was £10 per head. Now, for £5 10s. to £6 10s. per head, without any corn or cake of any sort or description. This gross profit was after charging the cost price in Wales, besides 5 per cent. commission to the man who bought for me, as well as the whole expenses of sending from Wales into Sussex. Possibly the "great" profit was made by the low price in Wales and the high price in Sussex, but what of that? If I had bought them cheap in Wales, and fed them fat there, so as to send them to a good market, I should still have realised that profit. If "Leisurely" and a few more of his easy going brethren would come up to Wales and buy the cattle, instead of leaving it to dealers to be the go-between, perhaps they would raise our prices, and so increase our farmers' profits, at least our breeders' profits. *G. A. H.*

THE GARDEN OF THE FARM.—No. I.

In a recent review of "Our Farm of Four-Acres," you quoted a true description of the low state of the great majority of farm gardens throughout the country. Of late years great improvements have taken place in the gardening of cottagers, but the wave of horticultural progress has hardly leaved the outcrop of the gardens of farmers. This is a singular social fact, deserving of notice. The reason of it may be found in the special efforts put forth to improve cottage gardening, while no corresponding effort has been made to improve that of farmers.

Local horticultural societies, village flower shows, county agricultural associations, have all exerted a powerful influence to improve cottage gardening, and the result is that the cottage garden is out of the gardens, and that of a higher quality. Taste has also been cultivated, and the love of the beautiful fostered to such an extent that the most utilitarian cottagers nearly all have their flower garden or patch, the area of which is gradually but surely widening. Others who cannot afford to devote a patch, however small, wholly to the pursuit of the beautiful, effect a tolerably successful compromise thus; they cover their cottages, or train up tastefully near their doors, groups, lines, or em-

bowered arches of Scarlet Runners, and thus grow one of the showiest flowers and one of the most profitable and best vegetables at the same time. The mention of the Scarlet Runner and its spread among cottage gardens is likewise most suggestive of another great step in advance that has recently been taken by cottagers. The growing of more than the number of varieties of vegetables that they used to do. French Beans, Vegetable Marrows, ridge Cucumbers, Leeks, superior varieties of Peas, Cauliflowers, and Broccoli are now becoming common. Strawberries of superior varieties are making their appearance in many gardens. The old sorts of fruits are being discarded for new; and in the provinces we have no keener observers of superior varieties at our local shows than many of our cottage gardeners.

It seems so extraordinary that while all this interest is being excited among the rural labourers, so little improvement is seen in farm gardens. Of these it may be said (with many notable exceptions, of course) that they continue as they were from the beginning of civilisation. The same crops and the same varieties, with the same unsatisfactory results, are seen year by year continually; and in hundreds of instances, where farms have been improved to the utmost extent that general gardening and the most skilful practice apply, the garden has reaped no benefit from the light of the one or the advancement of the other. Starved in the matter of manure, scamped in the mode of digging, neglected as to cleaning, and stocked with comparatively worthless varieties of vegetables and fruit, the farm garden has sunk down into a useless incumbrance, a sort of necessary evil, to be endured only as solely on the ground that it costs but little to cottagers. Keep it good, say I—do you call that state of things keeping? Why Eden itself would have become a howling wilderness if Adam and Eve had not dressed and kept it better. The earth has not yet learned to practise the highest of Christian graces, that of the forgiveness of injuries. Neglect it, and it will have its revenge; treat it liberally, and its rewards will be in exact proportion. As ye sow, so shall ye reap, in your gardens even more emphatically than in your fields. I believe in seed sowing, but it may be carried to excess; and until farmers learn to sow their gardens more thickly with manure, labour, skill, love, they will never reap a harvest worth the carriage home from thence. But sown with a full complement of the above seeds, the garden will become the most profitable as well as the most pleasant spot on the whole farm. Every day it will yield something for home consumption, and, with its little nook devoted to flowers held sacred to the use and exhibition of the beautiful could not fail to exert a refining influence upon those whose fate is so often to battle all their life long with the somewhat hard realities and stern utilities of a modern farmer's life.

Admitting, then, as most of your readers must, the generally neglected state of farm gardens, the great practical question remains, How is this state of things to be remedied? Several modes are possible, and each of them may be the result of a passing notice. The first, and perhaps the best, is to encourage the farmers themselves to set a good example. I am thankful to notice that this is being done in various directions, and the result is at first rather discouraging. The innovators have a good deal of banter to put up with: "Better drain the close meadow, or subsoil that upland, or give the muck to the Mangel, than throw money and labour away on the garden." But after a time superior crops, and a constant display of pretty flowers, begin to tell, and the world begins to laugh away to itself.

But farmers are characterised by great immobility. It has even been said that they are worse to move than churchwardens—and that the latter and the church steeple are equally immovable. That of course is a libel upon farmers; but still it is difficult to lift them out of the deep rut of past practice when the money to be made by the change is not very obvious, and will not sensibly affect their banker's balance. So to this good example we would suggest associations among farmers for the express purpose of improving their own gardens. We have cottage garden societies in plenty—why not tenant-farmers' garden societies likewise? Or, again, many local horticultural societies have a cottager's branch, distinct from the other, in which equals only compete, and all see the products shown. Why not also a branch for farmers? In many of the county associations, again, farmers themselves have anticipated some such arrangements. The garden prize is shown, and awarded, and there are special prizes for amateurs, that is, for farmers and others.

This is good as far as it goes; but the farmers ought to have a class to themselves, as it is hardly fair to expect them to compete against clergymen, doctors, lawyers, &c., who often employ skilled gardeners. Besides such competitions of garden produce from the gardens of tenant-farmers, there ought to be special prizes offered in each county for the best kept, kept, and arranged farm garden—that is, the garden with most in it of the highest quality and greatest variety, freest from weeds and other untidiness, and in which the best taste in the disposition of the crops, the growth of flowers, and the relative proportions of the quantities of each crop were most prominently displayed. Such prizes, awarded by competent judges, would do much more than the exhibition of one or

more special products to improve the farm gardens throughout the country. A man may grow a very fine dish of Pears, monster Potatoes, Onions, or Gooseberries in a very dirty untidy garden, and get the prize for them too; but general, I had almost written unusual, excellence alone could command the prize for the best farm garden, and it would then become an example to the whole neighbourhood. The result would be a race for the prize, which if it did not succeed in unseating the first rider would probably do better still—bring all others abreast of him. Such at least has been the result of the prize garden system among cottagers, and surely farmers could show as much public spirit or more, when once fairly aroused, as the labourer. As to funds, there could be no difficulty in raising a handsome sweepstakes for the best kept garden in the parish, union, or division of county, among tenant-farmers. It would be desirable to have from four to six prizes, as this would sustain the interest and enthusiasm engendered by the prize system at a higher pitch than if all were blanks but one. Every year there would be a struggle among the prizetakers to reverse their positions, while those outside would occasionally leap to the front over the heads of all others at one bound. All would have an equal chance, as the size of the garden should count for nothing in any such system of prizes.

It is in the power of farmers to adopt either or both of these methods of improving their gardens, but in the worst districts it is to be feared they will hardly do so. There is great want of interest in such matters; you may travel through some counties and scarcely see a creditable farm garden. It has been suggested that, where the mass of farmers are entirely indifferent, two other parties should take the initiative—the parson and the squire. Well, both may do much to create an interest in the matter. Clergymen in country parishes have mostly good gardens, and the farmers' wives and daughters might often be won over by giving a tea-drinking on the lawn at the vicarage when the garden was in the greatest beauty; and gentlemen like the Rev. Reynolds Hole could interest the most devoted pig or sheep breeding farmer in the glorious beauty, and almost dropping sweetness of the Rose. By making their own gardens like their lives—models for the whole parish, and exciting the wish to produce both at home, clergymen may revolutionise farm gardens, with even greater ease than they can change the lives of their parishioners. In many instances they have already done so to a great extent. They have been the life and soul of village flower shows, and have persuaded many a farmer to give handsomely to his cottagers for improving their gardens, while continuing to neglect his own. Perhaps if the clergy devoted equal attention to farm gardens as they have done to those of the labourer, they might be at least equally successful. The squire or the landlord may aid the improvement of farmers' gardens in various ways. He can advise about the improvement of old gardens, and can suggest—order if need be—the formation of new: and we know that his advice is generally gratefully accepted, and his wishes anticipated, while his order is law to many tenant-farmers. The state of farm gardens is likewise a hard question to a great extent. Many old gardens are wholly worn out, more are quite inadequate to provide for modern wants, while a great many need fresh furnishing. The sites of gardens can hardly be changed or their areas extended without the consent of the landlord, while yearly tenants can scarcely be expected to plant largely or well without any security of gathering the fruit. Therefore, where complete renovations or new gardens are necessary, the landlord might undertake the work, and do it thoroughly as a permanent improvement to the farm, reimbursing himself by a charge of five per cent. on the outlay added to the rent; of this I am certain, no outlay on the estate would repay all parties concerned better.

The squire or his lady would likewise be able to bring or find the requisite skill or taste needed for such undertakings. In the winter season the gardener might be furnished with a special staff of men for this purpose. Or, possibly, in most instances, the farmer would gladly find labour if the squire found the plan, taste, and material. By such arrangements, each farm on every estate throughout the country would soon be provided with good gardens. The keeping of them would become a simple matter, and might be left safely in the hands of the tenants themselves. If the squire, the squire, and his lady, would only sympathise with the farmer's efforts with approval, and stimulate him in

his new career of good gardening by the force of example and their active sympathy and interest, there is no reason in the world why the class who are so proud of their Wheat, their bullocks, and their Mangels, should not be equally proud of their Roses, Peaches, and Cauliflowers. Even as a source of food the garden ought to be the most productive plot of ground on the farm; while as a mine of pure, ennobling, satisfying pleasure, a well cultured, carefully furnished garden is inexhaustible.

Failing any of the foregoing means of improving the gardens of farmers, or as aids to them all, I would add the advocacy of the agricultural press, and with your permission I purpose giving a series of practical papers on farm gardens—how to make, furnish, keep, and, perhaps I ought to add, enjoy them. D. T. Fish, F.R.H.S.

TILE MAKING MACHINES.

WE give below an engraving (fig. 63), from the Journal of the Royal Agricultural Society of England, of Mr. J. D. Pinfold's tile-making machine, to which the first prize in that class of implements was awarded at the Oxford meeting, of which the following description was given by the judges:

"In Pinfold's largest machine—a splendid affair—the cutting apparatus is driven by gearing from the machine, and cuts as the clay is travelling, so no stop is necessary. The cut is a little straggling owing to the resistance of the clay and the spring of the wire, but it

rate as the clay, and hence makes a square cut. The work is thus continuous, and goes on just so long as there is clay supplied. The great feature in Pinfold's machine, and which in the opinion of the judges more than counterbalanced the extra power, was the ability to deal with clay in a less prepared state, and the economy of labour thereby."

IRISH PLOUGHING MATCHES.

I HAVE been much pleased with the work performed at the following ploughing matches which I have attended the past month in this land of green fields, and, let us hope, now more contented homes.

On the 14th ult., at Stradally Hall, on the farm of R. G. Cosby, Esq., we had as excellently managed as well as scientifically performed specimen of work as it has been my happy lot to witness. In the first place, when the ploughmen had drawn their lots and had nearly finished the task of dividing their field, and got their poles up ready to begin, and the crowd ready for any spree to fill up the measure of their appetite for mirth, a football was kicked off in the adjoining field, which had the desired glorious effect of drawing off all those who had more affinity for frolic than ploughing; thus leaving the ploughmen a field in which to do their work in a worthy and honest competition. After all was fully started the football was withdrawn, and the more frivolous were absorbed amongst the wise and industrious, and bent on the vast advantages to be derived by the competition between the first-class ploughmen, who were straining every nerve in laudable competition for the prizes offered. Perhaps at no place has so much interest ever been taken in double-furrow ploughing as was shown here in the working of Howard's new patent double-furrow plough, which in the hands of one of their best men did by far the best work in the field, the draught being 7½ cwt. for the two furrows, each 6 inches in depth and 9 inches wide, while the average of three single-furrow ploughs at the same size of furrow was over 6 cwt., which astonished all who, for the first time, had seen a dynamometer test made. Indeed, Messrs. Howard's manager showed great tact by allowing the dynamometer to continue on, for each and every one at all interested to have full ocular demonstration of what the draught was; and the excellency of the work and wonderful economy of horsepower must make these ploughs great favourites. When the ploughing was finished, and the judges about to begin their duties, Squire Cosby's intelligent steward started a horse-race in the adjoining field, again drawing off the mob from the business of the day, and permitting a great competition to be adjudicated upon without a single hitch.

At Kilkenny, on the 15th ult., competitors were thwarted and annoyed from beginning to end, and the judges mobbed and dogged in the most disgraceful manner, principally from the want of the well-timed football play and horse race, to draw off those who had come out for a spree more than to encourage scientific ploughing. Messrs. Howard's ploughs took the first prizes. Messrs. Ransome & Sims had one of their double-furrow ploughs at work, also Messrs. Gray & Sons; both did excellent work, but the horses in single ploughs appeared easier drawn than those in either of the two-furrow ploughs. Messrs. Howard's double-furrow ploughs were also in the field, but through the worthy secretary being laid up ill, and his substitute being unequal to the duty, no horses were provided, although several of the gentlemen farmers present stated how pleased they would have been to have given prizes for the purpose. This was a great denial to many parties, as the test between the single and double furrow ploughs as to draught was not to be seen, it being only the Bedford people who carry a dynamometer about with them to test this important feature.

At Sheffield, near Maryborough, the Queen's County match came off on the 17th ult. Twenty-eight single ploughs and five double-furrow ploughs started in competition. There was considerable confusion as to what style of ploughing would be right, as for some years rectangular ploughing has been the rule; but this year operators were allowed to take a chance of working after the popular high-crested or the sound cultivating rectangular style, as seemed best to them. I was much amused with the performance of Messrs. Howard's man, who really was the only one in the field making perfectly rectan-

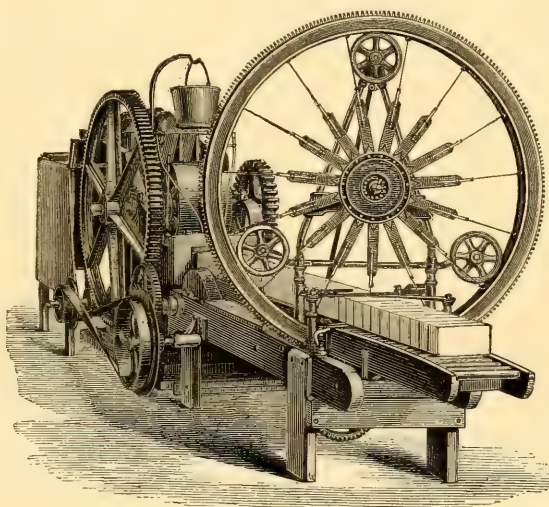


FIG. 63.—PINFOLD'S TILE-MAKING MACHINE.

is not at all the worse, but rather an advantage, as the mortar takes a better hold; but with pipes a clean cut is most important, otherwise continuity cannot be maintained. Pinfold's machines are so made that they can deal with clay in a moderately dry state, and for brick-making it is not necessary (though it is generally desirable) to prepare clay in any way. The large machine has a patent self-acting feed, consisting of powerful screws which, as they work the clay forward, subject it to the action of a pug mill. The rollers are provided with a safety brake, so that if any stone or tool got in, the machine is brought to a standstill. The rollers are powerful, and great care is taken to lubricate the clay and prevent undue friction by a proper supply of water. The self-acting cutter, which is very ingenious, consists of a large wheel with cog gearing on its circumference. The wires radiate from the centre like spokes, and can be tightened or even replaced without stopping the machine; before coming in contact with the brick they pass between, and are momentarily held by, two springs, and this detention gives them velocity, as well as tends to clean them. The wheel is fixed at such an angle in reference to the table as to secure a straight cut. It was this machine that conquered the brick-makers at Manchester, and brought them to their senses, and, as a triumph of mechanical genius, we could not do less than name it here; and we trust that any deficiency in our description will be made clear by the illustration. Pinfold's machine selected by the judges for competition was on a much smaller scale, and had no self-feed. The clay is fed into two powerful rollers, the space between which can be regulated by screws. It is provided with safety friction break and a travelling cutter which moves forward during the act of cutting at the same

gular work. When he saw the judges, and finding they belonged to the high-crested or false ploughing school, he immediately put on high-crest cutting shares, eclipsing all others in that style; but little did the man with the donkey, the plovered nose of the wisecracks. Messrs. Gray & Sons had three ploughs, Ransome one, and Howard one. One of Gray's and the two latter did by far the best work in the field, giving the judges enough to do to place them to their own satisfaction, even although the necessary races were going on outside to enable them to get quietly through their work; they placed Gray first, Ransome second, and Howard third. All three judges use Gray's ploughs, and like them much. The taught was tested in my presence, as follows:—Howard's, with a furrow $5\frac{1}{2}$ inches deep and 9 inches wide, was $6\frac{1}{2}$ cwt., moving 99 cubic inches; Gray's, $5\frac{1}{2}$ inches deep by 8 $\frac{1}{2}$ inches wide, was 8 cwt. for 97 cubic inches; Ransome's, at $5\frac{1}{2}$ deep by 8 $\frac{1}{2}$ inches wide, was 7 $\frac{1}{2}$ cwt. for 97 cubic inches; and an average of three single ploughs at 6 by 9 inches, was 4 $\frac{1}{2}$ cwt., or 9 $\frac{1}{2}$ cwt. for 108 cubic inches. These put relatively stand thus in economy, per 100 cubic inches moved:—

Howard's, to move 100 cubic inches	6.80 cwt.
Ransome's, " " " " " " " " " "	7.71 cwt.
Gray & Sons' " " " " " " " " " "	8.24 cwt.
Single " " " " " " " " " "	8.79 cwt.

Inasmuch as great difficulty was experienced by the judges in arriving at a fair award, I thought the above would have been the sound common-sense result as to the economical value of these implements. L. P. B.

Home Correspondence.

Tubers of Pea Roots.—At p. 113 I find an article on the "tuberiform excrecences" of the Pea; and the author, after having recorded some experiments made by him on the growth of the Pea, says that "the result of our experiments thus far was to show that it was not anything in the nature of the plant itself which produced the tubers." Now, as the tubers are in the nature of the Pea plant, and of many other leguminous plants, to produce these bodies, just as much as it is the nature of a Potato plant to produce tubers in roots. In support of this theory, I would add the underground pods of *Vicia amphicarpa*, of *Lathyrus amphicarpa*, and *Lathyrus tuberosus*; of *Dolichos tuberosus* and bulbous; of *Apis*, *Lotus edulis*, and *Arachis hypogea*, or monkey-nuts of the shops,—all of which are edible. The fact of larvae of insects being found in these excrecences is no more remarkable than that of their being present in the seed of the Pea, both being equally palatable to these animals. As these tubers do not exist (any more than Potato tubers would) on Peas grown in water alone (p. 114 o), we may infer that their presence indicate a vigorous condition of the plant, and I should not be surprised if some successful horticulturist should some day present us with a dish of tubers of Peas; and it is possible that, by sowing the seed from flowering, such a result might be attained. The author of the article in question (p. 114 o) states that "they (the tubers) commonly appear on the roots of Peas within a few days after germination, that is, in early summer, and after a month or so they are found empty and rotten." From this circumstance we may infer that the plant cannot assimilate sufficient nourishment from the earth to ripen two crops, one above and one under ground. In the case of *Arachis hypogea*, all the flowers which appear above ground, and the pods (perfect legumes in every respect) are produced on stalks which never bore flowers. In the case of *Vicia amphicarpa* and the others, pods are produced above and below ground, but the underground ones have no hard shell, and the seeds do not ripen. I observe in the report of the proceedings of the last general meeting of the Royal Horticultural Society, that the attention of Mr. Berkeley has been directed to this subject; but even that gentleman was to discover that these excrecences could not be eaten. From this circumstance would not shake my belief that they are due to the nature of the plant, quite as much as Potatoes are to the nature of *Solanum tuberosum*, or Jerusalem Artichokes to the nature of *Helianthus tuberosus*. *Giles Munby, Alice Holt Forest, Hants.*

Seaweed as Manure.—I have been lately mixing seaweed with farmyard manure in a heap, for the purpose of manuring Mangel and Potatoes, but since my heap has been made up, ready rotted down to go on the field, I have heard that seaweed is apt to rot Potatoes. Is this the case? And if it hurts the Potatoes, would it also hurt the Mangel and Turnip seed? Or does the seaweed rot away sufficiently to lose any damaging power it may possess? I have also mixed a quantity seaweed with leaves and earth to be used in a grass field next year. Will this make a good dressing for a hay crop?—the mixture being about 4 loads seaweed, 6 ditto leaves, 6 ditto earth? *W. C. S., K.* [Seaweed is capital in a compost. It dwindles, however, exceedingly in rotting. It will not hurt your Potatoes or any other farm crop. It will do them good.]

The Servitude of Cheese-making.—I have read with great interest an account of the discussion which took place at the Farmers' Club after the reading of Mr. Coleman's paper on the cheese factory system.

I think Sir George Jenkinson must only have visited the farmers' wives in the afternoon, or he would have seen that there is a very large amount of labour attending the present system of cheese-making. Let him go at 5 o'clock in the morning and he will find in the majority of instances (especially on the smaller farms), that the farmer's wife has already begun her day's work, herself being one of the milkers. As soon as that operation is over the milk has to be put together, and the rennet and colouring applied; then comes breaking, after which the curd has to be broken, which, being one of the most important operations, is specially attended to by the mistress, the highest class of dairy whey from the curd, which is a very laborious operation, as the stooping over the tub must be most trying; then comes the breaking and salting of the curd, and putting it in the vat—all important operations. This will fully occupy the time till half-past 10 or 11 o'clock, then there is dinner to be prepared; after which there is the turning and rubbing, &c., of the cheese which has been made on previous days, which in a large dairy is not very easy work, cheeses weighing from 80 lb. to 120 lb., not being readily handled, special care having to be taken not to injure their edges. After the farmer's wife can dress and receive her visitors, at which time no doubt Sir G. Jenkinson has been in the habit of calling. If a night's cheese is made, the labour is of course nearly doubled, but this is not the case generally, except where Sunday cheese-making is dispensed with, and then there is a cheese made on Saturday night. As regards the farmer's wives being "smartly dressed, and as jolly as anybody ever was at a fair," surely it would be very hard upon them if they could not have a holiday now and then, and they might as easily go to town without having cheese to sell. Of course there are exceptions, as there are many farms where the hard work is done by a dairy-maid, the mistress only superintending. Upon the whole, I think the general adoption of the factory system would be looked upon with satisfaction by the farmers. There is no doubt, many instances where the cheese is so good that any change of system would be looked on as an innovation; but I have no hesitation in saying that the factory system would tend very much to improve the general quality of English cheese, and it would be much more even than it is at present. I do not believe in the theory that the process of cheese-making exhausts the land, because I cannot see the difference between pasturing the land with dairy cows, feeding or not, or other kind of stock, and the cows being consigned to the lair by not having whey-fed pigs, I think, imaginary. A substitute for the manure they would make during the summer might readily be found either in bones or amongst the numerous artificial manures of the present day. *W. Dickinson, Dublin.*

Jersey Herd Book.—I beg to state, in answer to the query of a correspondent (*vide Agricultural Gazette* of January 28, 1871), that a Herd Book was established in Jersey in the year 1866, and that a complete list of the foundation stock, which was closed at the end of the last year, will appear in the Royal Jersey Agricultural Society's report for the present year, and which report is now being printed. I shall be happy to furnish a correspondent with any further information he may require. *Angulus, Le Gros, Jersey. Sec. of Herd Book, 42, Kent Road, Royal Jersey Agricultural Society, Bath Street, St. Helier, Feb. 23.*

Devons and Shorthorns.—My letter in your impression of February 4, calling your attention to the misrepresentations of the weights of the Devons, appears to have suddenly reminded you of a letter in the *Agricultural Gazette* of January 7, complaining of your insinuation that at Birmingham the Devons were not their usefulness. Here is the statement:—"The extreme beauty of the breed saves it from being utterly swamped by the more useful breeds of Herefords and Shorthorns, and judges are constrained by it not unfrequently to place them in the very first ranks of merit. Thus Mr. McNiven's Devon cow is not only 1st in her class, but pronounced the best cow or heifer of any breed in the yard, any one of the first 100." As you say in your paper of February 11, I have been displeased at anything, it is at the perversion of the truth and misrepresentations above alluded to, in which I think it is to be found sufficient cause. However "enthusiastic" I may be, I have not been sufficiently so to ask you to favour me with the loan of your columns to publish one word of untruth. I have said nothing to lead you to suppose I have in the slightest been displeased because the writer was pointed out that a cow, whether hardy, early ripening, and furnishing good meat or not—which was so small in number and in bulk—ought not to have that precedence over the large and fleshy Herefords, and the everywhere extending Shorthorns, which is given them by the Smithfield Club." This position is, in reality, of no advantage to the Devons, and I shall be but too glad to give it in exchange for that really great, unfair, and incomprehensible advantage the Shorthorns possess over all other breeds. I allude to the appointment of three Shorthorn to one Devon admirer to act as judges. The "precedence," of which you appear to be so jealous, given them by the Smithfield Club, can by no possibility favour the Devons in the contest for the

cups one iota, but I cannot say the Shorthorns derive no benefit from the present monstrous arrangement of selecting the judges. Really this, and I will predict with confidence that in future the Shorthorns will not carry off so many silver cups as heretofore. The Shorthorn men dare not risk their cattle in the hands of only one of their representatives, as exhibitors of other breeds are obliged to do! Allow me to ask you to raise your impartial voice in favour of justice being done to the Scotch, Welsh, Irish, and cross-breeds by appointing one judge to represent the former and one the latter three breeds, instead of leaving them to the tender mercies of the admirers of the Shorthorns. The *Mark Lane Express* has already set a very laudable example in this respect. You allude to the animals to be found in the London meat market. What has this market to do with the Smithfield Club? Is this "meat market" to teach the Smithfield Club its duties? Should the Smithfield Club alter its arrangements, and offer prizes for a lot of creatures, no one knows that, simply because they are to be found in the "London meat market," in large quantities, without condition, symmetry, and quality, and that without being exhibited at the Club's shows? If so, the whole order of things must be entirely reversed, and the names of Bakewell and Webb, who, in reducing the offal and inferior parts reduced the size of their sheep in the process of improvement, ought no longer to be held in such high esteem. I say, without fear of any contradiction I may receive, the Devon approaches nearer to perfection in symmetry and quality than any other breed. And this the late Mr. Jonas Webb informed me at the Royal Agricultural show at Battersea was his opinion, and he added, "in breeding Shorthorns I shall endeavour to bring them to the Devon formation." No bulk of carcass will ever compensate for the loss of these qualifications. If the Devons are not so numerous as the Shorthorns, it is very much to be regretted, and every encouragement should be given to its increasing and spreading of a breed of which more can be said in its favour than any other. The Devon steers, after grazing on the poorest pastures during the summer months, are dispersed throughout the greater part of the kingdom for the strawyards, and are most eagerly sought after and bought by the country butchers during the winter months for supplying the best country families, who are always at their country seats at that period, rendering it quite unnecessary for the grazier to send his Devon steers to the London meat market, the great emporium for anything that is inferior. I hope, sir, on some future occasion to be interested by your accounting for the great variety in the Shorthorn steers and oxen exhibited at Islington and Birmingham. Is it not because they are nothing more nor less than cross-breeds? *A Devon Breeder.*

Diseased Cattle at Islington.—Referring to a statement recently made in Parliament by the Right Hon. the Vice-President of the Council, which is given in your last number, will you be good enough to allow me to say that I shall be greatly obliged by an answer to the following questions:—Is it a fact that on or about the 22d of last month three cattle from Holland belonging to Mr. Kestell were, in consequence of being found to be diseased, taken to the Metropolitan Cattle Market, taken to a slaughter-house adjoining the lairs, and there killed? And if so, on what ground did Mr. Rayment order them to be slaughtered? *John Waller, Secretary, Home Cattle Defence Association, 81, Fenchurch Street, E.C., London, Feb. 23.*

Foreign Correspondence.

PARIS: February 25.—Almost every ill that could fall upon a city has fallen upon Paris during the last six months. War followed a miserable harvest—corn, forage, Potatoes, fruit, and dairy produce all short or poor; smallpox and other diseases, combined with the accidents of war, and the effects of low diet, and especially bad bread, raised the mortality from 1500 to more than 5000 deaths a week; the damage to commerce and to the arts, and the loss of the river, say nothing of difficulties caused by the enemy and disorganisation at home, made the revivalling of the city a most difficult task, which was rendered more difficult still by the incapacity of most of the 20 *maires* on whom the distribution of the food of 2,000,000 of people depended—incapacity so great, that after vain efforts even the gifts of the English committee could not be delivered for many days, and the distribution of what had at last been obtained was managed by other means; and lastly, the total absence of coal, and consequently of coke, the enormous price of charcoal, and the almost total want of any other fuel than green wood, which made cooking next to impossible, and the warming of houses quite so. Never was the dependence of a capital on the provinces so strikingly illustrated, or the unfitness of a government to manage ordinary business matters so lamentably exhibited.

The first appearance of good beef and mutton, and the disappearance of the horrible cat's meat, made people forget for moments the disasters of the country; a flock of sheep was a perfect show, and for some days the first confectioners and purveyors, who generally

deal in none but the greatest delicacies, game patties, choice fish, pheasants, partridges, and ortolans, made a great show of a few joints of mutton, beef, and pork, which sold at immense prices. This, however, lasted only a few days; good supplies arrived, and nearly the old prices were soon attained. The number of cattle on the way was enormous, and we looked forward to a full supply, when the bad news of the appearance of the cattle pest in many of the cantons of France reached us. It is to be hoped that the malady will not spread. Great endeavours were at once made to get rid of the diseased animals, of which doubtless you have heard, and the Director of Agriculture immediately appointed a commission to watch the course of the disease and take means to arrest its progress. The commission includes M. Bouley, Member of the Institute of France, Inspector-General of the Veterinary Schools, president; Dr. Fauvel, Inspector-General of Sanitary Services; M. Magne, director, and M. Reynal, Professor at the Veterinary School of Alfort, and two veterinary surgeons. The former commission did great service, and it is to be hoped that the efforts of the present one may throw further light on this terrible disease, and the mode of treating or limiting it.

The announcement of the formation of an Anglo-French committee for supplying the unfortunate peasants whose lands have been devastated by the invading armies, or whose crops have been killed in the germ by the excessive cold, recorded with immense satisfaction, and the immediate sending of supplies to Paris nothing has called forth such expressions of thankfulness as this act, and never was assistance more needed or more timely.

After our short commons almost everything is welcome, but especially everything fresh; of preserved meat, potted things, and salt provisions we have had a surfeit. The supply of meat is now fair, bread excellent, but milk, Potatoes, and all kinds of vegetables and fresh fish are still scarce, dear, and bad. The cows were pretty eaten up in and out of Paris, and the milk that we get is as bad as possible; large supplies of the concentrated milk have come in, and were sold off immediately, more have arrived, but I believe that for some time there will be a good sale for it. Potatoes are poor and dear, and, especially with the scarcity of all other roots and vegetables, large supplies would probably sell more readily. Amongst the other wants is that of forage, which is very scarce; and I am convinced that would certainly be a good venture, probably the Omnibus Company and other large owners of horses, as well as the Government, have arranged for this, but at present all kinds of horse food are extremely dear.

All questions relative to the preservation of articles of food have had a great interest of late, and the communications made to the Academy of Science have been very numerous; the other day, one from an old agriculturist was received with great favour. The population often suffers greatly from the deterioration of Potatoes, which easily germinate in this climate between January and April. M. Lebarre announces that he has tried with success the application of sulphuric acid upon Potatoes and other roots and tubers; his method is as follows:—The gas is produced by the combustion of sulphur, and is injected into a cask or case containing the vegetables, and they are thoroughly impregnated. Nothing is said about the flavour of the sulphur being retained in the Potatoes, but the experiment may easily be tried.

Arboriculture is awaking after the siege; M. Rivière, the head gardener of the Luxembourg, has recommenced his annual lectures on the pruning of fruit trees: these lectures or lessons are given as usual on three mornings of the week, and are well attended.

M. Joigneux, whose exertions for the production of salad and other vegetables within the city during the siege attracted much attention, and which were described in a balloon letter to the *Agricultural Gazette* in December [not received], has been elected a member of the Assembly. M. Joigneux is an eminent agriculturist as well as a politician, and was amongst the expelled of the *coup d'état*. He became very generally known by a publication entitled "Feuille du Village," which was circulated in every hamlet in France. The cultivation of vegetables under glass during the bitter cold of the past winter was not an easy task, but the establishment arranged by M. Joigneux sent a quantity of Cabbage Lettuce to the market of Paris in January, the heads were small and fetched at first 7d. to 10d. each, but at the end of the month they were sold at 3d. and 4d.

Societies.

ROYAL ACADEMY OF ENGLAND.

MONTHLY COUNCIL: Wednesday, March 1.—Present: Lord Vernon, President, in the chair; the Earl of Lichfield, the Earl of Powis, Major-General Viscount Bridport, Lord Chesham, Lord Kesteven, Lord Tredegar, the Hon. H. G. Liddell, M.P., Sir Massey Lopes, Bart., M.P., Sir A. R. MacDonald, Bart., Sir Watkin W. Wynne, Bart., M.P., Mr. Acland, M.P., Mr. Booth, Mr. Cantrell, Colonel Challoner, M.P., Mr. Dent, M.P., Mr. Brandreth Gibbs, Mr. Horsnby, Mr. Wren Hoskyns, M.P., Colonel Kingscote, M.P., Mr. Leeds, Mr. Masfen, Mr. Milward, Mr. Pain, Mr. Randell, Mr. Ransome, Mr. Ridley, M.P., Mr. Shuttleworth,

Mr. Statter, Mr. Stone, Mr. Thompson, Mr. Torr, Mr. Webb, Mr. Wells, M.P., Mr. Wells, M.P., Professor Simonds, and Professor Voelcker.

The Marquis of Hertford, Ragley Park, Alcester, was elected a Governor of the Society.

The following new members were elected:—

Averil, Edward, Woodgate, King's Bromley, Lichfield. Bailey, Sir Joseph Russell, Bart., Glanusk Park, Crick-howell.

Baleny, C. David, Red Barns, Newcastle-on-Tyne. Birch, Sarah, The Hatton, Brewood, Staffordshire. Best, John B., Stanstead Abbots, Ware.

Blurton, Edward, Wolverhampton. Bosanquet, S. Courthouse, Tanhurst, Dorking.

Brewster, Richard, Heathy Mills, Kidderminster. Chadbury, J. Cockfield, Lichfield, Notts.

Coleberr, R., Purewell Farm, Christchurch. Deane, Patrick, Hull.

Dunn, Jonathan, Kelfield Lodge, York. Elliot, John, Moor Park Farm, Rickmansworth.

Evans, J. Jones, Cwmyston Farm, Pencader. Farmer, Edward, Moreton-in-the-Marsh.

Firbank, Joseph, Newport, Monmouth. Fowler, James, Park Hill House, Ferry Hill.

Freemans, Edward, Creeping All Saints, Stotham. Garfit, Arthur, Henly, Wotton Park, Notts.

Griffin, C. F., Tillington, Stafford. Harkes, David, Mere, Knutsford.

Haslam, J. P., Gilmow House, Bolton. Higgs, Albert A., The Rath Farm, Penkridge.

Holehouse, J. G., Gauds, Chetwynd. Homfray, Lorenzo A., Woodlands, Newport, Monmouth.

Hope, A. Peterkin, Fenton Barns, Drem, N.B. Jenkinson, Wilson, Schoose Farm, Worthington.

Kerfoot, James, Faenol Bach, St. Asaph. Knowles, James, Eaglebank, Bolton.

Lee, Thomas, The Priory, Brighthelm, Shifnal. Lees, John, Waterloo Road, Wolverhampton.

Lovendge, Samuel, Chapel Ash House, Wolverhampton. Morris, James, Union Place, Oswestry.

Morton, Francis, 36, Parliament Street, S.W. Newhouse, Henry, Watton Park, Knutsford.

Parker, Thomas, Aldford, Chester. Peake, John, Mullaghmore, Monaghan.

Racliffe, Thomas, Cheswell Garage, Newport, Salop. Rolls, John Allan, The Hendic, Monmouth.

Rounding, John, The Rectory, Bridgton. Turner, Frank, North Bersted, Bognor.

Walker, William, Victoria Iron Works, York. Wallworth, George, Bridgefoot, Stone.

Wallworth, Joseph, Walton House, Ecclehall. Wilson, John Wilson, Austhouse, Broad.

Winterdyk, Thomas, Alevras Hays, Lichfield. Worsman, Richard, Glandwyl, Llandiloes.

FINANCES.—Viscount Bridport presented the report, from which it appeared that the secretary's receipts during the past month had been examined by the committee and by Messrs. Quilter, Ball & Co., accountants, and were found correct. The balance in the hands of the bankers on February 28 was £2062 19s. 3d., £2,000 remaining on deposit at interest.

The committee have to report that the action brought by Messrs. Bradburn against the Society will probably come on for trial at the ensuing Liverpool Assizes. The committee lay before the Council the annual statement of the accounts, by which it appears that the ordinary income of the Society was £26165 10s. and the expenditure £4663 10s. 5d. leaving a balance in favour of the Society of £15504 10s. 7d.; the other end of the excess of expenditure over the receipts for the Oxford Show was £2504 14s. 8d.

JOURNAL.—Mr. Thompson (chairman) reported that the committee recommend that it be referred to a committee to consider the expediency of appointing a botanist and entomologist to the Society, at a small fixed salary, the former of whom would undertake to furnish members with a report on the purity of samples of seed, or the nature of Fungi or other vegetable substances injurious to farm crops; and the latter would be prepared to investigate the character and habits of insects infesting a particular farm or crop. The preparation of articles for the Journal containing a summary of work done for the Society in these departments of science, or embodying recent discoveries, would also come under the consideration of the committee, which would consist of the Journal and the Committee.—This report was adopted.

CHEMICAL.—Mr. J. Dent Dent, M.P., presented the following report:—

The Chemical Committee have elected Mr. Wells as chairman. They recommend the usual grant of £200 be paid to Professor Voelcker for his papers in the late and forthcoming "Journal of Chemistry." The Committee have also considered the following papers: 1. "On the Composition and Practical Value of several Samples of Native Guano prepared by the 'A. B. C.' Sewage Process of the Native Guano Company." 2. "On the Best Mode of Preparing Straw Chaff for Feeding Poultry."

In presenting Professor Voelcker's quarterly report, the committee would again urge on agriculturists to insist on analysis of the manures and feeding stuffs which they use, and would especially urge them to insist on buying low-priced manures through agents, or cake from makers who profess to make various qualities of the same article.

The committee call attention to the remarks of the President on guano, and are glad to find their previous caution fully confirmed by the views of Mr. Lawes, in his annual circular. Dr. Voelcker states that he was never so fully engaged in analyses for members of the Society as at

present, a result which the committee think may partly be attributed to the publication of their quarterly reports, and to the more educated interest taken in those subjects by agriculturists, who are appreciating the value of chemical research; and they are glad to find that the Royal Agricultural Society of Ireland has determined to follow their example, and to publish quarterly reports on these subjects.

Quarterly Report by Dr. Aug. Voelcker.—In the months of December, January, and February comparatively few purchases of artificial manures are made by agriculturists, and in consequence a much smaller number of samples are sent to the laboratory for examination than during the spring quarter.

I have, however, to report on the following cases:—A sample of artificial manure was sent for examination by Mr. Catchpool, Faring Bury, Kelvedon, Essex, with the request to have its value ascertained in comparison with best Peruvian guano. This manure was found to have the following composition:—

Moisture	..	..	..	9.65
Organic matter	..	..	..	1.34
Phosphate of lime	..	..	..	4.99
Carbonate and sulphate of lime	..	..	..	48.77
Alkaline salts and magnesia (principally common salt)	..	..	..	3.22
Insoluble siliceous matter (sand)	..	..	..	19.83
				100.00

*Containing nitrogen	..	..	..	1.12
Equal to ammonia	..	..	..	1.36

The large quantity of carbonate of lime (chalk), sulphate of lime (gypsum), and sand, amounting, together with the moisture in the manure, to rather more than three-quarters of the weight, leave but little room for the more valuable fertilising constituents of manure. Making no deduction for the bulky, cheap, and absolutely useless matters, for which carriage has to be paid, the intrinsic commercial value of the phosphates and the nitrogenous organic matters (yielding only 13 per cent. of ammonia) does not amount to much, and the manure certainly would be dear at £2 on a ton in comparison with the price at which Peruvian guano is sold.

I have written for information with respect to the vendor of this manure, and the price at which it was sold, but have not received an answer as yet.

a. A seg of dried attention the same analysis of four samples of bone-manure, showing the great differences in the quality and value of different samples:—

Composition of Four Samples of Bone-manure sold in Cheshire.

	No. 1.	No. 2.	No. 3.	No. 4.
Moisture	25.02	24.34	9.28	30.42
Organic matter	15.28	19.73	31.23	13.74
Phosphate of lime (bone-earth)	34.10	47.72	45.49	48.01
Sulphate and carbonate of lime	13.44	7.27	9.36	6.43
Alkaline salts and magnesia	8.01	3.72	4.68	8.18
Insoluble siliceous matter (sand)	8.13	3.72	4.68	8.18
	100.00	100.00	100.00	100.00
*Containing nitrogen	1.37	1.95	3.54	1.34
Equal to ammonia	1.66	2.40	4.29	1.62

Nos. 1, 2, and 4 are boiled refuse bones of glu makers.

No. 3 is genuine raw bone dust, not very clean, but, on the whole, of fair average quality.

No. 1, boiled bones, contains one-fourth of its weight of water, and contains more sulphate of lime, salt, and sand than genuine bone dust.

Nos. 2 and 4 are too wet, but they are otherwise genuine boiled bones; and No. 4 contains rather more sand than it ought.

Assuming No. 3 to cost £8 a ton, the comparative money value of these four samples will be:—No. £5 a ton; No. 2, £6 15s. a ton; No. 3, £8 a ton; No. 4, £6 6s. a ton.

A sample of guano was sent for analysis by Mr. Samuel Fitton, Cheerbrook Farm, Nantwich, who informs me that he bought the guano from Messrs. W. Shaw & Co., Liverpool, at £14 10s. per ton, delivered at a station near Nantwich (less 5 per cent. for cash), guaranteed pure.

The analysis showed that the guano was much adulterated with sand, gypsum, and earthy matter, and in consequence yielded much less ammonia and phosphates than genuine Peruvian guano.

As far as I could judge this adulterated guano corresponded to a mixture of about three-fifths of genuine guano by weight, and two-fifths of yellow sandy loam, and similar adulterating materials; and in comparison with genuine Peruvian guano, selling at £14 10s. a ton, it was not worth more than £8 14s. per ton.

In reply to my inquiries, Mr. Fitton wrote as follows:—"I am sorry the guano is not pure; I enclose the invoice. I thought it best to tell you the truth. Mr. Shaw & Co., my name is Oakes. I told him distinctly when I bought it from him that I should get it analysed. He said he should be glad if I would, as it was a pure guano, and it would be to his advantage."

On receipt of my report Mr. Fitton communicated the

* The samples 1, 2, 3 were sent on February 2 by Mr. Leather, Delamere Lodge, Northwich, and on the 15th the following letter was written to him:—

"Dear Sir,—The sample of boiled bones recently analysed by you for me was given to me as genuine by Mr. Rob. Ashworthy, of Frodsham. On showing him your analysis, he stated that the sample of bones given me was taken from 'sweepings,' and was not a fair sample. 'He appeared to think would explain the large proportion of sand, gypsum, &c., in the sample.' There is, I think, a fresh sample, which I forward to you to-day for analysis. Yours faithfully, SIMON LEATHER."

In a subsequent letter Mr. Leather gives the following as the prices of the several samples, and the names of the dealers who supplied them:—

No. 1.	J. Ashworthy, Frodsham	..	..	£6 7 6
2.	Simon Bone Works, ..	..	..	6 12
3.	J. Ashworthy, Frodsham	..	..	8 10
4.	Do. Do.	..	..	6 5 0

result of my examination to the vendors, and in return received the following letter:—

"The Old Hall, 90, Old Hall Street, Liverpool.
"Dear Sir,—We have just discovered that our shipper has made a most egregious error in sending you *Upper Peruvian* instead of *Lower Peruvian* Guano. Please return it at once, as the whole cargo is ordered for transhipment. Will you also kindly see Mr. Bowker, and request him to return his share of the same quantity of Peruvian as soon as possible.
"We are, dear sir, your obedient servants, pro Wm. Shaw & Co.,
"R. OAKES."
"P.S. Shall be in Cheshire to-morrow, and will call at your place."

The guano was returned by Mr. Fitton, and genuine Peruvian sent instead of the so-called Upper Peruvian.

4. I beg again to direct attention to the variable quality of genuine Peruvian guano. Peruvian guano, I regret to say, appears to be nearly exhausted, and recent importations not only contain a considerable proportion of large stones and fragments of rock, but also some sand which cannot be readily detected without a chemical examination. The following analysis of a sample of Peruvian guano affords a good illustration of its increasing deterioration:—

Composition of a Sample of Guano sent by Mr. John Baker, Hargreave, near Kimberlon.

Moisture	11.22
*Organic matter and salts of ammonia	35.8
Phosphate of lime and magnesia (bone-earth)	23.92
Alkaline salts	7.73
Insoluble silicious matter (rock and sand)	18.24
100.00	
*Containing nitrogen	8.75
Total to ammonia	10.62

This guano is genuine Peruvian guano, but it will be seen that it contains a large proportion of the *débris* of the rock on which the guano was deposited, and yielded little more than 10½ per cent. of ammonia, or only about two-thirds the amount of ammonia which Peruvian guano of fair average quality used to contain.

Messrs. Thompson, Bonar & Co., the Peruvian Government agents for the sale of guano, have recently acquainted their customers that they have no more Chincha Island guano for sale in London, and they offer now Guanape Island guano at a reduced price, and quote the price of Government Peruvian guano at £12 per ton.

Guanape guano, as far as my experience goes, varies in composition to a greater extent than Peruvian, and the better samples are not equal in value to Peruvian guano. It is, therefore, highly desirable that purchasers of Guanape Island guano or Peruvian Government guano varying in composition, Guape guano should not be sold at a uniform price, but at rates corresponding to the intrinsic commercial value of different lots, which can only be ascertained by an analysis that may be fairly expected to be presented by the dealer to intending purchasers.

5. Rape cake is frequently so full of wild Mustard that it cannot be safely used for feeding purposes.

Several cases of rape cake unfit for feeding purposes were brought under my notice during the last quarter, and in one instance such cake did serious mischief to the sheep, which were being made from seed largely contaminated with wild Mustard seed.

6. Cases of adulterated linseed cakes have been referred to me lately, from the neighbourhood of Market Deeping, and Hertford, in which beechnut and earthenware cake were used, and the mark of the maker indicative of the purity of the article.

In these cases I made inquiries respecting the names of the dealers, but experienced unwillingness on the part of the buyer to have publicity given to the particulars, which deserve exposure.

These reports were adopted, and were ordered to be published in the agricultural journals.

VETERINARY.—Mr. Milward presented the following report:—On March 2, 1870, the Veterinary Committee recommended and the Council approved of a grant of £100 being made by the Professor Simonds for investigations with respect to pleuro-pneumonia, and measures to be adopted for its prevention.

In consequence of some questions raised by the Governors of the Royal Veterinary College, the money was not paid over till August 5.

This committee in December expressed their regret that no report on the subject had been received from Professor Simonds. The Professor has attended the committee to-day, and reports that he has obtained no results from the experiments hitherto carried out on the animals so purchased, with respect to pleuro-pneumonia; but that he has carried out investigations on acromion poisoning with the same animals, from which he has obtained interesting results.

The committee regret exceedingly that such results have not been communicated to them, and that they have not received any information on veterinary subjects from the Professor since the Report of the Governors of the Royal Veterinary College, received April, 1870, and they are of opinion that a quarterly report ought to be presented to the Veterinary Committee by the committee, calling the attention of the Council to any matters of interest in veterinary science which have occurred during the quarter, including the outbreak, progress, or diminution of diseases affecting British flocks and herds.

On the question "That this report be adopted," Mr. J. Dent Dent, M.P., stated that the position of

the Council and the Society in reference to veterinary questions appeared to him very unsatisfactory. Last year the Council had made an attempt to improve matters, in the belief that if Professor Simonds were independent of the Royal Veterinary College he would be able to keep the Society supplied with the latest information, and to carry out at the expense of the Society such investigations as might be deemed desirable. Nobody, in his opinion, had such means of giving the Society information as Professor Simonds, but in the present condition of affairs he felt it was a question whether they should not re-consider the whole question of the veterinary department of the Society once more, as on such important subjects as the spread of rinderpest in France, the working of the Contagious Diseases (Animals) Act, acromion poisoning, and splenic apoplexy as a result of feeding cattle off land irrigated with sewage, they had as yet received no report from their veterinary inspectors.

Mr. Thompson observed that if Mr. Dent had not raised the question now, he should have brought it forward after Easter. He recounted the successive efforts that had been made by the Council to place their relations with the Royal Veterinary College on a satisfactory footing; and, while bearing testimony to Professor Simonds's ability, and to the value of the papers which he had written for the Journal, Mr. Thompson thought that the time had now come when the Society should have its own Veterinary Professor.

Professor Simonds stated that he had not interpreted the alteration of the arrangements last year, in reference to himself, in exactly the same manner as the Veterinary Committee and Mr. Dent, otherwise he would have been glad to have forwarded reports from time to time on such subjects as had been quoted. He considered that his attention had been directed entirely to the question of pleuro-pneumonia, a disease which sometimes took the form of an incubated apoplexy, although his endeavours had twice failed, he did not think that he had lost much time. Numerous experiments had been carried out by him in reference to acromion poisoning, but the investigators were not yet sufficiently complete for publication and were still being continued. In reference to cattle-plague, he had considered that every one had been made acquainted with what had happened through the newspapers, but he would have been glad to give information on that subject, and also on splenic apoplexy, if it had occurred to him that the Society desired it.

In reply to a question by the Hon. H. A. Liddell, M.P., in reference to the precautions that had been taken by the Government to prevent the introduction of cattle-plague into England, Professor Simonds replied that cattle from all foreign countries (Holland excepted) were killed on arrival at the port of landing, and no animal coming into London or within the London area could leave it alive, except in the case of dairy cows, which under certain restrictions are allowed to be moved out of the metropolitan area. No animal has hitherto arrived in England affected with cattle-plague, and there has been but one case of imported pleuro-pneumonia.

Ultimately the report of the Veterinary Committee was adopted, as well as the following resolution, which was moved by Mr. Thompson and seconded by Mr. Milward:—That the Veterinary Committee be requested to make a special report on the subject, and to the Council will release the local committee be requested to carry out the plan of drainage of the showyard, which had been submitted by Mr. Webb and approved by the Showyard Contracts Committee, and the representatives of the local committee. It was also recommended that in consideration of the local committee undertaking to drain the showyard according to the plan and estimate given by Mr. Webb, and to have the same completed by the 30th inst., the Council will release the local committee from forming a siding into the trial fields,—it being a condition that the local committee shall make such arrangements as shall ensure the implements for trial being delivered on the trial fields without any increase on the charge that exhibitors would have paid if the said siding had been found for their use. The committee further recommended that the names of Sir John Morris, K.T., and Mr. Charles Matthews be added to the list of the local committee.—This report was adopted.

SHOWYARD CONTRACTS.—Mr. Randall (chairman) reported the recommendation of the committee that Mr. Penny's tender for the erection of showyard works be accepted; and that the attention of the local committee be directed to certain works required to be done in the showyard at Wolverhampton.—This report was adopted.

ARRANGEMENT.—Col. Challoner (chairman) presented the following report:—A letter from Mr. Easton having been read, it appears to the committee that there is no vacancy in the office of Consulting Engineer; and the committee are of opinion that no

change should take place for the present. The committee therefore recommended that Mr. Easton be requested to report in writing to the Implement Committee what arrangements he proposes to make for conducting the trials at Wolverhampton, both as regards his own supervision, that of his staff, and to the testing machinery to be employed.—This report was adopted.

SELECTION.—Mr. J. Dent Dent, M.P., reported that the committee recommend that Major-General Viscount Bridport be elected a trustee in the room of Mr. T. W. Bramston, resigned; and that Lord Vernon be elected a Vice-President in the room of the late Lord Walsingham. The committee also recommended a form in which the vote of thanks of the Council should be presented to Mr. Amos. This report having been adopted, Mr. Randall moved, and Mr. Milward seconded, the resolution that Major-General Viscount Bridport be elected a trustee in the room of Mr. T. W. Bramston; and Mr. T. W. Bramston, moved, and Col. Challoner seconded, the election of Lord Vernon as a Vice-President, in the room of the late Lord Walsingham. Both resolutions were carried unanimously.

A committee, consisting of the Implement and Stock Prizes Committees, was appointed to recommend judges of stock, implements, wool, butter, and cheese, at the Wolverhampton meeting; and the secretary was instructed to announce that he would be glad to receive from members of the Society until March 15, the names of gentlemen willing and able to act as judges in those departments.

On the motion of Mr. Torr, seconded by Mr. Shuttleworth, Mr. Booth was nominated as Steward Elect of Implements.

An application from the Appleby and Kirkby Stephen Agricultural Society for the loan of the Society's plough dynamometer was granted, subject to the usual conditions.

A letter was read from the secretary of the Glamorganshire General Agricultural Society.

Notices of Books.

Trade Circular. T. Bowick & Co., Bedford.

A useful list of manures, feeding-stuffs, implements, and memoranda. These can be substituted "Our Notebook"—an appendix—from which we take the following extract:—

"Prices of Piece-Work.—This paper is not intended to discuss the principles of task-work as compared with day-labour, nor to enter theoretically into what the prices might be or ought to be, but simply to quote from the writer's note-book what prices have been paid. Every farmer could not make out a list for his own guidance correctly, or at least approximately, altered if it may be useful. Piece-work will never take its proper position in the field until it is thus systematically carried out, and until the farmer can speak with definiteness as to what is a fair price for each item of labour. To say, when the hands are about to start on a job, 'I'll give you what it is worth,' or 'I'll give as much as my neighbours,' without specifying clearly what the amount is to be, is sure to open the door to dissimulation and disputes. The following prices are based upon day-labour, at 12s. per week, and at 25s. in harvest for good ordinary labourers. If more quotations are given than would be found in the general routine of farm labour, it arises from the fact that there was a considerable amount of 'estate work' to deal with, the farms having been (at the time the list was sent out) just broken up, and entered upon by Messrs. Howard, and then in a state of considerable dilapidation."

1. STRING WORK.					
Dibbling Beans (2 dibbles), per acre	3	0	2	6	
Dibbling Beans (single), per acre	5	0	6	0	
Dibbling Oats or Peas, in each plough furrow, per acre	5	0			
Planting Potatoes, with spade in ridges, per acre	7	0	8	6	
Hoeing corn crops, per acre	2	6	4	0	

2. SUMMER WORK.					
Dung turning, per cubic yard, per acre	0	2	0	7	
Hoeing (singling out) Turnips, per acre	3	0	3	6	
Mowing grass, per acre	2	0	3	0	
Running Clover and Grass, per acre	2	0	2	6	
Cutting, tying, carting, and stacking Wheat, per acre	12	0	13	6	
Mowing Barley, per acre	3	0	3	6	
Fitching and loading Wheat, per acre	1	0	2	0	
Fitching and loading loose Barley, per acre	1	0	2	0	
Cooking, pitching, and stacking Wheat, per acre	3	0	3	0	
Barley, per acre	3	0	5	0	
Hand-dragging corn stubbles, per acre	0	6			
Drain for use of road, per acre	2	0	4	0	
Washing sheep and lambs, per score	0	8			
Shearing sheep, per score	3	6			

3. AUTUMN WORK.					
Digging (1 spit), per cubic yard, per acre	0	2	0	4	
Digging (trenching), 2 spits, per square pole	0	8			
Forking land, per square pole	0	2	0	4	
Burning clay, per cubic yard	0	5	0	6	
Filling ditches, and spreading out of carts, per cubic yard	0	2			
Planting Wheat, per acre	5	0	6	0	
Topping, tailing, and filling Turnips in cart, per acre	8	0			
Pulling Mangold Wurzel, per acre	5	0			
Taking up and topping Carrots, per acre	20	0			

4. WINTER WORK.					
Ditching, 22. per chain (or per cubic yard)	0	2	0	3	
Digging holes for planting trees, per 100	1	3			
Mowing soil, per cubic yard	2	0	0	4	
Draining (4 feet), 22. per chain	3	0			
Digging gravel, per cubic yard	0	8	0	10	
Heaving out ditch, per chain	0	8	1	0	
Heaving, with cleaning out ditch, per chain	2	0			

* I analysed four pieces of this cake that Mr. Percival Harlam, of Gilnow House, Bolton, who had bought it from Mr. J. Andrew, corn broker, Liverpool.

	s. d.	s. d.
Hedging, without cleaning out ditch, per chain	1	6
Falling underwood with rotten wood allowed, per square pole	0	1
Cutting down small sapling trees, per acre	1	6
Sticking up roots, with rotten wood, per square pole	0	1
Fagoting tree-tops, per acre	1	0
Fagoting First-tops, per acre	0	6
Dung leveling, per cubic yard	0	0
Lifting and returning drains, per chain	0	0
Digging in small stones for seed, per sq. pole	3	3
Clung haulm, per acre	2	6
Trussing straw, per ton	1	8
Trussing hay, per ton	2	6

5. MISCELLANEOUS WORK.

Repairing sills, each	0	1
Windlass man, extra allowance to, per acre	0	1
Drill man, extra allowance to, per acre	0	1
Shepherd, extra allowance for, each score	1	0
Lambs reared	1	0
Pig feeder, extra allowance for each pig reared to each man 5 per cent. on prize-money	0	4
Paring and burning, per acre	30	0
Sowing Oak scantling, per 100 feet	3	6
Sowing Elm, per 100 feet	3	6
Sowing plankling, per 100 feet	4	0
One cross-cut to be reckoned 5 feet		
Fencing, leaving rails, posts, and piles (4 rails), per chain	7	3
Fencing, ready sawn rails, cleaving posts and piles (4 rails), per chain	3	2
Fencing, ready sawn rails, cleaving posts and piles (4 rails), per chain	4	0
Fencing, cleaving posts, per rails, and piles (4 rails), per chain	2	3
Boarding, putting on feather-edged boards, per 100 feet	3	6
Fencing with stumps, per 100 feet	3	6
Hanging 10-foot gate, each	5	0
Fencing, sawing posts, extra per post	0	2
Sawing wood for gates, each	6	6
Making gates, each	2	9
Falling trees, per 100 feet	3	6
Bark peeling, per 100 feet	15	0
Bark peeling, per 100 feet	15	0
Hurdle making, per dozen	3	0
Stakes for hurdles, per dozen	0	2

Farm Memoranda.

WESTHILL OF PARK, KINCARDINESHIRE: Report of 21 years from A. Kinloch, Esq. of Park. It is situated in the parish of Drumoak, in the county of Kincardine. The land extends to over 30 acres imperial, and when I entered upon it in 1863 was all uncultivated, and for the most part covered with Heather, with a good many stumps of trees in the ground.

My first work was to trench a portion of the land to get stones to use in a dwelling-house. It was not necessary to trench much for this purpose, as the stones were in such numbers that plenty were soon found. The erection was proceeded with, and a comfortable dwelling-house was put up at a cost—exclusive of all cartages and extra labour—of £63.

I continued trenching, and in the course of four years I had 15 acres under crop. I have now 30½ acres trenched, the whole of which will be under crop this year, with the exception of three acres, the stones of which have yet to be cleared off.

Suitable openings have been erected, comprising a barn with a two-horse threshing-machine, a byre for 11 beasts, and a stable for two horses. The cost of these, not including extra labour and cartages, was £35.

The cost of trenching would average £10 10s. per acre; and from the enormous quantity of stones turned up (the most of which I lifted with my own hands) the cost of clearing the land could not be estimated at less than £25 per acre.

The land has been laid off in suitable divisions for a five-course rotation, and to dispose of the stones these have been enclosed by large "consuming" dykes.

To give an idea of the quantity of stones, I may state, that of these dykes there have been formed 900 yards, 15 feet wide, and from 5 to 6 feet high; 360 yards, 12 feet wide and 8 feet high; 200 yards, 5 feet wide and 6 feet high, besides 300 yards fenced, but only built on one side.

The soil is a light loam with open subsoil, and very little of it required draining. What drains were required were put in 3½ feet deep, and filled with stones to within 2 feet of the surface.

The first crop, from so much of the subsoil being turned up, especially in dry seasons, has generally been deficient; but the succeeding crops, when the decaying turf was exposed, have been highly satisfactory.

In laying down the Turnips I have applied per acre 15 bolls of lime, and with farmyard dung and 15 bush mixed bones, I have always had a heavy crop.

I am not able to say that the improvements have as yet been highly remunerative, but I think there is a reasonable prospect that they will now yield me a fair return, and I have great satisfaction in seeing common turf fields where a few years ago there was nothing but barren heath. *George Carr, in Highland Society's Transactions.*

Miscellaneous.

THE PAST YEAR'S WORK OF CHAMBERS OF AGRICULTURE.—The following report of the work done by the Chambers is given by the *Chamber of Agriculture Journal*.—Some idea of the work done by the Chambers of Agriculture may be formed from a mere enumeration of the subjects upon which papers have

been read and resolutions passed after due discussion; to say nothing of the deputations to members of the Government, the numbers of petitions to Parliament, and the communications which the Chambers have had with their parliamentary representatives upon questions in which agricultural interests are deeply concerned. We have obtained information from most of the Chambers as to their meetings held during the year 1870; but, though incomplete, not a few of the Chambers having failed to furnish answers to our inquiries, this information will serve to show the relative amount of prominence assigned to the several subjects which have been before the Chambers during the past year. The Government education measure was discussed by thirty-three Chambers, and a similar number considered various aspects of the standing topic, local taxation. Thirty Chambers considered the future maintenance of turnpike trusts and highways, and the working of highway boards. The Game Laws, and proposed legislation with respect to them, occupied the attention of twenty-six Chambers; the desirability of securing uniformity of weights and measures, and the merits of the metric system were considered by nineteen Chambers; ten Chambers passed resolutions on the Malt Tax; ten Chambers discussed the new regulations of the associated fire insurance offices. The tax on horses, the abolition of the hawkers' licence, the tax on shepherds' dogs, the Coroners' Bill, were considered and resolved upon by many Chambers. Seven Chambers discussed anew the question of the corn averages and agricultural statistics; and a large number of Chambers took into consideration the advantages derived from the establishment of Chambers of Agriculture, and the means for improving the Chamber organisation and securing more united action between the central and provincial bodies. At many meetings of Chambers the Privy Council Orders under the Contagious Diseases (Animals) Act, cattle importation and the home cattle trade, prevention of the introduction of the cattle plague, the foot-and-mouth complaint, inoculation for pleuro-pneumonia, and national assurance against losses by pleuro, transit of animals, railway charges for the conveyance of dead meat, were the topics of debate. Twelve Chambers considered the causes which discourage the application of capital in agriculture. Other subjects before various Chambers have been tenant-right, compensation for encroachment improvements, drainage, relations of landlords and tenants, expediency of letting land on lease, the present position of the agriculturist, the law of hypothec, entail laws, relative merits of the four-course and other systems of cropping, small versus large farms, management of grass-lands, dairy farming, customs and chap money, corn-buyers' deductions on payment to farmers, the agricultural labourer, emigration, causes of pauperism, steam cultivation, Beetroot cultivation, management of poultry, accurate use of straw as food, horse-drawn paper file, common errors in veterinary medicine, fines for clipping sheep in cold weather, coniferous trees, management of different kinds of soil, town sewage, adulteration of feeding stuffs and manures, local provision for the repair of occupation roads not being highways, the injustice of the mode in which property tax is levied, the desirability of making tithe rentcharge a fixed instead of a fluctuating payment, the effect of the war on agriculture, county council rating of telegraph wires, and a variety of topics of immediately local interest, such as a new market for Swindon, a new cattle market for Leicester, and the Northampton Markets and Fairs Bill. Looking through this long roll of subjects and questions, all of more or less pressing interest and importance, we cannot doubt for a moment that the influence of so many papers read, of so many minds being brought together to exchange thoughts and sentiments, will tend to bring facts, must have told widely and deeply in forming sound public opinion, and animating a hearty public spirit among agriculturists. It must be worth all the pains and all the outlay bestowed in establishing and working the Chambers, that so much has been said and done, instead of being left unsaid and undone. But a still greater value of these new institutions arises from the power they confer in raising the agricultural interest in the estates of other classes, in eliciting public attention upon agricultural questions, and in so impressing the Legislature as to find in high quarters a greater readiness to entertain agricultural wants and complaints with the same consideration which is accorded to commercial questions.

THE GAME LAWS.—A game case of considerable importance was lately decided in the Irish Courts. A tenant, Peter Nelligan, forgetting that his high ground is practised, and a tenant, who habitually pays as much for extraneous manures as for land rent, the name on his property can neither in reason nor in equity be regarded so exclusively his own, as in the hundred days of our fathers, when what was given to the soil came entirely from the farm itself, had allowed the game so to increase as to be most destructive to this tenant's crops, strictly inhibiting him also from protecting himself. The tenant brought his landlord into court—a distasteful remedy, and one applied for as a last necessity, for it hardly ever fails to produce heartburnings and permanent alienation between parties whose interest and happiness it is to live in harmony. The tenant having established a *prima facie* case, his superior was ordered to lodge

£100 in court, leaving the final award of damages to a jury. The trial came on in Dublin. Fortunately for himself, the pursuer had secured as his counsel a gentleman who holds the same place at the Irish bar as the Youngs and Clarks among ourselves. After a luminous and forcible argument, Mr. Serjeant Armstrong, in his peroration, happily appropriated, *mutatis mutandis*, a passage from their immortal and popular national poet's "Deserted Village":—

"Ye friends to truth, ye statesmen who survey
The rich man's joys increase, the poor's decay,
'Tis yours to judge how wide the limits stand
Between splendour and a happy land;
It falls the land, to hast'ning joys a prey,
Where hares accumulate and crops decay;
Nimrods and game may flourish, and may fade,
On wastes and deserts let them make their raid;
But when on labour's ruins they browse and fret, fatten,
And can't be shot, let hungry jurors at 'em."

And so the jury did go at them, and gave the farmer £250, over and above the sum lodged in court, and all costs besides. Fortunate and salutary would it be were this case duly pondered by the Scottish squirearchy. Those who are friendly to the present constitution of things lament, from their inmost heart, how completely denuded they are, and chiefly through this question, of all political influence among those who once prided themselves in giving them support. The farmer separated from the land, and the squire, friendly enough to tell them the unpleasant truth, that the game preserver is coming fast to be regarded, even if he have redeeming virtues, as a public enemy. The Game Laws, as they now are, cannot stand, with modern rents and modern agriculture; and if the question be not soon settled, there will come forth, un-germane as it is to the Scotch character, what the triumphant Irish agitator called it, the "new tenantism." Without any additional irritant to the winter of the agriculturist's discontent, he had some difficulty in believing that animals fed by him on crops raised by guano from the Chincha Islands, and bones from the Black Sea, declared to be the exclusive property of another, was not inequity established by law. But those new congresses called *battues*, with their accompaniments—the gang of gunners, the party of beaters acting as dogs, the commission, the train, the hunt, the cry of the head of game, vainly proclaimed, to the highest market—have furnished the hair to make the tetter. As the Asian proverb says, the last straw breaks the camel's back; for the logic of the most stolid leads them to this conclusion, that it is not for sport, as practised in the days of old, that the game is so carefully guarded, but for its money value. The returns are no doubt considerable, but gold may be bought too dear. *Aberdeen Journal.*

The Week's Work.

MARCH 4.—*Spring Wheat* conclude sowing in southern counties; the April variety may be sown later further north. On a stale lea furrow infested with wireworm and the like sow half a ton of coarse salt per acre, and harrow it well in between the furrows, since before drilling. If the land is a cold clay, sow the seed in the quantity of salt viz., 5 cwt., and sow of lime if the land needs it. If the land is full of lime, then sow with the salt nitrate of soda or potash as the land will stand it. Some apply the salt a month or so before seeding the land, preferring wet, moist weather purposely to wash it into the roots of the grass and Clover, thus rotting all animal and vegetable matter in the soil, and killing at the same time insect life. Wheat manures may be drilled in along with the seed, should the land require such to force forward a rapid vegetation in the early part of the season, so as to cover the land and keep out solar heat, and to forward also the process of filling and ripening afterwards. Spring Wheat will this year be more than usually liable to suffer in dry weather, before the leaf covers the ground and the root gets below the influence of the drought of April and May.

Oat sowing should now be concluded as fast as possible in South and North. In Scotland and the northern counties of England, the place for this crop is a stale lea furrow. Throughout the midland and southern counties the Oat can hardly be said to have any definite place in the rotation, the breadth sown being comparatively small. Although hardy when up the crop requires a dry seed-bed in land thoroughly drained and cultivated, and also in good heart, otherwise a profitable return cannot be harvested. It is very wrong to suppose that the Oat can be reaped off land in any condition. The varieties of this cereal are very numerous, and it requires both skill and experience to select what best suits this and the other soil and climate. The old, and too common rule, "late sorts for the South and early ones for the North," is not to be relied upon. When sown on a stale lea furrow, infested with wireworm, sow salt as directed above for Wheat, and it is preferable to sow the Oat, and then drill the ground in the same way as above before the harrow. By drilling there is also a great saving of seed, as the young plants tiller better, and come away more evenly for harvest. When drilled after Turnips that have been infested with finger-and-toe, sow salt and artificial manure if the land will stand it, so as to rot roots

GREEN'S PATENT SILENS MESSORS,

OR

NOISELESS LAWN MOWING, ROLLING, AND COLLECTING MACHINES, FOR 1871.

THOMAS GREEN AND SON, in introducing their PATENT LAWN MOWERS to the Public for the present season, take the opportunity of acknowledging the unprecedented patronage that has been accorded to them in former years, and can assure their future Patrons that nothing will be wanting on their part to maintain the CONFIDENCE so long given to them.

Every Lawn Mower that is sent out by them is warranted to give entire satisfaction, otherwise it can be returned at once, free of cost to the purchaser. Our Machines have been submitted to numerous practical tests in Public Competition, and have in all cases carried off every Prize that has been given.

The following are their advantages over all others:—

- 1st. **Simplicity of Construction, every part being free of access and easily managed.**
- 2d. **They are worked with far greater ease than any other Lawn Mower.**
- 3d. **They are the least liable to get out of order.**
- 4th. **They make little or no noise in working, as is the case with Cog-wheel Machines.**
- 5th. **They perform their work in a neat and smooth manner, and leave no notches or scores.**

PATRONIZED BY

HER MOST GRACIOUS MAJESTY
THE QUEEN,
ON 45 DIFFERENT OCCASIONS;
H.R.H. THE PRINCE OF WALES;
THE KING OF THE BELGIANS;



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AND MOST OF THE
NOBILITY, CLERGY, AND GENTRY
OF THE UNITED KINGDOM.

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International Exhibition, London, 1862.

International Exhibition, Dublin, 1863.

Agricultural and Horticultural Society, Brussels, 1862.

Agricultural and Horticultural Society, Brussels, 1863.

Agricultural and Horticultural Society, Hamburg, 1863.

Agricultural and Horticultural Society, Liege, 1861.

Agricultural and Horticultural Society, Namur, 1862.

Agricultural and Horticultural Society, Laeken, 1862.

Agricultural and Horticultural Society, Gand, 1862.

Agricultural and Horticultural Society, Linneene, 1862.

Agricultural and Horticultural Society, Linneene, 1863.

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BUCKINGHAM PALACE GARDENS.
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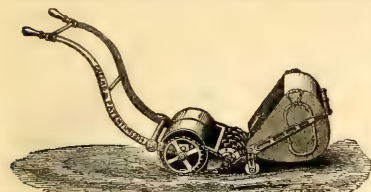
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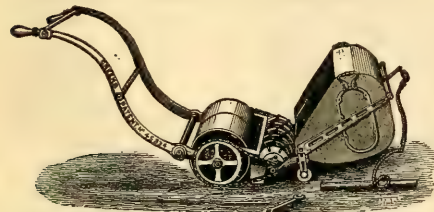
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SINGLE-HANDED LAWN MOWER.



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" 12 "	" 4 0 0
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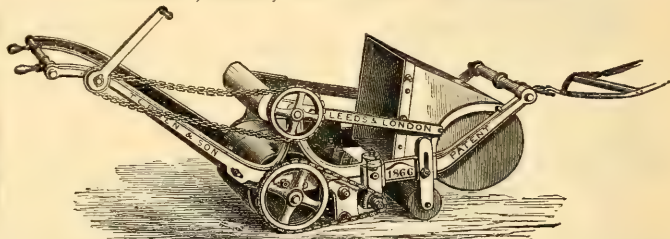


To cut 16 inches	Price £6 0 0	This can be worked by one Man on an even lawn. By Man and Boy.
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" 22 "	8 0 0	
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Prices of Horse, Pony, and Donkey Machines, including Patent Self or Side Delivery Box; Cross Stay complete; suitable for attaching to ordinary Chaise Traces or Gig Harness.

DONKEY and PONY MACHINES.

To cut 26 inches	..	..	£13 0 0
" 28 "	..	..	" 15 0 0
" 30 "	..	..	" 17 0 0
Leather Boots for Donkey	..	..	" 18 0 0
Ditto for Pony	..	..	" 12 0 0

HORSE MACHINES.

To cut 30 inches	..	..	£21 0 0
" 36 "	..	..	" 24 0 0
" 42 "	..	..	" 27 0 0
" 48 "	..	..	" 30 0 0
Leather Boots for Horse	..	..	" 16 0 0

The 26 and 28 inches can easily be worked by a Donkey, the 30 inches by a Pony, and the larger sizes by a Horse; and as the Machines make little noise in working, the most spirited animal can be employed without fear of its running away, or in any way damaging the Machine.

SPECIAL NOTICE.

Both the Horse, Pony, Donkey, and Hand Machines possess (over all other makers) the advantage of self-sharpening; the cutters being steel on each side, when they become dull or blunt by running one way round, the cylinder can be reversed again and again, bringing the bottom edge of the cutters against the bottom blade, when the Machine will cut equal to new. Arrangements are made that the cylinder can be reversed by any inexperienced person in two or three minutes.

The Handles of the Machines can be altered to suit the person using them, by either raising or lowering them.

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Sole wholesale and retail by the Agents for the Patent, Messrs. CARTER, DUNNETT, and BEALE, Seed Merchants, 239, High Street, W.C.; and Messrs. POLLARD, JEFFERSON, and CO., Agricultural Engineers, Bear Garden, New Park Street, Southwark, S.E. To be obtained of all Seedsmen in town and country. A liberal allowance to the Trade.



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THE "ARCHIMEDEAN" AMERICAN LAWN MOWER.

The only Lawn Mower that Cuts Wet or Long Grass (as well as dry) without Clogging,

Leaving the Cuttings in small particles, evenly scattered, never lodging untidy, serving as a Mulch to Protect the Roots from Heat and Drought, and Fertilising the Sod, which cannot fail to invigorate and beautify the Lawn. Perfectly adapted to SLOPES, UNDULATING LAWNS, RIDGES and VALLEYS; and for the CROQUET GROUND is invaluable.

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"Far superior to any of ours."—*Vide The Field.*

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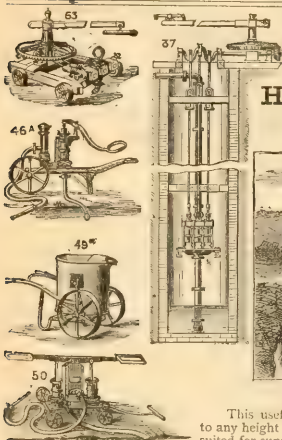
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THE IMPROVED SELF-ACTING HYDRAULIC RAM.

This useful Self-acting Apparatus, which works day and night without needing attention, will raise water to any height or distance, without cost for labour or motive power, where a few feet fall can be obtained, and is suited for supplying Public or Private Establishments, Farm Buildings, Railway Stations, &c.

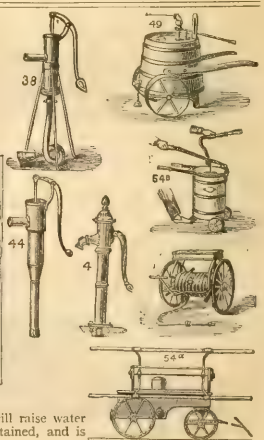


- No. 37. DEEP WELL PUMPS for Horse, Hand, Steam, or other Power.
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- No. 46A. IMPROVED DOUBLE ACTION PUMPS on BARROW for Watering Gardens, &c.
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- No. 50 and 50A. FARM and MANSON FIRE ENGINES of every description.
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S. OWENS and CO. Manufacture and Erect every description of Hydraulic and General Engineers' Work for Mansions, Farms, &c., comprising PUMPS, TURBINES, WATER WHEELS, WARMING APPARATUS, BATHS, DRYING CLOSETS, GAS WORKS, Apparatus for LIQUID MANURE distribution, FIRE MAINS, HYDRANTS, HOSE PIPES, &c., &c.

Particulars taken in any part of the Country. Plans and Estimates furnished.

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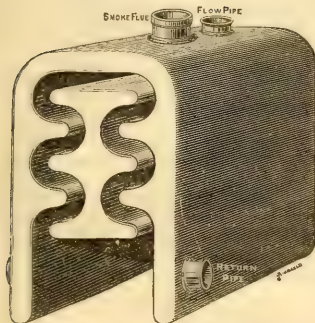
- No. 49. GARDEN ENGINES, of all sizes, in Oak or Galvanized Iron Tubs.
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BY HER MAJESTY'S



ROYAL LETTERS PATENT.

ORMSON'S IMPROVED WELDED WROUGHT-IRON CONVOLUTED BOILERS

ORMSON'S PATENT CONVOLUTED
BOILER.

Are better than Cast-Iron Boilers, because—

THEY DO NOT CRACK,
THEY REQUIRE NO INSURANCE,
THEY WILL BURN ANY KIND OF FUEL,
THEY ARE SAFE FROM SUDDEN FAILURE;

AND BY THEIR USE

£700 A YEAR HAS BEEN SAVED

IN THE

ROYAL GARDENS, KEW,

And a very large percentage in many other Establishments.

H. ORMSON is prepared to make a Boiler on his Patent Convoluted Principle to Heat WITH SAFETY a larger amount of Pipe than any "One" Boiler in the World can now be found doing.

The following Testimonials will serve to show how highly they are esteemed
by those who have adopted them:—

Temple Hill Gardens, near Dublin, December 9, 1869.

"SIR,—In reply to your inquiries concerning your Patent Convoluted Boilers erected here, I have much pleasure in bearing testimony to their effective working. The large Boiler is able to work 3000 feet of 4-inch pipe much better than . . . No. 4 Upright Tubular Boiler did 2500, and with a little less than three parts of the fuel consumed by the latter. I find such a difference in the quantity of fuel used now, and formerly, that a person would scarcely believe my statement. Of course, having the small Boiler is an advantage, as it answers quite as well as the large one for 8 months of the year, and does not require near so much fuel. I can say now that I have given your Boilers a fair trial, and the most conclusive evidence I can produce in favour of them is, that before I got them, I used to pay £2 2s. for fuel for a certain time, on an average; I now find that £1 5s. worth just lasts me the same time, and the work is better performed. (Signed) "THOMAS MOORE."

In a Notice of the Temple Hill Gardens, published in the "Gardeners Record," Oct. 8, 1870, the writer remarks of these Boilers as follows:—

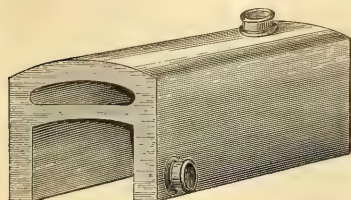
"Near to this entrance are situated all the glass structures, arranged so as to be heated by one Boiler (Ormson's Patent Convoluted Saddle). This was erected last autumn, replacing one of . . . Tubular Boilers, and was perhaps the first of them put down in Ireland, it being the one

exhibited at Manchester last year, where Mr. Moore first saw it. From his account of it, these Boilers only require to be known to be largely patronized. The advantages possessed by them over other Boilers are that, being of wrought-iron, there is no possibility of cracking."

From the convoluted parts coming in direct contact with the fire there is fully three times as much space exposed to its action as ever was in the old Saddle Boiler. Any kind of fuel can be used. Mr. Moore has provided against any possibility of accident by placing alongside of it a smaller one, which can be used separately, or if required (in extra severe weather) in conjunction with it. This small Boiler is very useful in summer when heat is only required in a few houses, as by using it a great saving is effected in fuel.

Mr. LAWLEY, Gardener at Franks, Kent, writes, Jan. 18, 1870:—

"I am sorry I have not written to you sooner to express my entire satisfaction with the Boiler you have put in for us: there is no doubt of its power—for it does our work easier than our old Upright Tubular Boiler used to, and with more economy as regards fuel, for I find it burns up anything, no matter what rubbish it may be. Where I used formerly to consume 1 ton of coke with some small coals I now can do with half that quantity or less. The amount of clinkers and ashes which I get, is the smallest I ever saw."



THE WELDED WROUGHT-IRON SADDLE AND FLUE BOILERS,

As recommended by MR. BAINES: see *Gardeners' Chronicle*, p. 235, for February 25, 1871. These Boilers have long been fixed by me, and I still continue to supply them.

HENRY ORMSON, HORTICULTURAL BUILDER TO HER MAJESTY,
AND HOT-WATER APPARATUS MANUFACTURER TO THE COMMISSIONERS OF HER MAJESTY'S ROYAL PALACES AND PUBLIC BUILDINGS,
AND TO THE ROYAL HORTICULTURAL SOCIETY,
STANLEY BRIDGE, KING'S ROAD, CHELSEA, LONDON, S.W.

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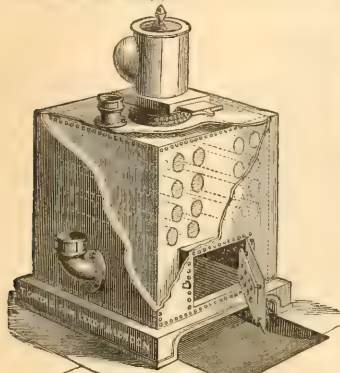
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Carriage paid to any station within 200 miles of Norwich, when orders amount to £3 and upwards. 8 feet long by 6 feet wide. £3 15 0 10 feet long by 6 feet wide. £5 0 0 12 feet long by 6 feet wide. £5 12 0 14 feet long by 6 feet wide. £5 15 0 16 feet long by 6 feet wide. £5 18 0 18 feet long by 6 feet wide. £6 0 0 20 feet long by 6 feet wide. £6 15 0 22 feet long by 6 feet wide. £7 0 0 24 feet long by 6 feet wide. £7 15 0 26 feet long by 6 feet wide. £8 0 0 28 feet long by 6 feet wide. £8 15 0 30 feet long by 6 feet wide. £9 0 0 32 feet long by 6 feet wide. £9 15 0 34 feet long by 6 feet wide. £10 0 0 36 feet long by 6 feet wide. £10 15 0 38 feet long by 6 feet wide. £11 0 0 40 feet long by 6 feet wide. £11 15 0 42 feet long by 6 feet wide. £12 0 0 44 feet long by 6 feet wide. £12 15 0 46 feet long by 6 feet wide. £13 0 0 48 feet long by 6 feet wide. £13 15 0 50 feet long by 6 feet wide. £14 0 0 52 feet long by 6 feet wide. £14 15 0 54 feet long by 6 feet wide. £15 0 0 56 feet long by 6 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feet wide. £144 15 0 574 feet long by 6 feet wide. £145 0 0 576 feet long by 6 feet wide. £145 15 0 578 feet long by 6 feet wide. £146 0 0 580 feet long by 6 feet wide. £146 15 0 582 feet long by 6 feet wide. £147 0 0 584 feet long by 6 feet wide. £147 15 0 586 feet long by 6 feet wide. £148 0 0 588 feet long by 6 feet wide. £148 15 0 590 feet long by 6 feet wide. £149 0 0 592 feet long by 6 feet wide. £149 15 0 59

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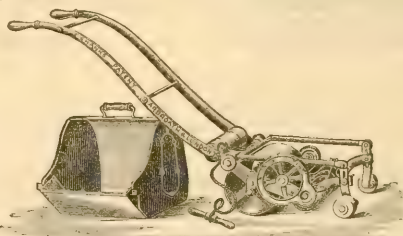
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During the season of 1870 a good deal was written on the desirability of allowing the Grass to remain on the Lawn after having been cut, for the purpose of acting as a mulch to protect the roots of the Grass from heat or drought. To those Gardeners who still advocate this plan of keeping their Lawns in order, A. S. AND SON beg to intimate that they have succeeded in bringing out a machine which they feel confident will be found to answer the purpose better than any hitherto tried. The Cutter of the Machine is made to cut long Grass; it is fitted with SHANKS'S PATENT DOUBLE-EDGED STEEL SOLE-PLATE. A Grass Box is sent out with each Machine, its use, however, being quite optional. As there is no Roller or other obstruction in front of Cutter, LONG OR WET GRASS can be readily cut with it. At the same time A. S. AND SON wish it to be borne in mind they do not recommend this Machine as the best for an English Lawn, or as a substitute for their "New Patent Lawn Mowers for 1871," particulars of which will be found in separate Advertisement, or sent free on application. These are alone adapted to keep an English Lawn clean, close, and smooth as a piece of velvet, and hitherto this has been the aim of the English Gardener. The long Grass Cutting Machine is only recommended as an excellent and valuable addition to the Lawn Mowers here referred to.

PRICES, DELIVERED FREE AT ANY RAILWAY STATION IN GREAT BRITAIN:
14-inch, £5; 16-inch, £6.

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THE OLDEST PATENT MEDICINE,
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SHANKS'S NEW PATENT LAWN MOWERS FOR 1871.

UNDER THE PATRONAGE
OF
HER MOST GRACIOUS MAJESTY
THE QUEEN,



AND MOST OF THE
PRINCIPAL NOBILITY
OF
GREAT BRITAIN.

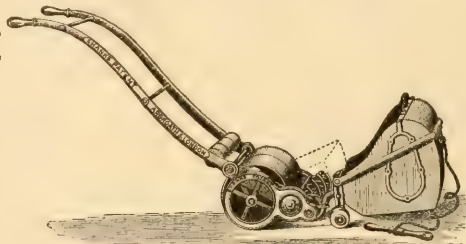
The Improvements introduced into Shanks's Lawn Mowers at different times have resulted in these machines occupying the first place in the market, to which the continued increase in the annual sale bears ample testimony.

THE MACHINE
FOR 1871

IS MADE FROM

NEW PATTERNS,

AND IS SO ARRANGED THAT IT



CAN BE USED

EITHER

WITH or WITHOUT

THE USUAL

FRONT ROLLERS

ALEXANDER SHANKS AND SON, in bringing their PATENT LAWN MOWERS under the notice of the Public for the Season of 1871, desire at once to draw attention to the various points of merit which their Machine possesses over all others. These advantages have only to be known to ensure the success and to establish more firmly than ever the position of Shanks's Machine as unquestionably the cheapest and best Lawn Mower in use.

1. SHANKS'S PATENT LAWN MOWERS have been entirely remodelled for the Season of 1871.

Every conceivable alteration has been made tending to improvement and reducing friction to a minimum. Notwithstanding the great expense which has attended these alterations, A. S. AND SON offer THEIR NEW MACHINE AT LAST SEASON'S PRICES.

2. SHANKS'S PATENT LAWN MOWER is fitted with a double-edged Sole-Plate. This Sole-Plate enables the Cutting parts to last twice as long as those in other Lawn Mowers.

3. SHANKS'S PATENT LAWN MOWER is fitted with a self-sharpening Revolving Cutter.

4. SHANKS'S PATENT LAWN MOWER is fitted with a Wind-Guard, which prevents the Grass escaping the Box when the Machine is in use during the prevalence of wind.

5. SHANKS'S PATENT LAWN MOWER has no obstruction in front of the Cutter, a most important improvement, just introduced.

6. SHANKS'S PATENT LAWN MOWERS are made of the very best material, carefully apportioned, so that no part has more weight than is absolutely necessary, and securing at same time the greatest rigidity as a whole.

7. SHANKS'S PATENT LAWN MOWERS are more easily worked and more durable than any other Lawn Mower, and are not at all liable to get out of order.

8. SHANKS'S PATENT LAWN MOWERS are silent in working.

9. SHANKS'S PATENT LAWN MOWERS perform their work in a manner vastly superior to the Scythe. The Lawn is not "ribbed" when cut, but has a most beautiful appearance, being as smooth as a piece of velvet.

10. SHANKS'S PATENT LAWN MOWER has not only obtained more Prizes and Medals than any other, but the highest Prize that has ever been given for a Lawn Mower at an International Exhibition was awarded to A. S. AND SON, who received a First Prize Silver Medal for their Machine at the Paris Exhibition of 1867. It is significant that no other Exhibitor received a Prize, not even an "Honourable Mention" or a "Bronze Medal."

11. SHANKS'S PATENT LAWN MOWERS are warranted to give ample satisfaction, and, if not approved of, can be at once returned.

12. SHANKS'S PATENT LAWN MOWERS are delivered free at any Railway Station or Shipping Port in Great Britain. Orders are executed on the day they are received, either from the Manufactory, DENS IRON WORKS, ARBROATH, N.B., or from the London Office and Warehouse, at 27, LEADENHALL STREET, E.C.

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Easily Worked.				Easily Worked.			
8-inch Machine..	£2 10 0	16-inch Machine..	£6 10 0
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14-inch Machine..	5 10 0	24-inch Machine..	9 0 0

The Hand Machines are all with Silent Movement.

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If with Patent Delivering Apparatus.				Easily Worked.			
25-inch Machine..	£12 10 0	30-inch Machine..	25s. extra.
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30-inch Machine..	15 15 0	42-inch Machine..	30s. "

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42-inch Machine..	26 0 0	48-inch Machine..	40s. "
48-inch Machine..	28 0 0				40s. "

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27, Leadenhall Street is the only place in London where intending purchasers of Lawn Mowers can choose from a Stock of from 150 to 200 Machines.
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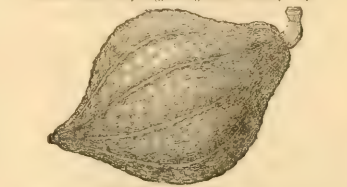
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GODETIA WHITNEYI. Splendid Dwarf Hardy Annual, with crowded clusters of grand flowers, each flower frequently measuring 4 inches across; bluish, with crimson spots. Per packet, 1s. 6d.
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Coloured Plants of the two Mimulus and Statice, post free, for 2s. 6d. One packet of each of the above six novelties for 1s. 6d.
Excellent either cut young, as Vegetable Marrows, or ripe.



BOSTON MARROW SQUASH. Weighs 6 or 8 lb. when ripe, excellent flavour. Per packet, 6d.
EARLY SUMMER CROOKNECK SQUASH—Very early, rich, and productive, used only when young and tender. Per pkt., 6d.
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NEW AND CHOICE SEEDS AND PLANTS, &c.

E. C. HENDERSON & SON,
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CHOICE FLOWER SEEDS.

ACHYROCLINE SAUNDERSONII—	Per packet—	1 0
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BALSAMS—Splendid double. See List.		
BEGONIA SEDENI—Most beautiful	5 0
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CALCEOLARIA—Finest in the kingdom 2s. 6d.,	5s. 6d.,	5 0
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CENTAUREA CLEMENTEI—Distinct new	1s. 2 6	
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HELIANTHUS GLOBULOSUS FISTULOSUS	..	2 6
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LAPAGERIA ROSEA—English seed	..	1 0
LEPTOSIPHON ROSEUM—Most lovely	..	1 0
LILIUM COLCHICUM—Pure yellow	1s. and	2 6
LINUM GRANDIFLORUM ROSEUM—New var.	0 6	
LOBELIA—New varieties, Pumila section. See List.		
PUMILA GRANDIFLORA—True	..	1 0
LOPHOSPERMUM SPECTABILE PUNCTATUM—New	1 0
MALVA MOSCHATA ALBA—Pure white	..	1 0
MIMULUS NEUBERTI—New, true, dbl. 2s. 6d.,	5s. 6d.,	5 0
TILINGI—New species, distinct	..	2 6
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PENTSTEMON GLABER—Most lovely blue	..	0 6
SPECTIOSUS—Fine blue, true	..	0 6
PLEROMA MACRANTHA FLORIBUNDA—New	5 0
PHLOX DRUMMONDI—General Grant, rich	..	1 0
Rose d'Amour, lovely; and Cardinal, brilliant, each	1 0	
PENTSTEMON GLABER—New double flowering hybrids	..	1 0
PRIMULA SINENSIS FIMBRIATA. See List.		
MAGNUM BONUM—Extra	.. 2s. 6d. and	5 0
SALVIA HISPANICA—New, distinct	1 0
PETSCHERI—New, fine	1 0
SCHIZANTHUS PAPIILONACEUS—Very gay	..	1 0
STATICE SPICATA—New and distinct	..	2 6
SWEET WILLIAM—Perpetual flowering, 6d. and	1 0	
THALICTRUM MINUS—Elegant Fern-like leaves	0 6	
VIOLA LUTEA GRANDIFLORA PERFECTA	..	1 0
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PUBESCENS—Clear yellow-flowered species	..	2 6

RENDLE'S PATENT PORTABLE PLANT PROTECTORS AND GROUND VINERIES.

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NEW TARIFF AND CARRIAGE FREE TERMS.

The following Prices are for the Patent Grooved Bricks and the Glass:—

GROUND VINERIES AND PLANT PROTECTORS		For Delivery in London or Bridgewater		Carriage Paid to any Railway Station within 10 miles of London or Bridgewater.		Carriage Paid to any Railway Station in England and Wales, or Edinburgh, Dublin, Cork, or Belfast.	
		<i>£</i>	<i>s.</i>	<i>d.</i>	<i>£</i>	<i>s.</i>	<i>d.</i>
10 Glass 9 in.		0	12	0	0	13	6
10 Glass 12 in.		0	14	0	0	17	0
10 Glass 18 in.		0	16	0	1	0	1
10 Glass 24 in.		0	18	0	1	2	0
100 Glass 9 in.		5	0	0	5	10	0
100 Glass 12 in.		6	0	0	6	10	0
100 Glass 18 in.		7	0	0	7	10	0
100 Glass 24 in.		8	10	0	9	0	0

A Reduction of 10s. per 100 feet will be made if 500 feet be taken at one time.

Patent Circular and Square Protectors, or HAND-GLASSES.

Patent Circular Hand-Glass.

Diameter	Doz.	Diameter	Doz.
No. 1.—4 inches .. 8s.		No. 5.—12 inches .. 20s.	
No. 2.—6 inches .. 8s.		No. 6.—14 inches .. 32s.	
No. 3.—8 inches .. 10s.		No. 7.—16 inches .. 40s.	
No. 4.—10 inches .. 12s.		No. 8.—18 inches .. 48s.	

There are most valuable, and will completely supersede the ordinary Bell-Glasses, Cloches, and Hand-Glasses, being so cheap and so durable.

Patent Square Ventilating Hand-Glass.

No.	Size	Doz.
No. 1.—6 by 9 .. 12s.		No. 2.—10 by 14 .. 28s.
No. 3.—12 by 16 .. 36s.		

French Cloche.

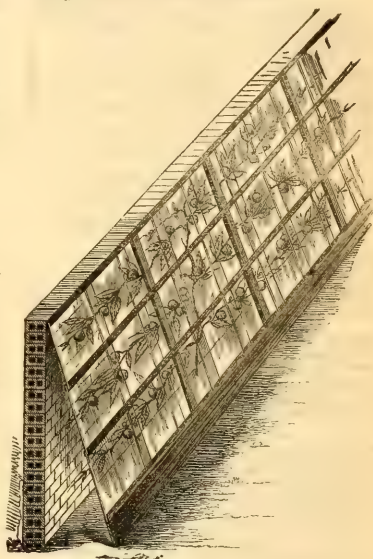
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Same as recommended by Mr. Robinson, in his "Parks, Promenades, and Gardens of Paris."

The Patent Grooved Bricks can be placed on ordinary Kiln Bricks set on the Flat. Full Directions for Fixing them will be sent with each Invoice.



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Is Now Ready, and can be had on application, Gratis.

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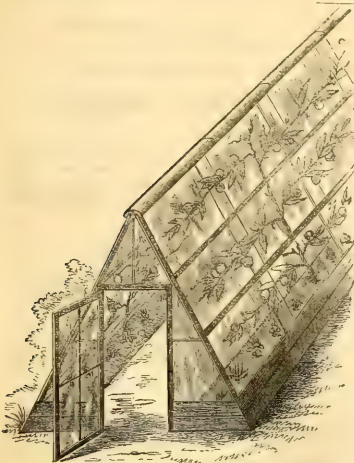
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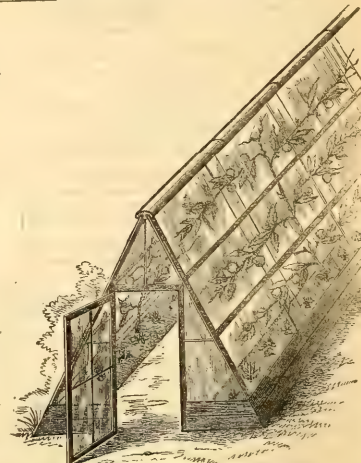
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Patent Portable Orchard House.



Patent Portable Orchard House.

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BIRD'S KING OF THE CUCUMBERS.—The best for exhibition. Length 24 to 30 inches. White spine, handsome fruit, short neck or handle. Price 1s. 6d. per packet.

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Leek Seed for Present Sowing.
HENRY'S SCOTCH HYBRID LEK, saved by Mr. Henry, the Champion Leek Grower. The largest and hardest growing, has been repeatedly weighed at 4 lb. 15 oz. of the single Leek, blanched to the length of 30 inches, and measuring in circumference 14½ inches. In the packet.
CATALOGUE OF VEGETABLE AND FLOWER SEEDS may be had post free on application. It contains the best varieties in cultivation, and a few novelties that can be recommended.

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Special Notice.—To large Consumers of Seeds.
JAMES CARTER AND CO. having harvested their own crops of FARM AND GARDEN SEEDS in splendid condition, are now prepared to make special low quotations for large quantities. Messrs. CARTER'S ILLUSTRATED FARMER'S CALENDAR is in the Press.

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For the BEST and MOST PRAC-
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WHEN, and WHAT to SOW, see
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High Holborn, London, W.C.

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H. AND F. SHARPE are now prepared to make a special offer of the above Seeds, comprising TURNIP, CABBAGE, CARROT, MANGEL WURZEL, BEANS, &c., grown from the finest selected stocks, and free from adulteration of any kind. They are all harvested in splendid condition. Seed Growing Establishment, Wisbech.

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GEORGE SIBBALD, Drumgeath, by Dundee, has for SALE a large stock of SEED POTATOES, &c., of his own growing, including Esters's Bonny or Cattie Favourite, 24 lbs. do. Red Seeding, do. Victoria; also Stirling White, Walker's Improved Early Calmahay, Daintree's Early Oxford Early, Kinoul's Early Smith's Early, Handsworth Early, Royal Ashleaf Kidney, Mona's Prize do., Webb's Imperial do., Lapstone do., Ashpot Fluke do., Queen of Flukes do.
G. S. begs to intimate that he has succeeded in raising one here, which has named ECLIPSE, the best Potato in cultivation, either for quality or crop, for field or garden. Not to be sent out till next season.
G. S. may say that he received a Medal from the Highland Society of Scotland for a Seedling Potato, exhibited at their show, held in the Park, Dundee, in 1867; also extra prize for 45 lbs. kind exhibited at the Dundee Horticultural Society's Show, held in the Baxter Park, in 1867, in connection with the British Association.
Also for Sale several cwt. superfine Early Dwarf CABBAGE SEED—fine stock.

SUTTONS' RENOVATING MIXTURE, for improving Pastures, should be sown in the early spring months. This Mixture consists of the finest kinds of Permanent Grasses and Clovers, and will greatly increase the quantity and quality of succeeding Hay Crops. The Pasture should be harrowed with heavy iron harrows previous to sowing, and bush-harrowed after sowing, and in the top-dressing of manure will be found beneficial. Sown 6 to 12 lb. per acre, according to the condition of the Pasture. Price 9d. per lb., 8oz. per cwt.; carriage free.
For prices and full particulars of other mixtures apply to SUTTON AND SONS, Seedsmen to the Queen, Reading.

Established 1793.
KING'S HOME-GROWN, UNRIVALLED, HARDY
PRICE STOCKS of
MANGEL WURZEL,
SWEDES, and other
TURNIP SEEDS,
The hardest and best stocks in
England, selected from large roots.
Five per cent. discount for cash.
Buy direct from the Grower.
Seed Farms:—Coggeshall and Peering, Essex.

Per lb., &c.
KING'S CHAMPION ORANGE GLOBE—This has often been grown by the side of others, and always pronounced the best stock. . . 1 0
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KING'S MIXTURES OF GRASSES AND CLOVERS, for all soils, at moderate prices.
The Seed is new, and nett grown of 1870, extra clean dressed.

I. K. K. had the Largest Collection, the heaviest roots, and best quality of MANGEL WURZEL that were exhibited at the Royal Agricultural Show of England, held at Manchester in July, 1869, and also again at the Royal Show, held at Oxford, in July, 1870, and were awarded by many distinguished judges, their superiority, their hardihood of character in keeping sound to such an advanced period of the season.
Large purchasers of these UNRIVALLED HARDY STOCKS supplied at special moderate prices.
A SILVER CUP and other PRIZES will be given for COM-
PETITION to Growers from Seed supplied by J. K. KING.
FARM SEED LISTS, with PRICES and TESTIMONIALS, now ready, post free on application.
Carriage paid to all Stations on orders of 20s. and upwards.
JOHN K. KING, Seed Grower, Coggeshall, Essex. Established 1793

RAYNBIRD, CALDECOTT, BAWTREE,
DRYING AND COMPANY (limited),
CORN, SEED, MANURE, and OIL-CAKE MERCHANTS.
Address, 26, Seed Market, Mark Lane, E. C.; or Basingstock
Samples and prices, post free on application. Price Medals, 1857,
for Wheat; 1862, for "Excellent Seed Corn and Seeds."
Vegetable and Flower Seeds.
1871. SEED POTATOS, GARDEN IMPLEMENTS, &c. 1871.
REVIEWS AND OF THE BEST SELECTION.
All but very small parcels carriage paid.

OUR Priced Descriptive CATALOGUE of the above, with Cultural Directions, also ILLUSTRATED SHEETS of new and desirable VEGETABLES and FLOWERS, IM-
PLEMENTS, &c., are now ready, and will be forwarded post free on application.

James Dickson & Sons.
(Old Established Nursery and Seed Business),
Newton Nurseries, and 102, Eastgate Street, Chester.



THE BEST MANGEL IN CULTIVATION IS
HARRISON'S NORMANTON GLOBE,

Which may be had true from the original introducers. It has proved its superiority five successive seasons, and is now well known.
Price 1s. 6d. per lb., cheaper by the cwt. or ½ cwt., carriage paid.

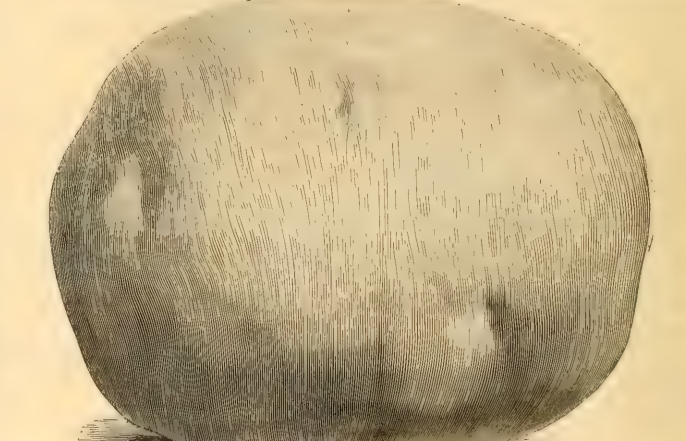
TESTIMONIALS FROM ALL PARTS OF THE COUNTRY.
From Mr. E. A. GOWING, Farm Steward to the Right Hon. Lord Berners, Tisbury.

"Your Normanton Globe Mangel is the best variety I have ever seen; having a small top and single root, they may be grown very close together, which is the secret of a heavy crop. My best field this year was a very heavy crop, very regular, and many bulbs weighing from 20 to 25 lb. each; my second best field yielded over 42 tons per acre."

Our SEED CATALOGUE, 44 pages, is now ready, and may be had on application, Post Free.

HARRISON AND SONS,
ROYAL MIDLAND SEED WAREHOUSE, LEICESTER.

THE HEAVIEST CROPPING AND BEST COOKING LATE POTATO.



SUTTONS' RED-SKIN FLOURBALL,
FIRST INTRODUCED BY SUTTON AND SONS IN 1869-70.

N.B. The above Engraving is from a Drawing made by Messrs. SUTTONS' own Artist in autumn of 1869, and first appeared in SUTTONS' "AMATEUR'S GUIDE" of 1870.

The Orders received last Season were far more than could then be executed, and we are again nearly sold out. It has this Season been procured from Messrs. SUTTON by about Forty of the leading Nurserymen and Seedsmen, whose names were published in the *Gardeners' Chronicle* of February 18 (p. 197).

Besides many others, the following Letters were received last Autumn by Messrs. SUTTON:—

From Mr. W. F. BUNNETT, Steward to Lord Northey, *Eden, Wiltshire*.
"Oct. 26.—The Flourball Potato is of first-class quality, a great cropper, and quite free from disease."
From Mr. JOHN HALLAM, *Eden*.
"July 22.—I never had such gains that gave me half the satisfaction I gained first year with your Red-skin Flourball Potato. Thirty compact."
From Major CUMBER, *Wilton Park, Devon*.
"Oct. 26.—The Red-skin Flourball Potato is very fine, quite free from disease, and remarkably uniform in size, with a shallow eye and fine clear skin."
From Mr. H. H. DONNISON, *Walsall, Wiltshire*.
"I have found your Red-skin Flourball an admirable Potato, prolific, and unequalled for baking."
From Col. J. L. COLEMAN, *Eden, Wiltshire*.
"Oct. 28.—Half a peck of Red-skin Flourball Potatoes produced 18½ lb. weight; they are a fine size, excellent and mealy; floury; no sign of disease."
From Mr. J. H. NIMBLE, *Eden, Wiltshire*.
"Nov. 2.—I consider your Flourball Potato the best I have ever grown, both as to quality and quantity; they are quite free from disease, and remarkably uniform in size, with a shallow eye and fine clear skin."
From Mr. B. HARRISON, *Gardener to the Right Hon. Lord Northampton, Wiltshire*.
"The Red-skin Flourball Potato you sent me is most extraordinary kind producing tubers varying from 1½ to 2 lb. weight. Certainly the largest Potato I have ever seen."
From the Rev. A. G. BISHOP, *Mells, near Frome*.
"The Red-skin Flourball Potatoes you sent me were remarkably large when dug. They both boiled and roasted well, and have been entirely free from disease."

Goods delivered Carriage Free by Rail.
PRICED LISTS of POTATOS and SEEDS Gratis and Post Free.
SUTTON AND SONS, SEEDSMEN TO THE QUEEN, READING.

THE AMERICAN ROSE POTATO (Imported Seed).



JAMES CARTER & CO.

Have a Large Consignment of this POPULAR POTATO shortly to arrive, and are prepared to execute Orders in rotation as received.

PRICE—Per lb., 9d.; per Peck, 7s. 6d.; per Bushel, 28s.

JAMES CARTER AND CO., THE ROYAL SEEDSMEN, 237 and 238, HIGH HOLBORN, LONDON, W.C.

TO THE TRADE.—SEED POTATOS.

H. & F. SHARPE

INVITE THE ATTENTION OF THE TRADE TO THE FOLLOWING VARIETIES OF

SEED POTATOS,

Which they have grown from the finest selected stocks. The quality is very fine, and prices low.

EARLY SANDRINGHAM KIDNEY
RACEHORSE KIDNEY
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MONA'S PRIDE KIDNEY
EARLY ASHLEAF KIDNEY
RYVERS' ROYAL ASHLEAF KIDNEY
WALNUT-LEAVED KIDNEY
MATT'S PROLIFIC KIDNEY
AMERICAN EARLY GOODRICH
DAINTREE'S EARLIEST
LEVERING EARLY PROLIFIC
KIDNEY

EARLY DALMANOV ROUND
DRUMMOND'S EARLY PROLIFIC
ROUND
EARLY OXFORD
FOX'S SEEDLING
HANDSWORTH
GOLDEN GEM
ROUND FRAME
MARTIN'S GLOBE
PORTFOLD
COCKNEY
FLOURBALL

EARLY KING
BRITISH QUEEN
FLOUNDER
WHEELER'S MILKY WHITE
EARLY LAISTONE KIDNEY, TRUE
BERKSHIRE KIDNEY
WALKER'S IMPROVED REGENT
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Special quotations may be had on application.

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comprising all the best varieties of HOME-GROWN SEEDS, is now ready.

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POST FREE, SIX STAMPS.

WHEELERS' SEEDS ARE THE BEST.

"The 15s. Packet of Garden Seeds is a most liberal allowance for the money."—Rev. H. J. POTTS, *Treculla House, Llangarou.*
Full particulars of the 15s. packet are given in "Wheeler's Little Book."

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The Two Guinea and Three Guinea Collections are most liberally selected, and are sent Carriage Free. Five per cent. discount for cash.

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FOR PERMANENT PASTURE on the OLD RED SANDSTONE. 30s. per acre, Carriage Free. Five per cent. discount for cash.

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FOR PERMANENT PASTURE on the COAL MEASURES. 28s. to 32s. per acre, Carriage Free. Five per cent. discount for cash.

5 per cent. Discount for Cash.



WHEELERS' COCOA-NUT CABBAGE.

Large Packet, 11.; Small Packet, 6d. Post Free.

"I consider the Cocoa-Nut Cabbage the best I have ever grown."—A. PATERSON, *Pontypool Park Garden.*

"The Cabbage Seed which I had from you last year has turned out excellent, not one in a thousand run to seed. All my neighbours have desired me to get some for them this year."—Wm. SMITH, *Penally.*

For List of Agents, see *Gardeners' Chronicle*, p. 66, 1871.

WHEELERS' LITTLE BOOK, 1871.

(Illustrated) for 1871, is a short Select List of the best Seeds in Cultivation, interesting and instructive to all who have Land, from a Lady's Flower Garden to a Nobleman's Domain, and from half an Acre allotment to a Farm of 2000 Acres. It has been sent Post Free to our Customers throughout the Kingdom: a few copies still remain, applications for which must contain Six Stamps.

"Wheeler & Son's Little Book, or Select Seed List, deserves our warmest eulogy as a work of art. The Flower Seed department affords an opportunity for several happy illustrations, and the Farm List is well treated."—*The Field.*

Forest Trees, Ornamental Trees, and Shrubs.

PETER LAWSON AND SON have to intimate that their CATALOGUES for the present season may be had upon application.

The stock of Seedling and Transplanted LARCHES, SCOTS FIRS, and other FOREST TREES is both unusually extensive and superior in quality. When personal inspection is not convenient, samples and special offers will be cheerfully required.

Edinburgh and London (30, Budge Row, Cannon Street, E.C.)

Choice Hardy Scarlet and other Rhododendrons.

JOHN WATERER AND SONS have the pleasure of announcing that their CATALOGUE of the above plants, as exhibited at the Royal Botanic Gardens, Regent's Park, is now published, and will be forwarded free of charge. It faithfully applies the colours of the Rhododendrons, and also contains selections of the most approved CONFITERS, with heights and prices, as well as the leading EVERGREENS and ROSES.

The American Nursery, Bagshot, Surrey.

To Noblemen and Gentlemen Making or Enlarging Game Preserves.

FURZE or GORSE.—Thirty to Forty Thousand prime strong plants, three years' growth, 10s. per thousand, delivered at the Railway Station, Cambridge.

Well Selected Genuine Seeds at Reasonable Prices.

PAUL AND SON, SEEDSMEN.

The Old Nurseries, Chesham, N.

New Descriptive SEED CATALOGUE, in two Parts.

PART I.—Select list of VEGETABLE SEEDS, at reasonable prices. Articles new or especially recommended.

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Paul's Superb Crimson, 12. per oz.

BEANS—Hastings Wonder, 12. per oz.

BROCCOLI—Snow's Winter White (Paul's strain), 2s. 6d. per oz.

CARROT—Hertfordshire Hardy, 2s. 6d. per oz.

CELERY—Honey's Conqueror Fries, 1s. 6d. per packet.

LETTUCE—Old Casbury, Blackseeded Bath Coe, our selection of several years.

ONION—Paul's Improved White Spanish, unquestionably the finest White Onion for sautes, 12. per oz.

Selected Nuremberg Park, 12. per oz.

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PEAS—Layton's Alpha and Supreme, at advertised prices.

POTATOS—Early Rose, 2s. per bush.

" Red-skinned Flouball, 10s. per bush.

" Ashleaf, and other kinds, home-grown and true.

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FLORISTS' FLOWERS of choicest kinds.

PRIMULA SINENSIS—FIMBRIATA ALBA, 12. 6d. to 2s. 6d. p. pkt.

do, do, RUBRA, 12. 6d. to 2s. 6d. p. pkt.

do, do, ALBA RUBRA POLIIS, 2s. 6d. p. pkt.

These are specially selected for their branched pyramidal habit, combined with large, frimbriated, waxy flowers. The last variety is a grand and bold flower equally fine and true.

leaves and foot-stalks.

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LOBELIA—Choice named collection, 12. per packet.

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leaves and foot-stalks.

COLLECTIONS OF VEGETABLE and FLOWER SEEDS at same rates as other well-known houses.

GLADIOLUS and HOLLYHOCK CATALOGUE also now ready.

WHEELERS' SEEDS ARE THE BEST.

Sweet-scented Flowers.

"Give me Cabbage Roses, Sweet Peas, and Wall-flowers. That is my idea of a garden. Corsande's garden is the only sensible thing of the sort. ***

"No flowers are admitted that have not perfume. It is very old-fashioned. You must get her to show it you."

"It was agreed that after breakfast they should go and see Corsande's garden. *** It was formed upon a gentle southern slope, with turf-terrace walls on three sides, the fourth consisting of arches of Golden Yew. The Duke had given this garden to Lady Corsande, in order that she might practise her theory, that flower-gardens should be sweet and luxuriant, and not hard and scentless imitations of works of art. Here, in their senses, flourished abundantly all those productions of Nature which are now banished from our once neglected senses; huge bushes of Honeysuckle, and bowers of Sweet Pea and Sweet Briar, and Jessamine clustering over the walls, and Gillyflowers scenting with their sweet breeze the bricks from which they seem to spring. There were banks of Violets, which the southern breeze always stirred, and Mignonette filled every vacant nook. As they entered now, it seemed a blaze of Roses and Carnations, though once recognised in a moment the presence of the Lily, the Heliotrope, and the Stock. *Lothair.*

SWEET-SCENTED FLOWERS

The following Twelve Packets of Seed, Post Free, 4s. 6d.

HELIOTROPE
GILYFLOWERS
CANDYTUFF, Sweet.
ALYSSUM, German.
TITTHIALA BICORNIS.
MIGNONETTE.

MILK
SWEET WILLIAM.
SWEET PEAS.
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WALLFLOWERS.
CARNATIONS.

We can also offer the following fragrant Flowering Plants:—

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STOCK, German, 12s. p. doz.
CARNATIONS, 12s. p. doz.
PERPETUAL ROSES, 12s.

J. C. WHEELER AND SON, SEED GROWERS, 59, MARK LANE, LONDON, E.C.,

SEEDSMEN TO THE GLOUCESTERSHIRE AGRICULTURAL SOCIETY, GLOUCESTER.

Seedsman to the
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"Comparison invited."

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ALL SOILS

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CARTER'S
GRASS SEEDS
FOR ALL SOILS,
CARRIAGE FREE.

FOR PERMANENT PASTURES.
 FOR ORDINARY SOILS, best quality, 27s. to 30s.
 per acre; second quality, 20s. to 24s. per acre.
 FOR HEAVY SOILS, best quality, 28s. to 31s. 6d.
 per acre; second quality, 20s. to 26s. per acre.
Reduced Rates for quantities of more than five acres.

GRASS SEEDS

Descriptive Lists
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Special Notice.—Immediate Despatch.
J. C. AND CO. having fitted up most extensive NEW PREMISES
are prepared to execute Orders immediately on receipt.

Much Cheaper by the Bushel or Cwt.

CARTER'S PRIZE MANGEL AND SWEDE—CARRIAGE FREE.

CARTER'S IMPERIAL HARDY SWEDE.



Per lb., 10d.

Cheaper by
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IMPROVED
MAMMOTH
PRIZE
MANGEL.



CARTER'S
IMPROVED
MAMMOTH
PRIZE
MANGEL.

From *W. S. Manly, Eng. Bulletin*, Sept. 26th, 1870:—"I took the first prize with four Mammoth long Minnabos, second with the Globe, at the Huntingdonshire Show. It is on the 21st instant at St. Neots. Two long Minnabos weighed 35 lbs., the Globe 26 lbs.—*See* 12th, 1870.—My Mammoth long bred Minnabos, from my son's, weighed 35 lbs., the Globe 26 lbs. My men take they caused more sensation than any other lot shown there. The first prize at York. My men take they caused more sensation than any other lot shown there."

From Mr. R. Bee her, Steamed to T. Round, Esq. Kilmahony, Oct. 12th, 1873.

CARTER'S WARDEN PRIZE MANGEL.



Per lb., 1s

Cheaper by

From J. Mansfold, Esq., Greenock, April 8, 1870. "I had about 60 Tons per acre from your excellent Mangel."

CARTER'S
COLLECTIONS of VEGETABLE SEEDS.

Will also have a constant supply of the best kinds of Vegetables
"all the year round." The Collections do not include Potatoes or
Culinary Plants.

CARTER'S, No. 1 COLLECTION of VEGETABLE SEEDS
(Carriage Free, 25 Cts.)

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No Charge for Packing
Detailed Lists of Contents forwarded Free on application.

PATERSON'S BOVINIA POTATO.

Price 10c. per bushel. Much cheaper in large quantities. Contains a large amount of farinaceous matter. The enormous quantity of 20 tons per acre can be grown on land where finger-and-toe destroys the Turnips, also on land where Mangel cannot be grown probably. With extra culture, 40 tons per acre have been grown. This Potato keeps in good condition for 12 months, and is excellent for table use.

THE RED-SKINNED FLOURBALL POTATO
Price per bushel. Much cheaper in large quantities.

We have purchased a stock of this fine Potato from the original raiser. Too much cannot be said in its favour, as it is the heaviest cropper and best cooking late Potato in cultivation; especially valuable for late use and winter storing, and producing tubers all of uniform size, which are very large.

COLLECTIONS of CHOICE FLOWER SEEDS

COLLECTION A, 10s. 6d.	COLLECTION D,
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COLLECTION C, 21s. 0d.	Carriage Free.

CARTER'S PRIZE GRASS SEEDS FOR PASTURES, &c.

Carter's Mixed Clovers and Grasses.

For alternate Husbandry.		Per acre.	d
CLOVERS and RYE GRASS only for One Year's Lay	..	13	6
CLOVERS and GRASSES for One Year's Lay	..	14	6
CLOVERS and GRASSES for Two Years' Lay	..	18	0
CLOVERS and GRASSES for Three or Four Years' Lay	..	22	0
Do. Do. Do. (second quality)	..	21	0
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FOR PASTURES.

Best quality, 27s. to 31s. 6d.
Second quality, 20s. to 26s., per acre.
Carriage free.

Italian Rye Grass.

CARTER'S SUPERFINE IMPORTED ITALIAN RYE GRASS, as supplied to the Metropolitan Sewage Company, heavy and very clean	Per bushel—s. d.
ITALIAN RYE GRASS, English Seed	8 c.
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For the best practical information, see CARTER'S ILLUSTRATED FARMER'S CALENDAR for 1871, Gratis and Post Free.

JAMES CARTER AND CO., SEED FARMERS, 237 and 238, HIGH HOLBORN, LONDON, W.C.

SIXTY THOUSAND DWARF TEA-SCENTED

had been a very handsome specimen, 15 guineas having been refused for it at a public auction. At the time it came to us it was a complete wreck, all the leaves upon it being insufficient to cover an ordinary dinner plate. It was in a tub nearly a yard square, but taking hold of it we found it quite destitute of roots, and when taken out of the soil and washed, all the living fibre upon it would not have filled a child's thimble. It was at once denuded of all decayed and decaying branches and roots, potted in the loam we have spoken of, and now it is a plant which during the season has not produced less than 100 flowers.

The greatest error in the management of the Camellia, especially if they are a little sickly, is that of never leaving them alone. A plant is out of health, and straightway the roots are examined, and it is potted into fresh soil. Weeks, or possibly months, pass over, and there is no sign of vigour. Again the roots are examined, and potting into fresh soil may be again tried. This is a most fatal error. No plant is more impatient of its roots being disturbed than the Camellia. If in an unhealthy state, examine the roots, remove the soil if bad, and re-pot in a proper manner into suitable material. That done, leave the plant alone, for almost as certainly as you tamper with the roots you will do injury. Now is the right time to commence the improvement of injured Camellias. Pot them at once, reducing the heads if necessary, and then place them in a warm, moist, and shady situation, but not in bottom heat. This, with patience, will generally bring them into renewed vigour.

Returning to the soils, it appears from the evidence of Mr. PEARSON, Jun., that, both upon the Continent and in this country, the Camellia delights in pure vegetable matter. Here we shake almost all the soil out of the fibre which we use; the black peat which they use upon the Continent appears to be an identical substance, only in a state of perfect decay. When, more than 20 years ago, the late Mr. GLENDINING brought over the Meudon Pines to exhibit before the Horticultural Society, a box of this peat accompanied them. It was a fine home-grown peat, soapy when wet, but at other times dry. To appearance it was poor as need be, and as it was laid over dug-heated vaults, we attributed the superior Pine-growing more to the manure than to the soil in which they were planted. This peat was dug from a pit near Meudon, so that if it was leaf soil it must have accumulated differently to what leaf soil accumulates at the present time. Go into our ravines, where leaves have been accumulating for centuries, and you do not find even in the lower strata a homogeneous mass, but rather a heterogeneous collection of vegetable matter in all stages of decomposition. In this country the Camellia certainly does not succeed in leaf-mould, at least we have never been able to induce it to do so.

Fibrous turf, almost devoid of loam, appears to be the proper *pavimentum* for the Camellia in this country, and this fact was proclaimed by the late Mr. ROBERT ERRINGTON, certainly more than 20 years ago. He, be it remembered, lived upon the sandstone formation, and hence his success. With the loam we find it advantageous to mix a fair proportion of pounded oyster shell, the more recent the better, around which the roots wrap themselves with great avidity; in fact, we find oyster-shells good for almost all plants.

With reference to exposure, we advocate giving all greenhouse plants the advantage of autumn dew and warm showers, their sunny influence being of immense importance. Nothing is more common with us on a warm, showery day than to lift our Heaths, Azaleas, and other choice plants, into the open air for a few hours, removing to the house again at nightfall, and for autumn use we have skeleton sheds, over which canvas can be thrown in case of heavy rain. In this way we had Camellias in bloom in September, and the same plant has still some expanding buds.

Our Camellias are grown under Vines, with an extra shade of tiffany thrown over the plants in bright sunshine. Weak manure-water, from soot and sheep's dung, is used almost constantly in the growing season, sometimes over the foliage; and so soon as the flower-buds are set the plants are removed to the open air, and covered with canvas when necessary. In this way our plants are in perfect health, and we get a good show of bloom from

November until April, the blooming time being governed by the season of growth and maturation. One fact in the cultivation of the Camellia should be specially marked: it will not force. If you want early bloom you must have early growth. Buds fall from checks, arising either from under-watering or over-watering, and very frequently from the attempt to force them. The Camellia, when in vigour, will stand a great deal of rough treatment, but there is one thing it will not bear, and that is coddling. Give it fair treatment, and success is certain. †

At the meeting of the Committee of the FRENCH HORTICULTURISTS' RELIEF FUND, held at the rooms of the Royal Horticultural Society on Tuesday last, subscriptions to the amount of upwards of £300 were announced, in sums ranging from 1s. to 50 guineas, and announcements of intention to contribute in kind were made. The nursery and seed trades, as well as the amateurs, were well represented, and there was great reason to hope that a large contribution in money and in kind will be made. Circulars have been sent to most of the nurserymen and seedsman of the kingdom, and it is greatly to be desired that these gentlemen will distribute them, and call attention to the objects of the fund. One firm alone has undertaken to distribute 10,000 such circulars. A General Committee, comprising several of the most influential of the horticulturists, amateur and commercial, has been appointed, as well as an executive committee, the latter consisting, as at present constituted, of G. F. Wilson, Esq., F.R.S., Chairman, Heatherbank, Weybridge; Messrs. H. Veitch, Standish, Paul, Laing, Turner, Cutbush, C. Lee, W. Bull, B. S. Williams, E. J. Beale (Carter & Co.), T. Moore, W. Robinson, Drs. Hogg and Masters, Mr. Hurst, Mr. Nash (Minier, Nash & Nash), with the Rev. H. Dumbain, Westwell, Kent, as hon. secretary. Another meeting of the Committee will be held on Wednesday next, at 2 P.M., in the rooms of the Royal Horticultural Society, after which a first list of subscribers will be published. We may remind our readers that any sum not less than one shilling will be thankfully received for the fund by the treasurer, secretary, or any member of the Committee, or by Mr. Jas. Richards, assistant secretary, Royal Horticultural Society. Notice of intention to contribute seeds, plants, &c., should be sent to the honorary secretary.

The schedule of the MANCHESTER BOTANICAL and HORTICULTURAL SOCIETY, for their grand National Horticultural Exhibition, to commence on May 26, has just been issued, and is on the usual liberal scale. Among the Special Prizes we note the Citizens' Prize of £30, for 16 Stove and Greenhouse Plants; Mr. MENDEL'S Prize of £20 for 20 Orchids; Mr. STERN'S Prize of £10, for 10 Stove and Greenhouse Plants in pots, not exceeding 14 inches across; Mr. SPENCE'S Prize of £10 for 9 Heaths; and several prizes of £5 5s. There are also some good prizes in the other parts of the schedule, as £15 for 14 Miscellaneous Plants; £15 for 16 Orchids, £12 for 10 Roses in pots, £20 for 20 Heaths, Azaleas, and other New and Rare Plants, &c. The Royal National Tulip Society's Show takes place during the exhibition; and there is to be a Rose and Fruit Show on July 7 and 8.

The following circular has been issued by the Royal Horticultural Society, with reference to the SPECIAL COMPETITION in Stove and Greenhouse Plants for a CUP and PRIZES, suggested by W. MARSHALL, Esq.:

"1. Each intending exhibitor is to send to the Secretary of the Royal Horticultural Society, on or before March 31, 1871, the names of any stove or greenhouse plants (suitable for the flowers) that he desires to enter, together with a deposit (on account of an entrance fee of £5) of £1, the balance of £4 to be paid on or before January 1, 1873.

"2. The plants (which must be in 6-inch pots) will then be put on sale, purchased on a day that will be advertised, at the nursery or nurseries which may be agreed upon by the subscribers.

"3. The plants will then and there be marked, so as not to injure them, by some one appointed by the Royal Horticultural Society, and they will at once be forwarded to the respective buyers.

"4. The name of the competitors and of the plants chosen by them respectively, will be published in the next week's gardening papers.

"5. The plants are to be open to the inspection of any one whom the Council may appoint to visit them.

"6. If the marking on any plant be such that at any future time it interferes with the growth of such plant, notice must be sent to the Secretary of the Royal Horticultural Society, when the marking will be altered to meet the occasion.

"7. The plants to be grown entirely by the competitor or his under-gardeners, till the last meeting in May, 1873, when 10 of them will have to be exhibited at South Kensington, in competition with a like number from the other subscribers. Due notice of the exact date will be given.

"8. The Society will give in that year (1873), and in each succeeding one in which the competitions may be continued, a cup, value 20 guineas, to go to the gentleman whose garden may win the 1st prize, and in addition, three prizes: 1st, £20; 2d, £15; and 3d, £10.

"9. The entrance fees will, after deducting expenses, be divided, *pro rata*, among the 1st, 2d, and 3d prize takers.

"10. Any person proving to the satisfaction of the Council that a prize has been gained fraudulently, either by substituting a new plant for any of those originally marked, or by any other practice not in accordance with these rules, will receive the prize money instead of the exhibitor; and if this should happen in the case of the winner of the 1st prize, the Cup shall be awarded to the gentleman subscribing whose gardener may have taken the 2d prize.

"11. It is intended to continue this exhibition in succeeding years, for which purpose a fresh subscription list will be opened annually in the same manner as is now provided, new sets being selected—those purchased for the entries of 1872 being shown in 1874, and so on."

A committee, as we mentioned last week, has been appointed to meet on the 15th inst., to consider, and finally settle, the regulations to be adopted; and we are sure that the suggestions of any intending exhibitor, who may not be able to offer advice personally, will be thankfully received and fairly considered.

SCIENCE in its various branches has made solid progress in NEW ZEALAND in the course of the past few years. In a comparatively short space of time the New Zealand Institute (the Royal Society of the colony), a museum, observatory, and chemical laboratory have been established in Wellington, and we now learn that a BOTANIC GARDEN is in course of formation near the town, and is being completed as rapidly as the small funds voted by the Colonial Government will allow. At present 43 acres of land are under preparation, through which a large extent of walks have been cut, winding in gullies among Tree Ferns, &c., so that a very fine effect is produced. It is intended to collect in this garden all the species of Tree Ferns from other parts of the colony, thus a very valuable collection will be made. A nursery has been formed, and plans for raising plants from seed and preparing them for distribution. Water has been laid on, and already hundreds of people visit the gardens on Sundays and holidays, and find delight therein. Perhaps no one individual has done so much for the scientific and educational advancement of a colony as Dr. HECTOR has for New Zealand. He first organised and now controls the geological survey of the colony, he has taken the most active part in founding the museum and university, the New Zealand Institute, the telegraph system, the meteorological surveys, and last, but not least in importance, the botanical gardens of the capital.

Among PUBLICATIONS RECENTLY RECEIVED, and to some of which we may allude at greater length on another occasion, we may mention *Waifs and Strays*, a series of natural history sketches, by Mrs. ALFRED GATTY (BELL & DALDY).—*Essays on the Capabilities and Development of the Alexandra Park and Palace* (COLLINGRIDGE).—*Cottage Gardening*, by E. W. BADGER (HOULSTON), a capital little treatise, to be had in a second edition for 3d, and in packets of 25, for distribution among cottagers, at 5s. 6d.

The FLOWERS of our common Spurge, EUPHORBIA, have long been a botanical puzzle, from the complex arrangement of their parts. The older view, that of LINNÆUS, who considered them as the essence of Euphorbia as a flower, the cup-shaped involucre being by him regarded as a perianth containing numerous jointed stamens surrounding a stalked pistil. ROBERT BROWN, on the other hand, considered the flower to be made up of a central female flower, represented by a stalked pistil, and surrounded by a crowd of male flowers, consisting each of but a single stamen, the filament of which was jointed, the whole enclosed, not by a perianth, but by an involucre. To put the matter as simply as possible, from the LINNÆAN point of view, the aggregation of stamens of Euphorbia, &c., forms a single flower, while according to BROWN it is a collection of a great number of very simple flowers—an inflorescence. The latter view has prevailed till recently, when certain French botanists, PAYER and BAILLON, saw reason to revert to the older view. To determine which of these two conflicting opinions is the correct one, the object of an elaborate essay of M. EUG. WARMING, of Copenhagen, recently published in French language, but with a summary of results in French. The whole matter is somewhat complicated, so that we must refer the reader to the original essay for the full details, wherein also he will find illustrative plates and references to the works of various authors who have written on the same subject. We have only to say that M. WARMING, from an examination of the course of development, arrives at the conclusion that the head of flowers of Euphorbia constitute an inflorescence, and not a single flower. M. WARMING lays it down as a general rule that the axillary buds of flowering shoots are developed simultaneously with the bracts from whose axils they arise, while in the case of purely leaf-bearing shoots the axillary buds are developed subsequently to the leaves. The glands, which form so remarkable a feature of the involucre of Euphorbiaceæ are simply glands, and not bracts or other organs in disguise. The stamens M. WARMING looks on, not as leaves, but as axes forming pollen, as is the case in Naia, Casuarina, Typha, and perhaps also in

Cyclanthera. The parcels of stamens represent a scorioid pipe, like that of *Boraginaceae*, &c.

— DR. CRACE CALVERT states that IRON immersed for a few minutes in a solution of carbonate of potash or soda will not RUST for years, though exposed continually in a damp atmosphere. It was believed long ago by soap and alkali manufacturers (says the "Society of Arts Journal"), that the caustic alkalies (soda or potash) protected iron and steel from rust, but that the components of these salts preserved the same property as they do in a caustic state new. It does not seem to matter whether the solution is made with fresh or sea water.

— It is said that the common BROOM PLANT may be made to supply a fibre capable of being worked into the finest fabrics. At present it is only used by the inhabitants of Languedoc, who, after steeping and beating it, work the filaments into a kind of coarse cloth. The plant is not cut till it is three years old, but during that time it serves as green food for cattle. The *Mechanics Magazine* suggests that the extensive use of which Broom grows in England should be utilised in this manner.

— The leading features in the METEOROLOGY of THE WEEK ending March 4, were the high day temperatures, accompanied by almost cloudless sky, during the 2d, 3d, and 4th days of March, and the low night temperatures during the week. The MAXIMUM TEMPERATURES at most of the stations in England were unusually high, at some exceeding 65°. The highest recorded at any station was 65°·3 (at Salford), while at Newcastle the highest was 58°; the mean for the country was 62°·6. Of the stations in Scotland, 62°·4, at Paisley, and 53° at Dundee, represent the extremes, the latter being closely followed by 53°·5 at Greenock, thus causing the mean for the country to be nearly 4°·5 lower than the mean for England; this, however, is partly balanced by the lower night temperature experienced in the southern part of England. The MINIMUM TEMPERATURES were less marked proceeding northward; dividing the lowest temperatures into groups of eight, it will be seen that the mean of the eight southern stations in England was 29°·9, of the eight northern was 32°·3, while of the eight Scottish it was 33°. In England the minimum temperatures ranged from 27°·5 at Leicester to 34°·3 at Liverpool, with a mean for all stations of 31°·1, or nearly 2° below the mean for Scotland, where the extremes were represented by 30°·8 (at Aberdeen) and 35° (at Edinburgh, Glasgow, and Greenock). The MEAN TEMPERATURES in England differed but slightly from those of the preceding week, the mean for the different stations being the same, viz., 44°·3. In Scotland, however, it was much colder, the respective values being 43°·2 and 46°. The mean temperatures in England ranged from 45°·7 (at Blackheath) to 42°·7 (at Norwich), showing a range of 3°. In Scotland they ranged from 46°·3 at Edinburgh to 41°·4 at Dundee. The last day of February was noticeable for the slight range of temperature which took place, amounting at Sheffield to only 2°, at Wolverhampton to 2°·1, at Manchester, 2°·5, and at several of the remaining stations to less than 4°. RAINFALL.—The largest fall in the southern country amounted to 0·38 inch (at Manchester), and the least to 0·06 inch (at Portsmouth), no rain having fallen at Newcastle; the mean for all stations was 0·22 inch. Scotland, with falls of 0·86 inch at Perth and 0·75 inch at Greenock, had a mean of 0·39 inch. (See MR. GLAISHER'S Tables in our present issue.)

— It is the intention of the Board of Works to erect an ORNAMENTAL FOUNTAIN on the Victoria Embankment, near the Charing Cross Railway Bridge, at a cost not exceeding £1000. The designs for the same have been submitted, but not yet finally decided on. The Board has approved of a design for a memorial fountain in honour of the late Judge PAYNE, the cost of which will be defrayed by the Metropolitan Free Drinking Fountains Association. We hope this is of better character than the majority of those put up by the Association exhibit.

New Garden Plants.

ODONTOGLOSSUM-MACULATUM, Lindl., var. INTEGRALE, n. var.

Labellum lamina intergrina concolori, callo extus continuo, nec fuso, carina mediana antice angulata, omnino paulo obsoleta, fere minor.

I have known for a long time that Galeotti's No. 5277 was distinct from Dr. Lindley's typical *Odontoglossum maculatum*, whose specimens, collected by Karwinski, Galeotti, Ghiesbreght, and Boucard, are widely different, having a much laxer inflorescence, larger bracts, a blotched lip, very often crisp and erose, larger flowers, of perhaps a thinner texture, and a little difference in the callus. I had, however, never seen a fresh flower, and felt disposed to defer dealing with the question till now, perhaps intermediate materials, should throw on it a new ray of light. Happily that ray of light has now come.

I have at hand a 1-flowered raceme, with the flower pretty well developed. The sepals are light brownish, the keels outside green; both petals and lip are yellowish white; there are a few transverse brown bars at the

base of the petals; and the crest of the lip is yellow, with some purplish-brown streaks. The callosity is not so far on the outer limb at the limits of the wider base and the narrower anterior part. The central keel is very obsolete. It looks different enough from the genuine plant; I do not, however, feel inclined to propose it as more than a variety, or, if you like the expression, as a sub-species.

I wrote intentionally "Odontoglossum maculatum, Lindl.," for there is no doubt about our knowing that plant well. Dr. Lindley wrote "Odontoglossum maculatum, Lay," he might have written "O. m. Llav. and Lex.," though it is more correct to write "O. m. Lex.," since Lexarza was the orchidologist. Now, when looking once more over Lexarza's description, I feel puzzled by his speaking about "gynostemium alatum" and "labelli lamina acuminata." His not meaning a column with such wings as in *O. Cervantesi* is clear, for he describes that with "auriculis dubius." I am disposed to think it "about a clerical mistake for clavatum." Yet the acuminate lip and the "scapo multifloro" are disagreeable enough. Since we are never likely to arrive at a reasonable certitude about Lexarza's plant, we may ascribe this plant to our good doctor.

I am indebted to Mr. B. S. Williams, Victoria Nursery, Upper Holloway, London, for it. He has just flowered (end of February). It is an entirely new importation, from good number of plants of *Odontoglossum cordatum*, Lindl. *H. G. Rchb. f.*

ON THE GROWTH OF THE ROOTS OF CONIFEROUS TREES AFTER BEING FELLED.

THE formation of wood has long been a subject of dispute among vegetable physiologists. We have one set of physiologists upholding the so-called horizontal theory—while another set espouse the vertical theory. It does seem a little strange that in a matter of this sort there should be any room for difference of opinion, as a correct appreciation of the mode of formation of wood must lie at the foundation of all sound teaching and practice in forestry. Yet this is a most important matter, and one of the teachings of the forestry must therefore of necessity be to a large extent empirical.

Our attention has been called to the subject of the formation of wood by reading a prize essay by Mr. John B. Webster.* It has been long known that growth may take place in stumps of the Silver Fir for a considerable time after the tree has been felled. Mr. Webster has also most carefully observed the growth in Larch stumps, as well as in Silver Fir, Scotch Fir, and Spruce Fir. In the case of the Spruce Fir it has been found that nine annual rings have been formed since the tree was felled. The stump of the Scotch Fir was half rotten, but eighteen layers of new wood were observable. It is very interesting to find that this tree had been in a state of vigorous growth before felling, forming annual rings fully one-fourth of an inch in diameter; while the annual rings formed subsequent to the felling of the tree are contained in a diameter of half an inch. Several Larch trees have been examined, and a careful experiment made. Two large trees were felled on April 20, 1869, and at the same time a slice 1 inch thick was removed, so that this typical section might afterwards be compared with the stump, and the number of annual rings accurately determined.

Mr. Webster's observations leave no room for doubting the correctness of his statements. Such being the case, let us try to discover how this growth has occurred. We should, however, very much like to know whether growth has ever been observed in the stumps of other trees, as we can see no reason why it should not occur if the stump does not immediately decay or become hopelessly injured by the ravages of insects and fungi.

Let us briefly glance at the two theories of wood formation. Those who hold the horizontal theory maintain that the new wood is formed by the direct transformation of the cells of the cambium layer into wood-cells. The vertical theory is much more complicated. As enunciated by Gaudichaud and his followers, it supposes that a plant is a collection of fixed embryos, each having an ascending and a descending axis. The ascending axis being chiefly connected with the formation of leaves, the descending with the production of roots, it is therefore supposed that wood is formed in a downward direction by the descending axes of the fixed embryos, the formation of the wood following the course of the elaborated sap. The vertical theory is supported by the formation of adventitious roots on many plants, and also by placing ligatures round the stems of trees, a swelling or layer of formation of wood occurring above instead of below the ligature.

The vertical theory has met with many supporters in this country, but when we attempt to explain growth occurring in the stumps of felled trees by its means, we find that it cannot be the true theory, because a theory, to be a true one, must be consistent with all known facts. It is obvious to every one that in these

stumps we have layers of wood produced, without the influence of leaves, so that in this case the formation of the woody layers has been altogether independent of the descending elaborated sap, or of the descending axes of the fixed embryos. The annual rings formed in the felled stumps were very small, 18 only occupying a space of half an inch, showing that although wood may be formed, still it can only be in very small quantity.

It is usual to consider the stem of an exogen as made up of wood and a separable bark. The bark is separated from the wood by the cambium layer. It is as well, however, to bear in mind, that in the youngest stages the fibro-vascular bundles include wood-cells, the cambium cells, and the thickened liber cells, with an external epidermal covering, and a quantity of cellular tissue surrounding the fibro-vascular bundles. In speaking, therefore, of the bark, we mean that part of the fibro-vascular bundle outside the cambium layer, and all the various tissues outside it. The distinction between wood and bark, although a well-marked physiological one, is not morphological. The disputes and experiments, therefore, of the older physiologists as to whether new wood was formed by wood or bark could not but lead, as they did, to conflicting and erroneous opinions.

There are two theories as to the ideal of the fibro-vascular bundle and the wood cells. Cambium cells are capable of multiplication by division, this property being retained during the whole life of the fibro-vascular bundles. The liber cells lying immediately outside the delicate cambium cells act as a protecting layer. The liber cells are completely filled up with thickening material, and therefore perfectly impervious; a condition which entirely precludes the possibility of their absorbing any nutriment from those of the liber. The cambium cells are, however, in connection with the young wood cells. In transverse section the cambium cells are much larger in one diameter than in the other, being brick-shaped, the greatest diameter being from side to side. As the cells expand they assume the character of wood cells, the walls, which were at first delicate, then becoming thickened and lignified, and the cells, as they say, "are to be traced through the cambium layer into, and sometimes even through, the liber layer. The only means, therefore, by which the cambium cells could derive nourishment from the descending sap in the inner layer of the bark would be through the medullary rays. As the liber cells are impervious, it is difficult to see how any fluid can descend in them. On the inner side the cambium cells are in relation to the sapwood, and on more anatomical grounds it seems most probable that their nourishment would be drawn from within.

We have shown that in the Cherry Laurel fluid exists in two different states,—a large percentage of the total fluid contained in the plant at any given time being in the cells, and subserving the purpose of nutrition, while a small percentage is capable of rapid movement from below upward, and from the plant to the place where the sap is applied by additional wood absorbed by the roots. The rapidity of the movement in many observed cases shows that the fluid must travel in comparatively few tubes or vessels, and not by a slow process of diffusion from cell to cell. The fluid in circulation containing various materials furnishes sap to the cells, which, coming into relation with the gases which it can be shown permeate the whole tissues of plants, enables the cells to perform all their different functions. The cells of the Pine have been shown apparently offer an objection to the statements just made, in so far that the cells of the Pine are small, and no large vessels exist. The stems of Pines are, however, very pervious to fluids. If sections of the stem are carefully examined, it will be found that the portion of their cell-wall which originally exists in the "bordered pits" soon disappears, and you have thus a free communication opened up between all the cells. These bordered pits being very numerous, the passage of fluid from cell to cell is easy and rapid.

The chief causes of the rapid ascent of fluid or circulation* are two—root action and leaf action. It is not necessary for our purpose to consider any others. From this rapidly ascending stream the cells take up nutrient material, which is distributed by diffusion, endosmosis, and other forces. Both the root action and leaf action are very powerful, and as both act in the same direction, they must, when working together, produce great results.

Are we now in a position to explain the growth in the stumps of felled trees? The pumping action of the roots will still be at work after the tree has been felled, and by this means a certain quantity of sap will be forced up the stem. This will supply a small amount of nutrient material, sufficient to cause a slight growth. The quantity of sap must, of necessity, be small, and as gases will only be admitted through the roots, and not by the ordinary manner, owing to the want of leaves, the formation of wood will be of the most imperfect description. The structure of the small annual layers in the felled stumps is not described by Mr. Webster, but in all probability the cells of the cambium layer

* We use the word "circulation" because we may consider that fluid is constantly circulating through plants. It is taken in by the roots, ascends through the stem, is given off by the leaves to the atmosphere, and the vapour, in the form of rain, is again applied to the roots, thus completing the circle.

* "On the Growth of the Roots of Coniferous Trees after being Felled," by John B. Webster. (Transactions of the Highland and Agricultural Society of Scotland. Vol. 3 (fourth series), 1871, p. 401.)

have only enlarged and a few new ones formed, it being unlikely that any thickening by deposit of ligneous matter will have taken place. This point can, however, only be settled by a very careful examination of sections of the stem by a skilful microscopist. It would also be a matter of the greatest interest to determine by chemical analysis the percentage of ash in the new growth, as compared with that of the old; important results might in this way be arrived at.

The vertical theory is not necessary to explain the healing of the wounds in trees from above downwards. If a piece of bark be removed from a tree, the cambium cells at that part must be more or less injured. Growth will therefore only take place at the uninjured parts. The natural tendency of the nutrient fluids will be to gravitate towards the upper part of the wound, and growth will therefore be more likely to occur there than at the lower part, because the nutrient fluids will by the same force of gravity be less likely to be attracted to the injured cells and those immediately below them. This would also account for the enlargement which is observed to take place when the bark of an exogen has been ringed. Then, again, if we try to apply the vertical theory to the growth of roots, it also fails us. Roots, when they are formed, have always a deep-seated origin, and are produced in relation to the fibro-vascular bundles. If their nutriment was supplied in a downward direction by the bark, we should certainly find that they were anatomically in relation to that part from whence they ought to derive their nourishment, but such is not the case.

Mr. Webster takes to explain the growth of stumps to be in some way due to the antiseptic action of the peat bog in which the trees were growing. The decay and subsequent destruction of the stumps by insects and Fungi may perhaps be to a certain extent arrested by the peat, but it is obviously inadequate to explain the growth that takes place. *W. R. McNab, M.D., Cirencester, Feb. 27.* [The classical paper on this subject is that of Goepfert. As to the vertical theory of wood-formation, that received its *coup de grace* from the hands of Trécul some years since. Eds.]

ASPARAGUS FORCING.

THE subject of Asparagus culture often comes under discussion in gardening periodicals, but I have no recollection of having seen or heard any arguments as to the best method of forcing this excellent vegetable. As there is a great demand for forced Asparagus in almost every large establishment, allow me to offer a few remarks thereupon, in the hope that by so doing some valuable information may also be elicited from some other of your correspondents. For several years past I have been expected to keep up a good supply of it from the early part of December until it could be procured from the open ground, and this I have successfully succeeded in doing by growing it in what I may term the old-fashioned way, viz., by lifting the roots from the oldest beds in the open garden, and planting them on a bed of fermenting material over which is placed a frame and lights. That good Asparagus can be grown in this way there cannot be a doubt, but at the same time I consider it when so grown one of the most extravagant luxuries that can possibly be produced in a gentleman's garden, and for this reason,—to get good roots fit for forcing, four years' growth at least are required, during which time very little can be grown that is fit to be cut. And after being forced the roots are absolutely of no use, except to enlarge the size of the rubbish heap.

The method of forcing Asparagus which I wish to bring under the notice of your readers, and which I consider highly commendable, is that which is practised at Nynhead Court, near Wellington, Somerset, the seat of E. A. Sandford, Esq., where a short time since I had the pleasure of seeing it growing in perfection, on what appeared to me to be a very simple and economical principle. It is grown in beds 5 feet in width, with alleys 2½ feet in width between each bed. These alleys are about 4 feet in depth, and when forcing is commenced they are filled with fermenting materials, the heat from which is conducted through the beds by 9-inch drain-tiles, which are placed about 2 feet from the surface of the beds, and at about the same distance apart. Over the surface of the beds span-roofed frames, with boarded sides 2 feet in depth, are placed, after allowing the application of additional linings in severe weather, during which periods the roots are also kept well protected with litter. With four of these frames, 4½ feet in width and 8 feet in length, and by keeping them changed in pairs, &c., Mr. Bray the gardener is able to keep up a constant and abundant supply for a large establishment, from the early part of December until plenty can be gathered from the open ground, and that, too, with four beds 50 feet in length. These beds are, however, only forced every alternate year, so that eight beds are kept entirely for forcing purposes.

The linings in the trenches are allowed to remain there during the summer months, during which time the roots of the Asparagus in large numbers luxuriate in them. A good medium for growing Vegetable Marrows, ridge Cucumbers, &c., is also thus provided. The frames are, moreover, turned to a useful account for Melon and cucumber growing, &c. That the plan is not a new one I need not say, for with many it has failed to give such satisfaction as required; that it

is, however, eminently successful with Mr. Bray is evident, from the fact that during the last two seasons he has been awarded by the Royal Horticultural Society three Special Certificates for forced vegetables, the chief merit of which lay in the Asparagus. And I see by your report of the same Society's meeting on March 1, that Mr. Bray was then awarded the 1st prize. Mr. Bray attributes his success to the copious supply of liquid manure which he gives to the beds during the summer months and to the extra care which he pays to the fermenting material, to prevent it from scorching the roots. *Thos. Fothergill, Exeter.*

GRAFTING RHODODENDRONS.

["A Twenty-eight Years' Subscriber" writes:—"Although I have been pretty successful in grafting a great many kinds of trees and shrubs, I have not been so with Rhododendrons. I know several other gardeners who, like myself, would be glad of detailed information on this subject." To this appeal, Mr. Standish has been good enough to reply in the following terms.]

THE chief points to be attended to in grafting Rhododendrons are to have good stocks, and to give proper

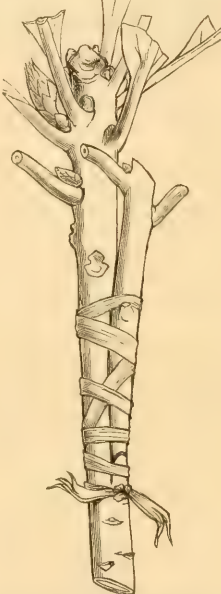


FIG. 64.—Rhododendron: side grafting.

treatment after grafting, though no treatment will answer if bad stocks are used,—by which I mean such as have been grown three or four years thickly together,

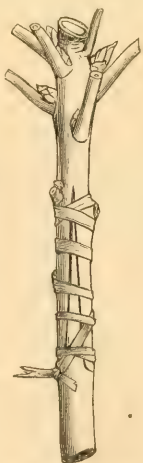


FIG. 65.—Rhododendron: saddle grafting.

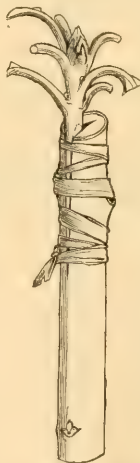


FIG. 66.—Rhododendron: wedge grafting.

and then stunted in transplanting. In that case the bark will be withered and dry, and scion and stock will

never make a good union. Indeed so imperfect will be the union that the heads will be liable to be blown off years after they have been grafted. To begin then at the beginning, let us first see how to grow the stocks. To do this well the seeds should be sown in a gentle heat about the beginning of February, in shallow pans filled with good peat soil mixed with a tolerable quantity of sand. The soil should be passed through sieves of three sizes; the coarsest part of it should be put at bottom, the second next, pressing it moderately firm, and giving a good soaking of water, and then when this is well drained, the finest placed on the top and pressed quite even and level with a circular piece of board about 1½ inch thick, provided with a handle in the middle. On this flattened surface sow the seeds, and then put a handful of the fine soil into the finest sieve, give it a gentle tap, so as barely to cover the seeds, and finish by a sprinkling of water from a very fine rose waterpot. It will be readily seen that if done in this way, and kept in a gentle heat near the glass, very little more water will be required before the seeds will have germinated. After the tiny plants begin to show their proper leaves, or about five or six weeks after they are up, pans or shallow boxes should be prepared in the same way as for the seeds, and the seedlings pricked out in them at about three-quarters of an inch apart from each other, and kept as before in a gentle moist heat of about 60° at night, shading from hot sun. When they are from 1½ to 2 inches high, gradually harden them off, so that by the end of July they may be fit to be placed outdoors in a shady place until about the end of August, when they may be transplanted again into their winter quarters, that is, under temporary hedges made of Arbor-vitæ, Laurel, Privet, or any plant that transplants well at that season, running from east to west, so as to afford shade from the mid-day sun. The beds should be about 2½ feet wide, with 1½ foot for a path, and 1 foot for a hedge, with cross hedges about 15 feet apart. The bed should of course be on the shady side of the hedge. It should be made of peat well broken to pieces, and the plants should be placed 2 inches apart in the row, by 3 inches from row to row. As each bed is finished, boughs should be stuck in, so that all the bed shall be shaded. Of course the bed should be well watered before that is done, and the waterings must be repeated if dry weather should set in. By the end of September or the beginning of October the boughs may be taken off, until the end of November, or until severe frost arrives, when the beds should be slightly covered with a layer of Heath, but not so as to darken the plants too much. With this, and the protection of the hedges, which afford a great shelter, they will get through the first winter. As soon as the worst frost is over, say about March, the Heath should be taken off, and the beds kept clean until the end of August, when the young plants may be planted out in the nursery quarters, soaking their balls of earth in shallow tubs of water before planting in rows, 7 or 8 inches from row to row, and 5 or 6 inches from plant to plant. In two years after this planting, if the soil suits them, they will be fine plants, with green bark down to the ground, and with good balls of earth about their roots; and they might, if desirable, be grafted within 2 or 3 inches of the roots.

We begin to graft in January, February, and March, and for a cold frame the operation may even be extended into April, but in the case of the grafts should have been taken off by the end of February and set under a hand-lift, behind a north wall, or in some other shady place. Those worked in heat may be grafted either saddle or wedge fashion, but saddle grafting (fig. 65) is the best, and makes the strongest union. The graft should be not quite so large as the stock, so as to leave enough room to make a good callus. The wedge grafting (fig. 66) is for using small bits of choice sorts. We use shallow boxes, 2 foot wide, 2½ feet long, and 4 inches deep, packing the plants into them as closely as possible (for when done in this way they are convenient for moving from place to place), and then placing them in a gentle moist heat, under double glass if possible, though I have seen very good results when they have been placed in shallow pits where these are heated with a couple of 3-inch pipes along the front. In that case they should be sprinkled, or syringed twice a day, and shaded from the sun until they start into growth, when air must be admitted very gradually until they are hardened, and fit to stand out in a shady place until October, when they can be planted out. The tender leaves made under glass will not stand summer sun. In April I have seen very good results in a cold pit, and for an amateur where only a few are required they will do very well under a bell glass; but they must be always attended to as above.

Another method is to graft in August. This must be side grafting (fig. 64), and the plants so done should be kept under glass all the winter in pots, and should not be headed back, until the stocks have begun to grow, when the young growth should be stopped back until the graft begins to shoot; the stock can then be headed back. Plants done in this way may, after they have made their first growth, be put in larger pots and planted in a shady place, and they will make fine plants by the autumn. *John Standish, Royal Nursery, Ascot.*

Home Correspondence.

Cheap Seed Frames.—I have lately made a number of little seed frames, 26 inches long by 18 inches wide, 11 inches high at the back, and 7 inches high in front. These are glazed on the top with old broken glass (that has come out of broken panes in the house), about 8 by 10 inches, by running a single sash-bar down the middle. An old three-dozen wine case will make two of them by sawing it through and by nailing a piece of wood about 1 inch square in each angle, so as to give it extra stiffness. This wood projects 3 inches below, and forms four legs, as it were, for pushing into the ground to hold it steady. When I use it I make a hole in the ground about 18 inches deep, and fill it up with long fresh manure, and cover it over with an inch or two of rotten manure, and then some nice soil to make a seed-bed. This makes, in fact, a small hot-bed, which I take care to raise 4 or 5 inches above the rest of the border, to allow for sinking, and the raised bed is made about 3 inches larger all round than my little frame. When the seeds are sown the frame is put down on top of them, and the four projecting feet being pressed in the soil hold it firmly in its place. I use it for Vegetable Marrows and ridge Cucumbers, sowing five seeds under each frame. When the plants require air, the frame is lifted up on a brick, and when the plants get too large for the frame they can ramble out beyond it by raising it permanently upon four half bricks. In this way the crowns of the plants are kept dry, and also protected from frost. The whole thing is rough, but for all that neat looking, for a single coat of white paint, pretty thick, makes the unplanned wood look clean. *G. A. H.*

Aucuba Fruit.—A month or so back one of your correspondents wished for information as to whether the fruit of the Aucuba had generally been injured by the severe frost. As the winter may now be considered to be past, it may interest your readers to hear that in these gardens the low temperature—about on the morning of December 25, 1870, fell to 7°—has not injured the fruit of the Aucuba in the slightest. We have a fine plant, 8 feet high and 13 feet through, standing by itself one of the lawns, naturally fertilised from a small plant in a pot fixed on a stake in the centre of the bush, which is now thickly covered with berries just turning red, and they appear not to have suffered in the least from the severe weather; the berries are, indeed, smaller than usual, but this I think is owing to the great number on the plant. Other bushes, at 12 and 16 yards from the male plant, have each a few bunches of fruit. It may also be interesting to note that the male plant (of the green-leaved variety), has stood out-of-doors all the winter, the soil in the pot occasionally frozen through and firmly to the ground, and yet the leaves have not been touched in the slightest, and are as fresh and more healthy than those of many other specimens planted in the borders. *W. Sowerby, Botanic Gardens, Regent's Park.* [See report of the last meeting of the Scientific Committee at p. 275. Eds.]

Asphalting Garden Walks.—About 20 years ago, on being presented to my present incumbency, I found the garden walks a source of considerable expense and trouble from the growth of weeds in the limestone gravel of which they were composed, and was persuaded to have them asphalted at a cost of £60. For superficial yard, the material used being slag from furnaces, and coal dust, at the end of four or five years the asphalt, which was only about 2 inches thick, began to break up, notwithstanding the repeated dressings of coal tar which it received, and I was obliged to replace some of it by an asphalt composed of hard magnesian limestone scraps, and to reface the rest with the same material. This answered so well, that I applied it to all the carriage and cart roads and yards on my property, leaving the grass-leaved village, laying it on 6 to 8 inches deep, and it has borne the wear and tear of continued traffic during 13 to 15 years, without any apparent deterioration, receiving about every fourth or fifth year a dressing of hot coal tar and sand. I cannot give any satisfactory statement of the cost per yard, inasmuch as it was laid down by my gardener and an assistant, the limestone scraps costing about 2s. per ton, and the asphalt 12s. per gallon, not including cartage. Although, however, I am perfectly satisfied with it, I have recently seen a material in use that I should much prefer to it, viz., the asphalt that is laid down in Chesapeake and Holborn, which for hardness, smoothness, and colour, is infinitely superior to any other asphalt I have seen. It must, I am persuaded, come into general use, particularly for garden walks, to the great comfort of gardeners, and the content of their masters. *A Country Clergyman.*

Conservatory Glazing, &c.—In reply to "J. N. M." respecting the panes of glass in the conservatory he has just built, slipping away after having been putted down, I would recommend him to try the pane which he has adopted. Having had occasion to remove an orchard-house, which contained very large panes of glass, I found they had been kept in their position through being secured at the bottom of each pane by small ½-inch nails, and in again fixing the

panes I am adopting the same plan, which has succeeded admirably. *E. Wilson Scpell, Plymouth.*

—It is useful to drive in a small spig nail at the bottom of each pane. A nail ½ or ¾ inch long can be carefully put in at the end of the pane, and a little above the surface of the pane below, which it must on no account touch. Thus, when putted over, the nail is not seen. The nail is driven in gently at an angle of 45°, measured from the surface of the glass. *G. A. H.*

—Mr. Rivers recommends the glazing of greenhouse roofs without any putty at all; the rebate on the spars for the glass being made only just the thickness of the glass, the glass being put in with a little white paint, and the joint painted over outside two or three times with a good quality of the same waterputty. I have glazed a good deal on this plan, and it is in every way so much the best, that I should as soon think of grinding flour in a hand-mill as of using putty in a greenhouse or light for a frame. To prevent the glass from slipping, Mr. Rivers drives small tacks into the spar, just at the low edge of each piece of glass; but I use slips of brass about an inch long, with a flange just the thickness of the glass (about one-eighth of an inch), and drive a quick 1-inch nail through the middle of the middle of the flange for the slip of wood between the two adjoining pieces of glass. These slips of brass are screwed on to the spar with a small brass screw. I have them made in Birmingham, by Messrs. Harcourt & Son; they cost a mere trifle, are neater and better than the nails, and are put on quicker, and with less risk of breaking the glass. *C. W. Strickland.*

Tree Carnations.—Mr. Miller has truly said, that these useful plants are very much neglected. I think the very moderate success which has attended the efforts of many to grow them satisfactorily for winter blooming has something to do with their being overlooked. I will, therefore, give here my system of culture, which differs slightly from Mr. Miller's, but which, I think, will be found equally simple, and bring more speedily return. Make cuttings of the young growths in March, and place them in a gentle heat. When rooted (which will be in about a month) pot them off singly into small pots. As soon as they are established, harden them off; and about the latter end of May or early in June they may be planted out in some nice rich soil, where they will make good plants by September, when they should be lifted carefully, and sent into a cold frame, or into the open air. By introducing a few at a time into a greenhouse or any place with a moderate heat, keeping them close to the glass, they will keep up a good supply of flowers all through the winter and spring. *A. Grant, Manor House, Finchley.*

Thuja occidentalis.—I observed that your correspondent "C. F. P." in his endeavours to explain the misconception which seems to exist as to the true sort of tree from which the white Cedar wood is obtained, remarks, in his letter at p. 138, that he has never known an instance in this country of the above-named Arbor-vite attaining the size of a tree. The natural character of its growth is branching, and it is usually thrown out several upright leading stems near its base, which gives it more the form of a bush than that of a tree. However, if these upright shoots are removed when young, a straight stem with a good leader can easily be formed. There was a fine specimen which grew here in an old shrubbery, but it was blown down about three years ago. It had, either from pruning or crowding when young, got away into a clean single stem, and attained quite the character of a tree; its height was 88 feet, and it was a fine symmetrical tree with a stem clean and free of branches 15 feet from the ground. I considered it a rare circumstance to see one so large, and caused a block 18 inches long to be cut off its base, which we still preserve. It measured 17 inches in diameter at the smallest end; the stem at 14 feet from the ground measured 13 inches. This part I had sent to the saw-mill and cut into planks. The wood, which is of a dark yellow color, is strongly scented, but it is very soft and appears of little value. The outer bark was cracked and much twisted, and very similar in appearance to the corkscrew form of the Spanish Chestnut. The soil it grew in was a black sandy loam, much sheltered, and about 70 feet above the level of the sea. *F. Webster, Gordon Castle.*

The Origin of Striking Plants on Turf.—The turn which the discussion on this subject has taken, has been disagreeable to me. I had no idea I had put my foot into such a "mare's nest" when I penned my short paper on Vine eyes, to supplement Mr. Miller's paper, which did not contain the little *modus operandi* of my practice; and but for that reason it is improbable that I would have written anything about the matter at all—much I might have done, long ago. It is quite true, as Mr. Thomson—to whom I am indebted for the best lessons in horticulture I ever received—says, that I was at Dalkeith during the most stirring times there, and either as journeyman or foreman had charge of the vineries, and saw the one year old Vines started on turves for planting the vineries there. It then occurred to me, when I observed how well they did, that if two years old Vines were conserved in only, by striking the turves upon turves at first, it would be an improvement, and I put the idea into practice the first opportunity I had of doing so, upon my own responsibility, and have done it on every occasion

that I have had to plant Vines since I came here. The idea of using turf, however, for such purposes, I did not learn for the first time at Dalkeith. It originated from the old practice of raising Peas upon turf for early planting, and the first account I ever saw of it was an extract from the *Gardeners' Chronicle*, copied into the *Cottage Gardeners' Dictionary* nearly 20 years ago, a copy of which I bought about 1854, when I was an apprentice at Drumlanrig Castle garden. On the advantages of root-pruning the young Vines the first year I offer no comment. I have had about a dozen pot Vines from Mr. Thomson, that were grown as he describes, and they are now setting a most extraordinary crop of Grapes, such as I never saw from nursery vines before; but his canes are not stronger, nor so strong in some cases, nor better ripened than our own pot plants, that were struck on sods in March last. Judging by the illustration in the *Journal of Horticulture*, however, Mr. Thomson's planted-out Vines must be stronger than ours, but these were planted later than Mr. Thomson's, and stopped early to secure plump eyes for fruiting this season. I cannot send you samples of our Grapes, such as the Vines asked, and would be glad; but if all's well I may send you a sample of the fruit by-and-by, and wood also. *J. Simpson, Worthy.*

—Unfortunately I have not before me for reference the remarks penned upon this subject by Mr. Simpson, and which I recently ventured to submit were so similar in character to the *modus operandi* put forth by Mr. Thomson as to clearly show that what the latter gentleman maintained to be new after all was really an old practice. I do not think that Mr. Thomson in his disclaimer (p. 273) has put me in the wrong, as the point laid so much stress upon by Mr. Simpson was the use of turf as a means of propagation, and it was this matter to which I referred solely. If Mr. Thomson conceives that he has a right to claim novelty for his application of root pruning to young vines, I have no wish to dispute the matter with him; but the practice of root pruning has been in use long and generally adopted, that it is necessary for every one to be cautious how he lays claim to any kind of originality in the matter. As was aptly illustrated in the case of the discussion that took place in these columns some time since, anent the question of Vine budding, it is now rare to find any practice made public by any man as new, that is not easily proved afterwards to have been the practice of others for a considerable time. I find a capital illustration of this in the solution of the solution in the contemporary, in which a writer with a suspiciously northern signature puts forth the use by him of strips of turves on which to raise early Peas under glass as a new discovery. Uncommon cool, certainly, as scores of your readers can testify. Surely his horticultural reading must have been very limited. *A. D.*

Horticultural Boilers.—In answer to Mr. Fish, allow me to state that the boilers in use here were supplied by Mr. J. Turner, horticultural builder, Cheetham Hill, Manchester. They are made of wrought iron, and are riveted. Cast iron is a material that should never be employed in the construction of boilers. In the case of those of the simplest make it may last for many years, or it may give way in a very short time after being in use; but with those of more complicated construction, especially if these are pushed hard, the danger is almost certain of its giving away on account of the more intense action of the fire on some parts than on others, causing consequently a greater amount of expansion of the parts in question—a strain which cast iron, from its nature, is not calculated to bear. There is another matter, in the fixing of horticultural boilers, which is generally lost sight of; but which is of great importance in economising fuel: it is the necessity of leaving much air in the fire bars, in the shape of vapour, and which, as is well known, in a great measure prevents the formation of clinkers. This can generally be managed by having the ash-pit about 2 inches lower than the floor of the stovehole, the drain from which should not be deeper than just sufficient to draw the water from it, leaving it continually damp; and if, as I have found, the water is a little lower, it will be found quite wet, and will keep up a regular stream of vapour rising to the bars. In the case of stoveholes that are dry, this can be effected by simply having a strong iron pan, 2 or 3 inches deep, sunk so as to form the bottom of the ash-pit, and which should be kept regularly supplied with water, so as to keep the ashes always wet. *T. Baines, Southgate House Gardens.*

Gardeners' Discount.—At last you have hit upon a subject that has been as a thorn in my side ever since I have held a responsible position in the nursery and seed business. You are quite deceived in supposing that, if gentlemen paid their own bills, the practice would be stopped. I think I may say that most employers do so; but the gardeners seem to appear at seed shop for a packet of something he really does not need, and timidly asks "if the governor has looked in and settled yet," or he goes out to the nursery on a similar errand, and before leaving, confidentially requests the foreman to tell his master that "he has dealt with him such and such a time, and has never yet had the pleasure of drinking his health." Some gar-

deners are more courageous; when about to give their first order they plumply ask, "What discount is allowed?" some even adding a reminder that "They have been used to 3d. in the shilling where they came from;" others ask if at the end of the year in the form of a Christmas box, but there are very few who do not ask for it in some way.

—One day, when I suggested to an older head than mine replied, "It's all very well; you'll find you must, or give up the retail trade;" and assuredly as I grow older I find it is the truth. Employers will ask why we must silver their gardeners' fingers; it is simply because the gardener has the nurseryman completely in his power. Should a gentleman visit a nursery he has not hitherto patronised, and select plants to be sent to his gardener, if that functionary find there is no chance of his gaining any pecuniary benefit by the transaction, it lays in his power to "very soon sicken the squire of that game;" if large trees have been bought he will not properly secure or mulch them; choice plants he will "shove" in a position or soil admirably adapted to "cook their goose;" if seeds, he will in some way destroy their vitality, not sow them at all, or substitute them for others older than the seeds, for they will lay on to the dealer, the plants being cross-rooted or not rooted at all, or "too delicate for our place," or "not worked on the right stock for this part." Finally, the employer gets discouraged, and confining his patronage to the gardener's favourite tradesman, the object is attained. A nurseryman soon gets his name up, for good or evil; a fresh arrival is duly informed "over the fence" that "Giles is a rattling one for discount," or that "Smiles 'aint worth a rap." No one in the trade can consequently refuse all this as the average state of affairs: all classes of gardeners are alike, from those who are "kid-gloved" and write clever articles in our periodicals, down to the official who, in addition to a small lawn and kitchen-garden, looks after the "hoss and shay." Delighted shall I be to find that a movement is being made to abolish this system of extortion, this horticultural rattenfing, for it is nothing else; delighted, not for the sake of the money the tradesman has in his pocket, but for the opportunity of showing that a custom is not necessarily a right. *A Young Nurseryman.*

Yellow Bedding Pansies.—In the *Gardeners' Chronicle* of October, 1869 (p. 1088) I entered into a discussion respecting the merits of Yellow Pansies as acquisitions in bedding. Several of your correspondents condemned them on the score that they did not last in flower sufficiently long to be useful for autumn decoration. Now, all who were sceptical on that point I requested to visit, during the autumn months of 1870, the gardens of Thoresby, Rufford, and Sandbeck, and thus be convinced by ocular demonstration, that what I had said respecting their merits was perfectly correct. I have not heard whether any of those gentlemen, engaged in the controversy, did visit either of the above named places; if so, I have no doubt they have arrived at a very different conclusion—notwithstanding that the past season has been one of the worst for Pansies that could possibly have been. How they flowered at the above places I have not heard; but this I am prepared to state, that the two Pansies, named Sandbeck Gem and the Pride of Rufford, continued in a perfect sheet of flower at Enville from the end of June until November, and nearly 100,000 persons, who visited the gardens during the season, could testify to the fact stated. I had about 4000 planted last season, so you may imagine that that number was not in the least diminished every one by the display they made throughout the whole of the summer and autumn months. Such a thing as a Pansy bedded out here was quite a new feature, and caused quite a sensation. Indeed, these Pansies, and the beautiful *Ice Verbena* we have here (certainly the best I have ever met with for bedding, being good in all other points), were admired above all the other flowers in the garden. *Calceolarias*, the two varieties raised in my herbaceous border, and especially *wellingtonia*, the Pansies came in for the lion's share of the patronage, and certainly bore off the palm, especially with the ladies, who called the *Calceolaria*, with its large golden truss, "vulgar and gaudy;" whilst the Pansy was called "beautiful," and "so sweetly innocent." I intend, during the present season, to use at least from 8000 to 10,000, so, if there are any still doubtful respecting the merits of the Pansy as a flower, with sufficient freedom throughout the summer and autumn months, a visit to Enville will prove that all I have stated respecting them is perfectly correct. They withstood the winter without any protection, thus proving that they are perfectly hardy. Indeed, the Rufford variety is as hardy as the *Cerastium*, and as easily propagated. The fault complained of by many persons respecting the Pansy not being suited for autumn flower garden decoration does not in truth lie with the Pansy, but with the cultivator. Both Pansies and *Violas* are gross feeders, and if not provided with a plentiful supply of food they will generally begin to decline by the beginning of August; and with ample food to feed on they will continue equally good until the end of October. Dig out a trench 6 inches deep, similar to a Celery trench, and fill it partly with good rotten manure, and the remainder with rich soil, then water the trench well, and sow about the middle of the duration of flowering. How few persons, compara-

tively speaking, grow the beautiful *Viola cornuta* fit to be seen, yet at Osberton and Hunsford nothing could excel it for profusion of blossoms. How is this? The answer is, simply for the want of food, of which it says "give me or I die." I wonder how many, in consequence of the past hot summer, have declared they will grow *Viola cornuta* before you can get to remember you have no other colour like it; and still further, pause—come to Enville and see my large circular beds, in mixture, of *Viola cornuta* and Mangles' *Pelargonium*, and the same *Viola* mixed with Beaton's Variegated *Nosegay Pelargonium*, and if you do not say they are both chaste and beautiful, your humble servant will be very much deceived. *Edward Bennett, Gr. to the Right Hon. the Earl of Stamford and Warrington, Enville Hall Gardens, Stowbridge.*

Rhododendron Nuttallii.—Will any of your professional correspondents inform me the best plan to adopt to bring *Rhododendron Nuttallii* into blossom? I have had two fine specimens for some years; they flourish most luxuriantly as to leaves and branches but no flowers! I have tried smaller pots, but in vain. *Amateur.* [Grafting on a restrictive stock sometimes induces a flowering habit. Eds.]

Cool Treatment of Orchids.—At p. 274 of your journal I sent a letter from "Scrutator," which reads as if I should answer it, and yet I must say I do so with great reluctance, as the examples he brings forward to prove the advantages of cool treatment in comparison with my practice, are not his own. In fact, we have not before us, that I am aware of, either Mr. Anderson's practice, or that followed at Fernhurst. Under these circumstances there can be no discussion without I write and ask them, through your pages, questions, which, not being asked by "Scrutator," but always well pointed out to "Scrutator," that terms are relative, and that though he may not think that my plan of growing *Odontoglossums* comes under the head of cool treatment, I do; and I am prepared to maintain that it is: if he has better information upon the point, I shall be very much obliged to him if he will set me right. In my last letter I said that I doubted if O. *Alexandree* came from Bogota, or any other place having an elevation of 8000 feet, and for my part I have a conclusion, which I have already furnished quotations from Mr. Purdie's letters. In Saturday's paper I see an advertisement of some for sale on the 9th that are claimed to have come from the "original locality" in New Grenada, called Pachó. I cannot find any such place in Keith Johnston's Atlas, but I find Pasto; if this is the place intended, its elevation is given as 8577 feet above the sea; but mark what he adds, "surrounded by woods and bogs," and "very different situation, and capable of modifying to no slight degree the effect of the radiation Mr. Purdie speaks of." "Scrutator" asks if I have ever tried cool treatment for *Odontoglossums*? I have never tried growing them for any length of time, say, three or four months, at a temperature of 40° to 45° for a minimum, nor has any one else, in my opinion, without seriously injuring his plants. Severe weather may necessitate many things; we had a house at Enville down to 20° temperature, and I am afraid that the *Cleodendrons* planted out are killed, though the *Cymbidiums*, *Allamandas*, *Habrothamnus*, *Stephanotis*, *Bignonia*, and a number of other stove plants did not suffer, and in this house we had also a number of *Dendrobiums*, which we did not remove, nor have they received any injury that we can see; but these plants were at rest. Can "Scrutator" get his *Odontoglossums* to rest during the winter? I assure him I am not too old to learn by any means; on the contrary, I consider any man who gets into that condition half dead—certainly his mind is, if he cannot receive new impressions. I do not see the force or bearing of his remarks about Vine cultivation; we try to get size of bunch and berry, and to obtain it lower the temperature and increase the moisture; by so doing we lose the richness a greater heat would obtain. With Orchids our success is the greatest with those that in their native habitat grow on trees. Do *Odontoglossums* grow in the same manner, or do they depend on what part of the trees? is a question I should like to see answered, though I have very little doubt they do, from the reason stated above, namely, that I do not find them difficult to manage. *G. H.* [We hope shortly to publish a letter of Sir Triana, on the conditions under which these fine *Odontoglossa* grow. Eds.]

Heading Down Young Forest Trees, &c.—I have just been looking over our young forest trees, and find that many of them, and especially the young Larch, are nibbled to the ground by rabbits and hares. Not only is the bark destroyed, but the liber also. I therefore wish to offer a few remarks on the subject. Examine your plantations, and if you find them in the condition above described, cut the trees down at once, and that immediately below a year's growth, as by so doing you will be sure to get a few good strong healthy shoots by June or July, from which you can select the strongest one nearest to the ground to furnish the future tree; whereas if you cut Larch immediately above a year's growth, you will get a lot of pendulous brush, anything but suitable for the purpose. My experience with young Pines teaches me that they require to be cut below a year's growth. They should not be cut below a year's growth, as they do not break so freely on the

older wood. I had a specimen of *Picea nobilis* which lost its leader at 5 feet from the ground. I cut it down to within 4 feet, and in the second season following a fine single shoot made its appearance, and grew to the height of 21 inches. This winter *Pinus insignis* has suffered a good deal from the frost, but not so much as to raise the question of its being a species that I have seen, an example of *Picea nobilis*, about 26 feet high, a noble looking plant. *John Burns, Gr., Tollyall Hall, Middlesbrough-on-Tees.*

Calla aethiopica.—It may interest your readers to know that where the young (freshly planted) Pampas plants have all perished, the *Calla aethiopica* is not so liable to be killed (last year) as some of the others above the water, in a sluggish stream leading to a trout pond. *Somerset, March 7.*

Oxford and Cambridge Floral Emblems.—"W. T." has overlooked the claims of the lovely light blue flowers of the *Myosotis disilliflora* to occupy a place in the hutch-holes of the partisans of Cambridge at the great University Boat-race Day. The selection of flowers which he has submitted is probably as good as can be offered generally, but individual advantages may well be made with advantage. As to the *Scillas*, I think it is probable that by April 1 they will be "quite out of the race," otherwise flowers of *S. sibirica*, with a few sprays of the *Myosotis*, and dressed with just a small piece or two of the Maidenhair Fern, would make for Cambridge an unbecomingly combination. It will be exceedingly difficult to find for the "Dark Blue" any better or more accessible representative than the Russian Violets, especially as these hardy flowers will just then, as now, be blossoming in abundance; and if for the sake of variety some other hardy flowers were desired I can commend nothing better than blooms of the *Geniata acaulis*, or, better still, if in bloom, flowers of the lovely *Lithospermum prostratum*. All of these being quite hardy, would stand exposure to a cold stream much better than flowers cut from a greenhouse or conservatory, whilst the colours are decided. *A. D.*

Damp, Cold Feet.—To those working gardeners who suffer from cold or damp feet, whether caused by working out-of-doors or in wet hot-houses, I would recommend clogs, &c., wooden shoes, as they are being made to suit the last are all wood, and are not nearly so comfortable to the wearer. Some object to clogs on account of the noise they make on stone or brick surfaces, but this may be prevented by covering their bottoms with thick leather. I can recommend them from experience as being far drier, and, consequently, warmer than ordinary boots. The authorities at the Royal Botanic Gardens, Kew, supply a pair annually to those of their employees who have to work in hot-houses, &c. Doubtless the "kid-glove fraternity" will sneer at this, but those who value their health will surely not be so foolish as to wear thin gentlemanly boots for mere appearance sake. Clogs vary in price from 2s. to 6s. per pair, according to finish, &c. *F. W. B.*

Horticultural Exhibitions.—"Combative predictions" are very necessary in men of progress, and if there were not some of that ilk among public writers, what a dull, monotonous world this would become! The fearless, incisive, practical writers—those who use the free lance without poisoning its point, are they who are the most to be depended on to supply the leaders up to their collars. Mr. Baines says I have been "conjuring up monstrosities." I would it were so; but they are dread and drear realities,—gaunt spectres, like skeletons of plants whose attenuated limbs are obliged to be tortured into all kinds of unnatural forms in the way of foliage or flowers to hide their nakedness. Mr. Baines may call them specimens if he pleases; I call them abortions, which, if the judges were true to their duty, would disqualify every collection they are put into. No, no, Mr. Baines, with the grey hair coming upon me, I have more respect for youth, health, and vigour, than to regard the keeping alive of worn-out plants a feat worth the trouble. I have seen many exhibitors founder upon that rock, and those who hug it too closely must most assuredly go down, and in no manner is it to follow Mr. Baines through his attempted justification. To do so, and reply to him, would be merely to repeat a thrice-told tale, for which I have neither leisure nor inclination. When, [however, he descends to misrepresentation, I may join issue with him, and show up his injustice. In reference to the classes for 50 plants that used to exist, I may observe that it is well known that a one-horse van would hold the lot." So says Mr. Baines. In the short notice which at the time of his death I wrote of the late William Barnard, the late President of the Knighthood Medal, ever awarded by the Horticultural Society went to Mr. Barnes for 50 stove and greenhouse plants (his first exhibit), which he conveyed in a one-horse van; but this last time he showed (which would be about 1845) he required eight vans to convey the same number of plants. This last fact carries us back a quarter of a century, and will show Mr. Baines that his aspersions is as uncalled-for as it is unjust. Every one who knows anything of the metropolitan shows is aware that the stove and greenhouse plants of the late speak in a language infinitely larger, and the exhibitions, taken as a whole, immeasurably superior to what they have been for many years past. If anyone has led Mr. Baines to think otherwise, they have certainly been very imposing. His reply, I repeat, is a mere insult, and the specimens exhibited at the Royal Botanic Society by the brothers May

required five, if not six vans, to convey them to the Regent's Park; so there was no "one-horse machine" for the purpose. Of poor May's justly will say nothing; the malady that killed him forbids that. I have been connected with Chiswick for little short of 40 years, and I should be very glad if I could say the shows are as good now as they were 20 years ago. The only two genera in which I can admit any improvement is *Alamandras* and *Dipladenia*; the cultivation of these has improved, while scores of equally good things have fallen out of cultivation altogether. That the whole institution of the London flower shows has been, and is still going to the bad, needs no clearer proof than the fact that the Chiswick shows in their zenith cleared from £1500 to £2000 annually, while the whole proceeds of the past year at Kensington, Oxford, and the fortnightly shows included, is only £1277, the expenses £1484, or a loss of more than £200. There must be a cause for this, and that cause will be found in the exhibitions being cut up into fortnightly gatherings, and at the same time denuded of rich and distinct collections. Those who make a business of exhibiting are quite right in growing those plants which will sell them most profitably; but whether this is the right in encouraging such monopoly is another and different question. I say they are not; and I say more, they will never revive the interest of exhibitions while that system continues. Men's likes and dislikes in regard to things must be guided by fact, or the want of it, and Mr. Baines objects to *Staphyleas*, and he is quite right, for no one would care to grow for exhibition purposes the "bladder nut" of our common shrubby borders. But when we speak of *Staphylea*, a genus of *Eupaciaceae*, all of which are beautiful, and of different sizes, we must not see Mr. Baines exhibit fine *Heaths* and *Eupacis*, but I can tell him that if he will exhibit a plant of *Staphylea tubiflora*, 3 feet by 3 feet, it will do him more credit than the best plant he ever yet grew. Mr. Baines once told me how he had seen *Leschenaultia*, and yet they have fallen out of cultivation. Let me assure him that at the other end of the chromatic scale *Podolobium staurophyllum* is equally good, while, as a rule, *Duronia conferta* is not condemned by those who cannot grow it, and they are the great majority who make the attempt. Years ago exhibitors took to growing plants in pots, in that they were not only difficult to grow, but which at the same time required great skill and forethought to catch them to the day in perfection. Now the plant which pleases is that which can be shown every day in the week for weeks or months in summer, and which, according to the rule of the utilitarian spirit of the age, but whether it accords with good taste I leave others to decide. Of the small plants at the London shows I know nothing, as I did not see them. Mr. Baines, no doubt, will be at Nottingham, and he will tell me that the plants which are of good size and quality for age, will not lose caste by being staged beside his veterans. Let me advise my friend Mr. Baines, than whom there is no more deserving gardener in England, to try his hand at showing three months in the year for fifty distinct species or varieties in pots, or in a house flowering plants, and I have no doubt he will find he has yet something to learn. With the difficulties of road and railway traffic, I am not unacquainted, but at the same time let me inform Mr. Baines I would rather see plants two miles from London, or by night, than two miles over the London stones, and I would rather my plants travelled by an express train than a slow one; the greatest drawback is the action of a scorching sun upon the covering of the van, which makes it intolerably hot. I know, Messrs. Baines, that you are a hardy man, and "too much stress is laid upon the practical" knowledge of judges." I quite agree with you that there must be the power to "weigh evidence," but even that must have a groundwork, and what must that be if it is not "practical" experience? In the same way, in the same science, trade, commerce, or labour, know a man to become really great who did not know the groundwork of his calling? I know it is quite possible and not infrequent to hire ability, and by such means a man of fair administrative power may manage a garden and even have the reputation of being a competent comparative judge of culture skill; but such a man can never be a judge, just because he has not that innate knowledge of his subject which would enable him to weigh evidence in a proper manner. Points are very well when properly told off, but the man who is not a judge is not a judge when applied to plants by persons who do not even know their names, and of the cultivation of which they do not know anything at all. [Of course; but we put no such premise case. Eps.] This is the complaint which exhibitors always make, and which is doing more harm than I am not without experience in judging and general gardening, but there are some departments—Orchids and florist's flowers, for example—in which I should feel considerable difference in giving a decisive opinion, and in that case I am almost sure that the exhibitor is not devoted sufficient "practical" attention to their cultivation. There are those who aspire to be considered "all round" judges, but I must confess I do not know one who is entitled to the distinction. Nothing is more common where judges are called in, than to hear the name of the exhibitor, and then to say, "I know nothing of Orchids;" another, "Plant growing is not my forte;" and a third, "I hate florist's flowers." At almost all shows good men are selected, but as a rule they are badly matched. What, for example, could be more absurd than at Oxford to see Mr. Goode, who is no doubt one of the most accomplished plant growers in Europe, and who for the last 15 years or more has had the sole direction of a collection of plants only second to Kew itself, that of the last London Peninsula, in preference, putting about among florist's flowers and herbaceous plants? And yet the same kind of misapplication of ability is happening at every show. Next to practical acquaintance with the subject, honesty and independence are the main points, and for that reason I not only advocate open showing, the name of the exhibitor being given to every exhibit, but I go further, and say the name of the judges should be placed to every prize awarded. A man who could not put his own productions into competition, and award the prize justly, ought to be scouted from

society. W. P. Ayres, Feb. 27. [We are not yet convinced that no one but an exhibition-grower is fit to be a judge, which is, as we understand it, the doctrine to which we referred at p. 239. EDS.]

Foreign Correspondence.

THE FROST AT MONTPELLIER.—M. Martins writes to me that the Centigrade thermometer in December and January registered several times lower than -15° = 5° F., and on one occasion lower than 16° . The duration of the frost was exceptionally long, indeed the winter was so unusually rigorous that many plants, such as *Quercus coccinea*, *Pistacia Lentiscus*, *Anthyllus Barba Jovis*, *Laurus nobilis*, &c., have been killed to the ground. At Coulioure also the cold has been exceptional, and the indigenous *Cistus* have been much injured. I learn also from Hyères and Antibes that much damage has been done. Ch. Naudin, F.L.S.

Notices of Books.

The Student's Elements of Geology. By Sir Charles Lyell, Bart., F.R.S. Murray. Pp. 624. figs. 636.

The problems with which geology, like astronomy, physics, and chemistry, are themselves so vast, the speculations in which the votaries of the science occasionally indulge are so audacious, that the ordinary reader who has not paid special attention to the subject, often needs the reminder that the kind of evidence available to geologists, and the way in which that evidence is used by them, are precisely similar to those in every day use for common affairs of life. The method is the same, the object to which it is applied is different. In itself this admits of no mean estimate to the value of the method. For the accomplishment of an extraordinary purpose it would be no matter for surprise if extraordinary means had to be taken; but if common methods are found competent factors, so far at least as circumstances permit, to explain the great results which geological science presents to us, so much the more valuable must those methods be. A fossil shell, for instance, is found with serpulæ or barnacles attached to its surface, and even testimony to the value of the method. To show that the inhabitant of the shell was dead before the serpulæ attached themselves—sufficient to show that the shell could not have been buried as we now find it, but must have been exposed for some time at the bottom of the sea. So in the case of the *Echinus*, or sea-egg, living representatives of which are still found, though not commonly, on some parts of our seashore, and which are extremely abundant in the fossil state on the chalk formations. In these mollusc shells we may often see one valve of a shell of some fossil adherent to the *Echinus*. Now the *Echini*, when living, are covered with spines, which fall off when the creature dies, leaving small tubercle-like cicatrices. It is clear the shell now adherent to the *Echinus* could not have been contracted that adhesion till the spines had fallen off, in consequence of the death of the *Echinus*. Such illustrations are so self-evident, that it seems unnecessary to multiply them, but we merely do so for the sake of showing the nature of the evidence on which the geologist builds up his theories.

It is by evidence of a similar character that it has been established beyond controversy, that a mild climate must once have prevailed in arctic regions, now ice-bound, and scarcely able to support life in any shape. *Sequoia*, *Tupopsis*, *Salisburia*, *Beeches*, *Oaks*, *Planes*, *Fopliers*, *Maples*, *Walnuts*, *Limes*, living in Greenland, and even a *Magnolia* could ripen its cones within the arctic circle. Whatever scepticism may be felt as to particular details, it is quite certain that Professor Heer has amply proved his case, and that if some of his determinations still remain conjectural, the correctness of others is beyond all suspicion. Not only are *Maple* leaves found in the Swiss miocene beds, but the "keys," or seed-vessels also. The most recent fossils are found, and might readily be mistaken for something else were it not for their association with fragments of wood with the bark peeling off in slabs, as happens to this day. In an island at the mouth of the Thames the vegetation must once have been akin to that of an island in the Indian Archipelago at the present day. In the mud cliffs of Sheppey, remnants of *Palms*, *Pandani*, *Nipas*, *Proteads*, and other tropical and sub-tropical plants are found by hundreds. In rocks of still older date near Aix la Chapelle Ferns of New Holland type, *Conifers*, *Pandanads*, *Oaks*, *Figs*, *Walnuts*, exist, and specially *Proteaceæ*, the leaves of the latter so perfectly preserved, that even the breathing pores are perceptible under the microscope, and seem to be identical in form and arrangement with those of recent *Grevilleas*! It is curious to see in these cases the persistency of type and form throughout a lapse of time far beyond the power of the mind to conceive. If such forms alone were found, the theory of evolution by natural selection, or otherwise, would be absolutely negated by geological evidence; but it is not so. Countless forms are extinct, or, at least, so far as we know, they have no living representatives; their organisations, as is proved by their remains, was often intermediate between that of other creatures. The *Archæopteryx*, a fossil bird, was in some points as much a reptile in

its organisation as a bird. Huxley has traced for us, with no uncertain hand, the pedigree of our existing horses.

Some Brongniart, Carruthers, and others seem also to supply links in the great chain of organisation.

How very much has been lost or destroyed we can form no adequate idea of, and scarcely of how much remains to be discovered. The Purbeck beds, in the Isle of Wight, for instance, were most carefully and conscientiously examined by Professor E. Forbes. *Mollusca*, insects, cycads, conifers of various kinds were found in abundance, but not a trace of animal life higher than that of reptiles. Geologists drew their conclusions accordingly. All on a sudden a thin layer a few inches in thickness revealed in the course of a few weeks the memorials of so many species of fossil mammalia that they already outnumber those of many a sub-division of the tertiary series, and far surpass those of all the other secondary rocks put together! It is quite clear, then, there is no room for dogmatism, but much for renewed scrutiny. We know of no book more admirably adapted to enable the learner the method of study, the general principles of the science, and more suggestive as to the best course to pursue in extending its boundaries than this latest work of Sir Charles Lyell. It is modestly entitled "The Student's Elements of Geology," but the title, while certainly not a misnomer, fails to convey a true idea of the work as an exponent of modern geological knowledge. To the general reader anxious to obtain an insight into the facts upon which geologists base their speculations and inferences, this work will also prove most acceptable.

The *Gardener* for March contains some good practical articles—especially one concerning the judicious introduction of foliage plants, *Ferns*, *Dracenas*, &c., among our flower-beds. The writer's remarks are very much to the purpose. Like "A Reader," we are curious to know where two or three dozen, or even one, Elm is to be seen grafted on Beech.—The *Villa Gardener*, as usual, contains a number of very serviceable articles, just the things for persons willing to learn to be gardeners. As we entered a mild protest against the profusion of silly notions, raised by Mr. and Mrs. Merchant Prince last month, it is only just to state that the article this month, in which Mr. Tell Effect is taken into consultation by the loving pair, and advises as to the practical laying out of their garden, is excellent, and conveys exactly the sort of information which amateurs and beginners generally require.—The *People's Magazine* for the current month comprises a coloured illustration of one of the big trees (Sequoia) Wellington, California. These have often been described, but such is their amazing size that the wonder does not wear off. "Where were our Pines," says the writer, "with their 18 feet girth, by the side of a giant some 100 feet round breast high? Of course, the great size of the ordinary forest timber in which these huge growths are found takes off from their immense proportions, but if one were set upon a plain it would show like the great system of the world. To speak for myself, it was hard to realise that what we saw were trees. Their trunks, when we stood close to them, had almost the appearance of artificial structures; one that had fallen was hollow, and had been broken by its fall. We rode into the break and through the prostrate fragment as if it had been a tunnel. We climbed up on the trunk of another also fallen, and when I had stepped 55 yards upon it I measured its circumference, and found it to be 25 feet. The trunk of the tree on which I had been stripped, would have been at least some 30 feet in girth at a height of 170 feet from the ground. * * There are about 600 of these trees in the Mariposa Grove."—The *Wochenchrift* of the 25th ult. contains an article on the more ornamental species of *Statice*, with a figure of *Statice spicata*, presumably from the pen of the secretary, Dr. Karl Koch.—The *Florist* and *Pomologist* contains a good illustration of the Royal Violette, giving a new and excellent variety sent out by Messrs. J. & C. Lee; a useful lesson for amateurs on the fruiting of Vines in pots; and several other practical and interesting papers.

A very unpretending, but at the same time very serviceable, guide in the manufacture of wax flowers may be noted in Miss Annie M. Williams' *Wax Flower Modelling Made Easy* (Bradbury & Evans). The directions are simple and to the point. Whether or not there is not something aggravating in having the same flowers in the same waxy stolidity always before one, in that season of the year, is perhaps a matter of personal predilection merely, besides, the remedy is easy.

The Spiny.

HISTORY OF A HIVE AND A SUPER.—On June 19, 1869, one of my stock hives threw off a second swarm, which I put into a new straw hive. Although rather late, it soon provided plenty for the winter, and was evidently the strongest hive in my apiary in the following spring. Still it did not swarm till June 2, nor did I observe anything particular on that occasion. On the 7th, a cast came off, unseen, and settled on a tree, in my neighbour's garden, and hanging on a branch, I wished him luck of his visitors. On looking round

next morning I was surprised to find that no less than 12 queens had been thrown overboard, and during the day another met with the same fate. A few days and all was over, the bees had fled, leaving between 20 and 30 lb. of honey. At this time I had taken off a super containing a queen, and as the bees went on very well without her, I placed the super on the deserted hive, under the impression that the bees would go downwards and save me the trouble of putting them in; but no, down they would not go. On November 20, seeing how matters stood, I took the super off, rolled it up in a piece of canvas, and laid it on a table in a store room, where it remained till January 3. By this time I had completed one of my bar-frame hives, and furnished it with comb from the straw hive, to be in readiness for an early swarm, never for a moment dreaming that the colony in the canvas would ever see daylight. Upon unrolling the bundle, judge my astonishment to find all alive, but with scarcely any food. To give it another trial I placed the super on my new hive, taking the precaution to wedge up the door, and cover all well up. Anxious to see what was going on, I removed the top of the super on the 14th inst., and again I found the bees all right, but with this difference, plenty of food. Determined to play with them no longer, I gave them the benefit of a little tobacco-smoke, which very soon had the desired effect. When I removed the super I was somewhat startled to find not only the outside combs filled from the hive below, but one in the middle partially filled with brood. Ninety-three were sealed up, and eight or ten times that number in various stages. Now the question is,—On what were these grubs fed? On the pollen collected by the foragers? If so, then pollen may be stored up by the bees as well as honey, and the breeding season commence much earlier than is generally supposed. The bees, now that their door is open, are very busy setting their house in order; but as yet I have seen no pollen carried in, although I see a bee occasionally go in loaded into the other hives. *Reason Why, Feb. 27.*

Florists' Flowers.

WE have to thank Mr. H. Cannell, of the Woolwich Nurseries, for the use of the accompanying representation (fig. 68), copied from a photograph of a well-grown SPECIMEN FUCHSIA, and published in his comprehensive Floral Guide for 1871 (which may be briefly described as a descriptive catalogue of all the best novelties in the way of Pelargoniums, Fuchsias, Calceolarias, Verbenas, Chrysanthemums, Petunias, &c.). We add from the same source an abstract of his instructions how to grow Fuchsias and other soft-wooded plants, so that they may fairly represent high-class cultivation:

What is it we really require? It is the very height of perfection in all its forms that is to say, a large object of great beauty, in as small a pot as possible consistent with its well-being, and to possess the utmost amount of perfectness, both in growth and vigour, in foliage and bloom, perfectly free from dirt and blemish of every description, and with both stakes and pot made as invisible as possible.

The annexed woodcut represents one of a set of about 30 plants, grown in the manner described, last season, and which was produced from a cutting within 12 months.

The following remarks more particularly apply to the growth of the Fuchsia, though almost any other soft-wooded plant might be grown well in a similar way, with a little alteration as to temperature, &c. The taking a cutting off an old plant, and striking it, is a very simple affair, but there is a right and a wrong way to do it, and the wrong way will often come first. The cutting selected should be strong, healthy, and woody, with no less than three or four joints, to be inserted in the sand of the cutting pot; and each leaf should be pulled off, so that every facility may be given it to form a number of small roots. Altogether the cuttings should be set 2 or 3 inches in the soil, and about an inch out, with the base of the remaining lower leaves rather below the surface. Each one should be struck singly in a thumb pot, plunged just as if it were an ordinary cutting. It is very necessary that they should be kept close and moist, being exposed only so as to keep the lower leaves from damping, until they show signs of fresh growth; cutting pot half the roots get broken off in repotting, then they may be gradually expanded. The three them. In shifting them from one pot to the other, the first months of the year in which to make sure the soil is in a proper condition—neither too wet nor too dry—and of the same temperature as that

growth, and the young rootlets have become numerous, give them a good shift, say into a 5 or 6-inch pot. The advantage of striking them in small pots is that the roots are kept intact, while in pulling them out of a



FIG. 67.—FUCHSIA DOLLS' BEIGHT.



FIG. 68.—SPECIMEN PLANT OF FUCHSIA. (From a Photograph.)

in which the plant has been kept. By no means let the plant be dry at the time of shifting it, but rather the contrary, for when plants are shifted from one pot to another they are sure to lose a certain amount of supply. Let the soil be nicely and firmly placed around the ball of roots. This is rather a delicate operation, but it will be sufficiently understood by any intelligent person, if I state, in plain words, that the plants must be transferred with a light hand from these small pots to the larger ones, without their even knowing it, so that they receive no stoppage in their growth; for if they do the wood becomes hard, flower-buds appear, stuntedness sets in, and they are perfectly useless as yearlings, which always produce such fine flowers.

The plants should be kept growing in a temperature of from 55° to 65°, and in a nice moist atmosphere. Perfectly clean rain-water, of the same temperature as the atmosphere, should always be used, so as to keep the foliage clean from that limy white appearance by which half the Fuchsias grown are spoiled. This is a matter of some difficulty where only water from the waterworks can be had; but to grow fine Fuchsias, with perfect blooms, the foliage must be large and of a bright healthy green. This is of the first importance.

After they are all in their new pots, careful watering will be necessary, as well as more moisture in the house, with a closer atmosphere, while more shade will be necessary should the sun be bright. All this will require careful watching until the roots get hold of the new soil. The light kinds are most liable to damp, and therefore require to be placed where they get less moisture, with more air and sun. The soil must be kept in a nice even state of moisture until the plants strike well into it; and as the plants grow and fill the pots with roots, so must the supply of water be accordingly increased.

At this stage—supposing the plant to be about a foot high—the art of using the water-can with judgment must be mastered, otherwise the perfection of the plant will be lost. This is, indeed, a question of easy solution, although so many seem bewildered about it; for it must be evident to an intelligent mind, that a uniform state of moisture is what is required. Flushing the pot within a larger one assists greatly in keeping the soil in a regular degree of dampness. If either extreme is indulged in, the injurious effects will soon become manifest in the appearance of the plants. In the case of the Fuchsia, it is better to keep the soil rather wet, if it be well drained, than otherwise. Therefore always keep a strict watch that the soil is kept in a nice healthy state as regards moisture, and the plant will succeed accordingly.

Each plant will have a sound stake as required, and when a larger stake is added be particular that it is inserted in the same hole as the former. When a pot becomes filled with roots, by no means run either stakes or labels down by the sides of the pots, as the roots are sure to be there in plenty. These small matters may seem frivolous, but if an exhibitor has to put up with a minor prize, he will then wish he had paid more attention to trifles. When the roots are sufficiently thick round the outside of the soil to hold it together—by no means let them approach anything like being pot-bound—let the plants be shifted into the blooming pots, taking the same care as before, for any sudden check at this stage will cause them to make bloom buds before they have filled the large pots. Choose dull weather if possible for this operation, and adopt any other means to prevent exhaustion, until they become established.

It will now be necessary to go through the whole system of repotting and preparing the soil. The preparation of the soil is rather a difficult matter to explain. Every one must have observed, in the growing season, small insects turning up the soil in which our choice pot plants grow, as if they were moles in miniature; and take whatever cause we may, particularly with rich soil, worms are almost certain to make their appearance. To remedy this state of things, I have prepared my soil in a peculiar way. I believe this to be a grand secret—and which has escaped the attention of all our great men. I have practised it now for two seasons, and the accompanying woodcut taken from a photograph of a yearling plant when in its prime, will testify to its success. It is clearly necessary, when plants are limited in their root space to a certain sized pot, that every particle of the soil should be genuine, and every part of the space should be made the most of; so, after due consideration, I came to the conclusion that, as fire causes the rank black blotches which are so conspicuous in our Wheat fields, &c., in the spring,

where the farmer had been burning his soil and rubbish, so I thought, would flower plants show a preference for similarly prepared soil. I determined, therefore, to subject all my soil for particular things to the following ordeal—*I* build up with bricks a rough furnace about a foot high, and if I can get some old bars to form a draught, so much the better. The size of the fire is that of the largest old tea tray that can be procured. A good coke fire is made up, and being handy, it is put on the tray, and with the brick-layers' trowel turned over which has in this way a considerable quantity can soon be slightly burnt and purified, and can then be stored away in any old boxes, to be ready to use as required. I am convinced that no dung ought to be used for pot plants, until it has undergone this process.

We add a woodcut (fig. 67) of one of the finest of Mr. Banks' last batch of new Fuchsias, which has been named JOHN BRIGHT, and which is being distributed by Mr. Cannell. It is considered to be an improvement on Beauty of Sholden and Disraeli, and to be one of the finest exhibition varieties ever sent out.

Obituary.

THE German journals announce that Mr. THEODOR HARTWEG, who lately occupied the post of Grand-Ducal Garden Inspector, died, at Schwetzingen, in Baden, on February 3 last. Mr. Hartweg was formerly in the employ of the Horticultural Society, and was, in 1836, sent by the Society to Mexico, to collect seeds, roots, plants. The collections he made were described by Mr. Bentham under the title of "Plantae Hartwegianae," the publication of which commenced in 1839, and was extended over several years. After making extensive collections in Guatemala and equatorial America, including Quito and Bogota, Mr. Hartweg visited Jamaica, whence he returned to England in 1843. A second mission to Mexico and California, with the same objects and under the same auspices, was undertaken in 1845, and completed in 1848. A record of these journeys, and their results will be found—those of the first, in the "Transactions of the Horticultural Society of London" (2 ser., iii., 115); and those of the latter, in the "Journal" of the Society (vols. i., 180; ii., 151, 187; iii., 217). It was on his first journey, at Zaquapan, on the eastern declivity of the snow-clad Orizaba, on trees overhanging the perpendicular sides of the ravines, that he found *Hartwegia purpurea*, "the little plant," as he calls it, "which now bears my name," and which was given it by Dr. Lindley in acknowledgment of Mr. Hartweg's success as a collector while at Leon. *Lupinus Hartwegii* was abundant in the fields. In the neighbourhood of San Luis Potosi, at the foot of a bluff rock, called El Contadero, was gathered the striking pinnate-leaved *Berberis Hartwegii*; and *Pinus Hartwegii*, first met with near Totonicapan, was afterwards met with in Guatemala, in the crater of the Volcan de Agua. The many fine plants introduced in the course of these journeys, especially in the classes of Orchids, hardy trees, and hardy annuals, will long keep up amongst us the memory of Mr. Hartweg.

THE WEATHER.

STATE OF THE WEATHER AT BLACKHEATH, LONDON, FOR THE WEEK ENDING WEDNESDAY, MARCH 8, 1871.

At 9 A.M.									
1871. MONTH AND DAY.	Reading of				Hygrometrical Deduction from Glaisher's Tables, 5th edition.				
March.	Barometer reduced 32° Fahr.	Dry Ther- mometer.	Wet Ther- mometer.	Dew Point.	Degree of Humidity.	Weight of Vapour in a Cubic Foot of Air.	Gr.	°	
	Ins.	Deg.	Deg.	Deg.	Deg.				
2 Thurs.	30.15	57.8	38.6	35.3	43.9	84	2.7		
3 Friday.	30.14	58.6	38.5	35.3	44.3	84	2.7		
4 Saturday.	30.20	59.9	38.9	35.9	44.9	84	2.7		
5 Sunday.	30.20	59.9	38.9	35.9	44.9	84	2.7		
6 Monday.	30.20	59.9	38.9	35.9	44.9	84	2.7		
7 Tues.	30.27	61.1	40.1	37.8	46.3	87	3.0		
8 Wednes.	30.27	61.1	40.1	37.8	46.3	87	3.0		
1871. MONTH AND DAY.	TEMPERATURE OF THE AIR.				WIND.	RAIN.			
March.	Highest.	Lowest.	Range in the Day.	Mean.	Direction. Temperature of Mean from Average of 35 Years.	Direction. Horizontal Movement.	In Inches.		
2 Thurs.	57.8	30.1	27.7	43.9	+ 3.0	Calm. S.W.	120	0.00	
3 Friday.	58.6	30.1	28.5	46.7	+ 6.5	S.S.E. S.W.	130	0.00	
4 Satur.	63.0	30.9	32.0	49.8	+ 11.7	S.S.E. S.W.	260	0.00	
5 Sunday.	58.6	42.4	16.2	50.5	+ 0.2	S.S.E. S.W.	380	0.00	
6 Monday.	55.0	48.1	6.9	51.5	+ 11.1	S.S.E. S.W.	370	0.01	
7 Tues.	51.7	40.6	11.1	45.4	+ 5.2	S.S.E. S.W.	420	0.00	
8 Wednes.	52.7	37.0	15.7	44.7	+ 3.8	W.S.W.	550	0.22	
March 2.	Cloudless. Hoar-frost in the morning. A very fine day.								
3.	— Cloudless. Hoar-frost in the morning. Light clouds were prevalent.								
4.	— Fine. — Variable amounts of cloud during the day, and at night the sky was covered with cloud.								
5.	— Fine in the morning. Overcast afterwards. Rain fell between 4.30 and 6 P.M.								
6.	— Overcast till 10 A.M. fine afterwards.								
7.	— Very fine, but variable. A heavy shower of rain and hail at 1.30 P.M.								

3. *Selaginella erythropus*, 4. *Adiantum hispidulum*; 5. *Selaginella Martensii*.
SOFT WATER TANK: *Thirk* asks if a cement tank, with a 4-inch hot-water pipe passing through the centre, can be made watertight. He had several built in this manner four years ago, but they have always leaked, and the bricklayer informs him that it is impossible to make them watertight on account of the hot-water pipes. Will some of our readers give him the benefit of their experience on the matter?
THE TREE ONION: *W. D. F.*, who says that this plant was to be found in many gardens some 40 years ago, asks if it can now be had, and where?

CATALOGUES RECEIVED.—Francis & Arthur Dickson & Sons, Catalogue of New and Select Farm Seeds.—Bell & Thorpe, Select Seed Catalogue.

COMMUNICATIONS RECEIVED.—G. H. R. (No. 1—W. P. A. I. M. O. A. J.)—A Country Nurseryman.—M. C. A. G. G. O. M. R. J. Anstetter.—T. S. (received with thanks and sent to Chitwick, H. S. & H. C. B. Beale, enclosure).—Minier, Nash & Co. (enclosure)—W. A. X.

Markets.

POTATOS.—Southwark, March 6.

During the past week the arrivals both coastwise and by rail have been in excess of the demand, and a decline in prices has been the consequence. The following are this day's quotations:—Yorkshire Inks, 9s. to 11s.; Yorkshire Regents, 8s. to 8½s.; Lin. chloride do, 7s. to 8s.; Dunbar and East Lothian do, 6s. to 7s.; Perth, Forfar, and Fifehire do, 6s. to 7s.; do. Rocks, 6s. to 6½s.; Kent and Essex Regents, 5s. to 6s.; do. Rocks, 5s. to 5½s.

COVENT GARDEN.—March 10.

This market still remains firm, at last week's quotations supplies are now considerably on the increase, so that we must shortly expect prices to recede. New Potatoes are to hand from the Channel Islands, Bermuda, Tenerife, and Malta, ranging from 4d. to 1s. 6d. per lb. Hothouse Grapes have advanced in price, and good supplies are becoming comparatively abundant. The principal flowers in the market are still Hyacinths, Tulips, Lily of the Valley, Cyclamens, Pelargoniums, Azaleas, Cytisus, and Violets.

FRUIT.

<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>
Apples, p. 4 size	1 6 to 3 0	Oranges, per 100	6 0 to 8 0
Grapes, per lb.	8 0—18 0	Pears, per doz.	3 0 to 8 0
Lemons, per 100	6 0 to 10 0	Pine-apples, per lb.	6 0 to 10 0
McClens, each	1 0		

VEGETABLES.

<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>
Artichokes, Jersey	2 0 to 4 0	Herbs, per bunch	0 2 to 0 4
Asparagus, p. bundle	4 0 to 10 0	Min. per bunch	3 0 to 5 0
Beet, per doz.	2 0 to 3 0	Lettuces, per doz.	1 0 to 2 0
Brussels Sprouts, s. 3	0 6 to 1 0	Mint, per bunch	0 3 to 0 6
Carrots, p. doz.	0 6 to 1 0	Mushrooms, p. pott.	1 0 to 1 6
Cauliflowers, p. doz.	1 6 to 3 0	Onions, per bunch	0 4 to 0 8
Celery, red, p. bundle	1 0 to 1 6	Parsley, p. bunch	0 6 to 0 8
—white, do.	1 0 to 1 6	Rhubarb, p. bundle	0 1 to 0 6
Cucumbers, each	1 0 to 2 0	Spinach, per doz.	0 8 to 1 0
—white, do.	1 0 to 2 0	Spinach, per bush	0 8 to 1 0
Potatoes, Regents, per ton	20s. to 25s.	Kidneys, 8s. to 13s.	
		Rocks, 5s. to 6s.	

RENDEL'S PATENT PORTABLE PLANT PROTECTORS—New Illustrated Catalogue, just published, can be had gratis, on application to the Patentee, Mr. WM. EDMUND RENDEL, 68, Welbeck Street, Cavendish Square, London, W.

THE ACME GARDEN FRAME AND GROUND VINERY.
 The most perfect and effective, also at the cheapest Farm and Vineery yet brought out. See the *Gardeners' Chronicle*, Dec. 17, 1870. See also JAMES L. KOCKER, Invention, Patentee, and Sole Manufacturer, Kingston-on-Thames.

Indestructible Terra-Cotta Plant Markers.
MAW AND CO.'S PATENT.—Prices, Printed Patterns, and Specimens sent post free on application, also Patterns of Ornamental Tile Pavements for Conservatories, Entrance Halls, &c. MAW AND CO., Benthall Works, Brossley.

TABLES, LABELS, PARCHEMEN, or CLOTH LABELS.—Printed Plant Labels, per hundred, per dozen, per 100, or 1000, for 35s., cash on delivery. Sample Label sent on receipt of 4s. per 100. JOHN FISHER and CO., Label Works, Bottom, London.

BROWN'S FLORAL SHADING, for Shading Plants under Glass from the Sun, and Protecting the Bloom of Wall-Flowers from Frost. Price, 1s. 6d. per yard. No. 1—38 inches wide, 20 yards long, at 4d. per piece. No. 2—38 inches wide, 20 yards long, at 5d. per piece. No. 3—38 inches wide, 20 yards long, at 6d. per piece. Samples on application. CHAS. BROWN, Greenhays, Manchester.

RUSSELL'S TAGANROG MATS are the cheapest and most durable. Price list, which gives the size of every class of Mat, for sale post free on application. JAS. T. ANDERSON, 7, Commercial Street, Shoreditch, London.

RUSSIA MATS—A large stock of Archangel and Petersburg, for Covering and Packing. Second sized Archangel, 1s. 6d. per 100; Petersburg, 1s. 4d. per 100; 5s. 6d. per 100; packing Mats, 20s. 30s., and 35s. per 100; and every other description of Mats, Russia Mats, and Sack Warehouses, 4 and 5, Wormwood Street.

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these islands. And prompted by their own desire to give the fullest information, the authorities of the statistical department of the Board of Trade have pursued their calculations into many other points of interest to agriculturists. We shall in the course of the next few weeks publish the contents of this Blue Book almost in full, meanwhile we give the following analysis of Mr. FONBLANQUE's report.

Objection is still found to exist on the part of farmers in some parts of England to give the returns which are desired, and a good deal of delay in their publication is thus experienced. A classification of the holdings in Great Britain, according to their acreage, has been made by the collecting officers this year for the first time, and the Table that has been prepared to show the number and percentage of each class of holding in each county will be examined with interest. In England, out of a total of 393,569 holdings, 213,262, or 54 per cent., do not exceed 20 acres; in Wales, the total is 55,957, of which 21,185, or 48 per cent., do not exceed 20 acres; and in Scotland the total holdings number 79,603, including 45,434, or 57 per cent., not exceeding 20 acres.

The Table in which these results are given in detail presents a curious illustration of the possibilities which exist in every county for the energetic labouring man in agricultural districts. It is not possible to suppose, to take Gloucestershire, for example, that its 3600 "farms" under 5 acres are mere "grounds" around good houses; the great majority must be what they profess to be—"holdings" occupied by separate tenants for a living. There are, further, 285 such holdings between 5 and 20 acres each, 1250 between 20 and 50 acres, 1000 between 50 and 100, and 2000 over 100 acres each. In Gloucestershire, therefore, the ladder of ascent by which a working man might ultimately become the tenant of a large farm is full of rungs; there is no interval so large as to be unbridgeable by energy; and the truth so obvious here may be seen in almost every county—though, excepting some of the Highland counties, where "crofters" are a considerable population, it is not so obvious in the Scottish counties as in the English.

The following are the principal figures among the returns of live stock. There are 90,000 more cattle in the United Kingdom this year than there were in 1860; 1,460,000 fewer sheep, 622,000 more pigs. The agricultural horse stock of the past year cannot be fairly compared with that of 1860, owing to a difference in the way of taking the returns. We now learn that the number of strictly agricultural horses, *i.e.*, horses used on farms and market gardens, unbroken horses, and brood mares, is 977,707 in England 116,131 in Wales, and 172,871 in Scotland, making a general total for Great Britain of 1,266,709.

Of this total, 965,515 were horses used solely for agriculture and by market gardeners, and 301,194 were unbroken horses and mares kept for breeding, the latter amounting to 38,141. The total number of licences issued for horses in the year 1870 was for England and Wales, 770,306; for Scotland, 70,902; making a total of 841,208 for the whole of Great Britain. Thus, the agricultural returns and the licences issued show a total of 2,107,700 horses; but, as some horses used partly in agriculture and partly for duty, may have been included both in the agricultural returns and in the number of licences, and as two or more licences may have been taken for the same horse, upon changes of ownership, some deduction must be made from the total number just stated. The total number of horses in Great Britain may probably be taken at 2,000. The number of horses returned in England in 1870 was 531,306, which makes a total for the United Kingdom of 2,581,306 horses.

These figures possess some interest in connection with the subject discussed by Mr. TATTERSALL before the London Farmers' Club, to which reference is made in another column. The number of horses returned per 100 acres in the several counties is worth studying, as showing the effect of extensive arable culture in some districts, and the prevalence of horse-breeding in others.

From the returns of acreage under different crops, we learn that there were 200,000 fewer acres under Wheat, 120,000 acres more Barley, but little difference in the extent of Oats, 124,000 acres less in Peas and Beans last year than in the year before. The extent in green crops of various kinds, including Potatoes, did not differ much in 1869 and 1870. We learn, however, that the cultivation of Mangel Wurzel is increasing, the Kohl Rabi has advanced from 13,000 acres in 1869 to 24,000 acres in 1870; and that Sugar-Beet, of which a separate return has been obtained, occupied 1429 acres

in 1868, and 4332 acres in 1870. The acreage under Flax culture also considerably increased. The increased return reported under the head of Clover and other grasses under rotation, amounting to no less than 1,056,000 acres in 1870, is explained as due, in great measure, to an altered heading in the Table:—

"Previously to 1870, the heading in the collecting forms was worded 'Clover under rotation,' but as it was reported that some farmers returned under that head land under grass for one season only, and land under grass for more than one season as permanent pasture, the wording was altered to 'Clover under rotation for one or more seasons.' The effect of this alteration in causing a transfer of land from one class of grass land to another is observable in the increase in the acreage returned under permanent pasture in 1870."

Here, again, is another fact of agricultural interest well brought out by the returns:—

"Subject to these remarks upon the returns of the acreage of Clover in 1870, it will be interesting to notice the acreage returned in Great Britain 'for hay' and 'not for hay.' Of the grasses under rotation in England, 1,585,271 acres were 'for hay,' and 1,241,506 acres were 'not for hay'; in Wales, 205,346 acres were 'for hay,' and 102,936 acres were 'not for hay,' and in Scotland, 33,614 acres were 'for hay,' and 1,001,269 acres were 'not for hay.' Thus the total for Great Britain was 2,069,233 acres 'for hay,' and 2,435,651 acres 'not for hay.' From these figures an estimate may be formed of the extent and value of the hay crop from the sown or arable grasses, and at an estimated average of 1 ton per acre, about 2,070,000 tons of this kind of hay must be harvested in Great Britain, of the value of £8,280,000, at an average price of £4 per ton."

In like manner it appears that there are in England 2,647,448 acres of permanent pastures (exclusive of mountain land) "for hay," and 7,032,763 acres "not for hay." The figures for the whole of Great Britain are 3,067,151, and 9,005,705 respectively.

"Altogether, therefore, the hay crop, both Clover and meadow, in Great Britain, from a total acreage of 5,196,000 acres, may be estimated at about 4,830,000 tons, of the value of £19,320,000. This estimated amount will form a guide to one branch of the pecuniary loss that a season of unusual drought, such as that of 1870, may entail directly upon agriculturists, and indirectly upon the general community."

We have not room for further comments this week upon a Blue Book which has been issued only the day before we go to press; but we shall continue for several weeks to draw upon the large store of useful agricultural information here laid open to us.

THE paper on "THE SUPPLY OF ENGLISH CAVALRY HORSES," read by Mr. E. TATTERSALL, of Albert Gate, Knightsbridge, before the London Farmers' Club on Monday evening, was well received by a large audience. It was complained that the horse-breeding counties were but sparsely represented, but the extensive experience of the lecturer was so embodied in his paper as very fairly to elicit from those who took part in the discussion, the practice of the country generally as to the breeding and supply of horses for military purposes. The resources of the country were practically illustrated by the large number of horses sent annually to the Continent, owing to the high price given for first-class breeding stock; and although it was argued that the home supply was thus reduced below our own immediate requirements, so that prices must be unnaturally enhanced, yet general opinion appeared to be that breeding horses for the Government did not pay, and that were a fair price offered to farmers, the fine stallions and mares sent to the Government studs of Germany, Austria, and France, would be retained at home, and the large number of inferior animals now complained of would disappear.

During the subsequent discussion, Mr. SIDNEY, of the Agricultural Hall, referring to his own experience and that which he had acquired in connection with the large horse shows at Islington, in a very lively manner contrasted our own Government with the Governments of Austria, Germany, &c.; but the fact is "our Government is what we make it." The rearing of horses is not profitable at present, yet prices in England are higher than on the Continent. We possess the means of growing the best horses in the world—Government establishments are seldom successful, and he did not think Government studs would be an exception to the general rule. He was not afraid of England being taken by surprise. He did not think favourably of the system of granting prizes, and the manner in which prizes were awarded by the Royal Agricultural Society was objectionable.

Mr. CORBET, the Secretary of the Farmers' Club, took Mr. SIDNEY to task on the prize

system, reminding him that prizes are very liberally given at the Horse Shows in the Agricultural Hall. Agricultural societies have done much good in every county by granting prizes; their annual meetings are an excellent school for teaching farmers, and the prize animals form the practical lessons. He next drew attention to the exclusive stimulus given to cattle, sheep, and pigs, prior to the Royal Agricultural Society having given prizes for thorough-bred horses. We have more good cavalry horses now than formerly, and we want more of them than we yet have. He believed the political economists would rise up against any Government stud grants in the Chancellor's Budget. He reviewed the practice of giving plates at horse-races, and thought encouragement might be given in this way to breeding thorough-bred horses for military purposes.

Mr. SMITHIES expressed a wish to represent the breeders of horses more closely than had been done by previous speakers. The present low prices have induced Yorkshire and the other breeding counties rather to breed and fatten cattle and sheep. He preferred an open market to any Government establishment. The present low price has for either its result or its cause a large produce of inferior horses, immense numbers of which pass through the metropolises for the Continent, thus proving that all the cavalry horses exported are not first-rate. In India £70 is the Government price. He thought the price of £40 would not encourage the breeding of fine horses, for if a thorough-bred stallion were worth £1000, and the mare were worth £70, their produce at four years old could not be so sold for £40. If a breeder gets £180 and £200 for a first-rate hunter, is it likely he will breed cavalry horses at £35 and £40? Small farms supply a large number of "machine horses," both for home and export use, but small farmers too frequently use an inferior stallion at a low price.

Mr. COUSSMAKER said that in Surrey some bred heavy cross-horses, some light cross, and others thorough-breds, and so on, the produce in every case being a mixture of good and bad. Breeding for the market is unprofitable. At present Surrey farmers cannot supply cavalry horses at the low prices now paid.

Mr. TRETHERWY said that farmers want something that will pay. Practically they could not look at the subject in any other light. There were districts in which horses are largely bred, other districts lend themselves out for the breeding of cattle; but if beef and mutton pay better than horseflesh, the upshot is inevitable. An abundant supply of horses can be produced if Government will give a remunerating price. Less than £70 will not do. He then drew attention to the increased demand for saddle horses, which is 20 to 1 as compared with former times, whilst the increase of gig horses is 500 to 1. Such facts speak for themselves, as to the demand of our large towns and the supply of the country.

Mr. WILD reviewed the thorough-bred stud establishments of Continental Governments, and the practical lesson of the war between Germany and France, and thought we should profit more by private enterprise than Government support.

THE CHAIRMAN in his summary said, the general conclusion appeared to be that purchasers must pay for good cavalry horses.

Mr. TATTERSALL, in reply, explained that Government studs were breeding studs for thorough-bred stallions to cover at a low price, say £2; and were this done regardless of expense, the breed of cavalry horses would thus be improved; and the country ought to bear in mind that very important advantages would be gained indirectly, as in Prussia and Austria. Germany, for example, was able to supply her cavalry at the recent outbreak of war within her own resources, at a moment's notice; and the value of such ability could scarcely be overestimated. He concluded by mentioning several examples of thorough-bred horses being kept by landowners and let out at a reasonable price—a thing which met with the hearty approbation of the meeting.

—At Mark Lane, on Monday, the supply of English Wheat was short, and its condition bad, still there was an advance of 1s. per qr. on the prices of the previous week; flour, also, brought the extreme prices of the previous Monday. Wednesday's market was characterised by firmness both in Wheat and flour—especially country marks of the latter. —In the Metropolitan Cattle Market trade was dull on Monday; choice sorts met with ready sale—but the

average price of beasts was lower. At Wednesday's market there was an active business in sheep, at a slight rise.—There is considerable activity in the seed market.

—An Order in Council is about to be issued, forbidding IMPORTS OF CATTLE from FRANCE and BELGIUM. The prevalence of the cattle plague in both countries is its sufficient justification.

—MR. LOCH'S GAME BILL, giving landlords and tenants a joint right to kill game, and prohibiting the latter from contracting himself out of this right in his lease, was thrown out by a large majority on Wednesday evening.

—At a meeting connected with the French Relief Fund at the Mansion House on Tuesday, LORD VERNON announced, on the part of the FRENCH PEASANT-FARMERS' SEED FUND, that, with the two grants of £5000 each from the Mansion House Committee, they had altogether received £25,000, and had expended £24,700. They had purchased seed corn to the extent of £22,000, sacks to the extent of £1,000, and had spent in advertisements £1000, besides making a grant of £500 to the War Victims' Funds. 3000 bags of wheat were in process of distribution at Amiens, and they had reason to believe that more had arrived. With the first grant of the committee 1500 qr. of seed wheat had been purchased for distribution in the Department of La Beauce, and would leave London on Wednesday; and 1000 qr. of Wheat, Barley, and Oats would be distributed in the Departments north of Paris, such as the Seine, Seine-et-Oise, and Marne. Not a moment had been lost in purchasing and despatching the seed corn, which was in the nature of things rather a long process, as the corn had to be collected from individual farmers in small quantities.—It need hardly be added to this, that any one willing to contribute to the great need, which will thus be imperfectly met, should do so at once. Seed-time has already come, and must be promptly used.

On Tuesday, at the regular meeting of the CENTRAL CHAMBER OF AGRICULTURE, including representatives of the various county Chambers, held at the Salisbury Hotel, Fleet Street, under the presidency of Sir MASSEY LOPES, M.P., after a large amount of general business had been disposed of, Mr. J. ALGERNON CLARKE, the Secretary, presented the draught of a letter which it was proposed should be sent to the Chancellor of the Exchequer, on the subject of the Malt-tax. It commenced by reminding Mr. LOWE of the conviction he expressed last year, when the deputation from the Chamber waited upon him, "that it is impossible to levy a revenue of nearly £7,000,000 upon a single article of agricultural produce without very much interfering with the cultivation of the land and with the business of those who are engaged in it." Mr. LOWE had also agreed that it was exceedingly undesirable that a most important class should live in a state of chronic discontent; and the agriculturists, the letter said, had reason to complain; and they trusted that the hopes of relief founded upon his favourable reception of them were about to be realised, and that a reform of the oppressive malt duty was only postponed last year in order to accomplish the important remission of the sugar duties. The Council, in conclusion, begged for earnest attention to the pressing claims of the growers of Barley and the consumers of beer, and that the Chancellor of the Exchequer should give effect to a resolution agreed to by the Chamber, to this effect:—

"That the Council urge upon the Government, when reviewing the general licensing system of the country, to consider the unjust pressure of the Malt-tax upon the growers of Barley and upon the labouring classes, who are the great consumers of beer."

The letter was approved. The subject of local taxation was then brought before the meeting, on a report from a committee of which the President is chairman. A considerable discussion followed on the motion of Mr. A. STARTIN, seconded by Sir GEORGE JENKINSON, M.P. :—

"That the present incidence of local taxation, imposing, as it does, many new and national charges not mentioned or contemplated by the original Act of Elizabeth, and falling, as it does, on real property only, is unjust and requires revision; and that no Bill on this subject which continues the exemption of any other property from contributing towards those new and national burdens, will be regarded as just and satisfactory by the owners and occupiers of real property."

This was carried.—MR. JASPER MORE moved, on another portion of the same subject :—

"That this Council protests against clauses 26 to 32 of the new Municipal Corporations Bill, under colour of providing facilities to boroughs and counties for borrowing money for militia barracks, would establish further the objectionable principle that such expenditure should be defrayed by ratepayers instead of forming part of the general military expenditure of the country." The motion was carried by a large majority.

MR. J. BOWEN JONES, of Shropshire, seconded the motion, which was read to *non com.* On the question of the Elections Bill, Mr. C. S. READ, M.P., moved :—

"That the proposed payment of the expenses of Parliamentary elections out of the county rates would be an aggravation of the present excessive burdens upon rateable property."

He said he had himself run a county, and successfully too, for £650—and cheap enough. If this Bill passed, there would be a lot of vulgarious men who would run an election and have the expenses paid out of the county rate.—MR. TRASK seconded the motion.—MR. CORRANCE, M.P., differed from the views of Mr. READ.—The motion was carried.—A discussion then ensued, opened by Mr. GEORGE ANDREWS, on the subject of roads, and Mr. WHITAKER seconded the following motion, proposed by the first speaker :—

"That in the opinion of this Council good roads would benefit all classes, especially employers of labour and capital, and secure to the public rights of user practically unlimited; and that, therefore, highways should not continue to be a charge on real property only through the poor assessments."

MR. ANDREWS said highways originally were made and kept in repair by taxes on personality as well as on real estate. Eventually the whole tax was laid on the latter. The magnitude of the tax for roads was considerable, and the removal of tolls, which the Agricultural Chambers of Agriculture would require to do more than pass resolutions to get rid of such burdens. Members of Parliament must be bound at their elections to insist on their removal. Highways were a public benefit, and ought, therefore, to be upheld by a public charge.—The motion was carried.

—The annual MIDLAND COUNTIES SHOW and SALE of bull calves, cows and heifers, and older bulls, at Bingley Hall, on Thursday of last week, included no fewer than 150 head in all. The prizes were awarded by Mr. C. HOWARD and Mr. WILLIAM SANDY. Both the principal prizes, £50 and £20 respectively, were awarded to Rev. K. B. NEWBARD, for MARMALL DUKER, a yearling bull, which was sold for 71 gs. to Mr. ALPSO, and for a bull calf, OXFORD PRIZE, which realised 66 gs. Several other bulls and calves made very good prices, as 50 gs. for Messrs. GARNE'S PROCTOR, a yearling bull, bought by Mr. ATTWATER; 66 gs. for Lord BEAUCHAMP'S UNION JACK, another yearling, bought by Mr. WHITE; 45 gs. for Lord BRAYBROOK'S GRAND DUKE OF OXFORD, a bull calf, bought by Mr. BAKER; 40 gs. for Lord ROSE'S bull calf. The prices on the whole, were hardly equal to expectation, owing probably in part to the poor condition of the stock, and in part to the large number offered.

—We learn from the county paper that, at the forthcoming annual exhibition of the ESSEX AGRICULTURAL SOCIETY (who held their meeting in 1870 at Romford), the gross amount of prizes offered is no less than £1400. The Chairman, Mr. T. MASHITER, at the late meeting of the committee, said this was the largest sum given by any county with the exception of Yorkshire. The Suffolk and Norfolk Society, observing how they were getting on, wished, he understood, to be incorporated with them, but he fancied the Essex society would best take care of itself.

—MR. TAYLOR'S DEVON OX, No. 18 in the Catalogue of the ISLINGTON SHOW last December, weighed "153 stones of 8 lb., and proved capital beef." His height was 4 ft. 6 in., and his carcass weight was such, as nearly as possible, two-thirds of his live weight, showing wonderfully small stall.

UTILISATION OF SEWAGE.

THE CHINESE SYSTEM.

WHICH is the best method for the disposal of the sewage of our towns? In pursuing this inquiry, the question of utilisation will naturally arise, and the solution of the problem, with a due regard to sanitary consideration, is the desideratum of the age.

The building of towns upon the banks of rivers has undoubtedly been prompted by—(1) the commercial advantages evidently attendant upon such a situation; (2), the necessary supply of water for the domestic purposes of the inhabitants; and (3), the facilities for getting rid of the refuse from the same.

It is this last evil that we have now to contend with, for we positively allow to run to waste those substances which are the very quintessence of all manures, and also pollute and poison the greatest necessary of life.

It is unnecessary to inquire what are the component parts of the refuse of our towns which are taken away by the sewers, for that they are the very matters which are most required for the resuscitation of the land for agricultural purposes is well known. Consider with what pains all our stable manure and the ordure of every other animal is preserved, and then we are told that from the antipodes, while we throw away far more valuable substances from our very doors, to the deterioration of our rivers and streams, and allow such a deposit to be cast upon their banks as to become injurious to health.

We have no hesitation in saying that the state of the River Thames from the embankment at Westminster to the end of the tidal way is a disgrace to our civilisation, and that the whole of the whole of the bank, from high to low water mark, is covered in some places several feet deep, with thousands of tons of what is termed mud, a mixture of all the pollutions of the towns and villages upon its margin, and is emphatically the fat of the land running to waste. That this is only an instance of the state of every river in this country, who can deny?

Now what has been done towards remedying this state of things? We will just glance at some of the most prominent schemes now before the public, in order to show by contrast the superiority of the one we are about to explain.

There is now working, in a few places in the United Kingdom, a plan of irrigation, such as we find in operation at Edinburgh and Croydon. This is undoubtedly the best system at present in use, but the great acreage of land required to carry it out efficiently renders its adoption too expensive for general application, and indeed it is scarcely practicable in low-lying districts.

Another scheme which recommends itself to our notice is what may be termed the straining, subsiding, or condensing principle, such as we find in practice at Leamington, and a few other places, called technically the "A. B. C." system (from the initials of the substances employed), where by means of quasi-chemical agents, the sewage matter is precipitated, and the most fluid part at the top is poured into the nearest strainer. But this great quantity of water mixed with the other matter renders it, we fear, impossible to separate them, so that the overflow shall be perfectly innocuous. The case would be very much simplified if there were a distinct drainage for the rainfall, but this would be a most expensive task for any of our old towns.

We must not omit to notice the dry-earth system, which is most effectual as a deodoriser, but it only professes to deal with the offensive portion of the sewage, the obvious difficulty of obtaining a sufficient supply of earth for a large town will deter its use, except on a very limited scale.

On many subjects of this kind, especially in reference to construction, we can gain very considerable information and assistance from other countries; but I venture to assert there is no country in Europe where there is anything like our system of underground sewers, and their with their numerous closets, and for all other purposes connected with cleanliness. Through all the cities of Europe and America, we find chiefly only the old barbarous mode of cesspools impregnating wells and other water supply, so much that they virtually use the same water several times over. Indeed, all over three-quarters of the globe there is very little that can throw a light upon this apparently difficult and unsolvable scientific problem.

Turn we then to the remaining quarter of the world, Asia, for Africa is barren for our subject. The following statements are compiled chiefly from notes taken during a botanical tour through the central and north-western provinces of China, the botanical portion of which only has hitherto been made public. In all the works that have been written respecting the Chinese, the most confused and the most densely populated country on the face of the earth, alleged to contain one-third of the whole living human race, we have never met with a description of their method of collecting and disposing of the sewage of most of their cities and towns; and as it appears to us to combine all the advantages of long experience, together with the best and most salient points of every other scheme with which we are acquainted, and the working is very simple and most economical, we propose to give a sketch of the *modus operandi* practised by a people we are often disposed to consider as only half civilised.

The difficulty of access for Europeans to this, which has been called the Celestial Empire, must be the reason why this method has not been reported before, there having been so few scientific travellers allowed there, and those few sent only upon one or two particular subjects, and the so-called missionaries seem to consider their mission as entirely confined to the spiritual and future state of mankind, to the exclusion of their comfort and well-being in this life.

The Chinese are unquestionably the best agriculturists of any people, every one being an excellent gardener; for they all cultivate some kind of plant or other, and their whole country, so far from being worn out or exhausted, like many of the countries of antiquity, is as productive now as was in the days of Noah, a few hundred years ago; and this, there is no doubt, proceeds from their system of replenishing the soil with its best and most natural *paludum*.

Well may this be called the Flowery Land, for every foot of land, rock, and even the water, sparkles with blossoms and flowers at almost all seasons of the year, for a Chinaman would no more think of pouring filth into a river than he would of fetching his manure some thousand miles from the end of the earth.

China possesses within its boundaries every species of the animal, vegetable, and mineral kingdoms that is to be found in any other country, and many more peculiar to itself. It is where the natives assert our first parents were started into life, and where, indeed, there exists the appearance of all we can fancy Eden was, with everything to delight the eye and to please the taste.

It is in this favoured region—which, from the above extracts, can be no mean authority—that men practise the following system of disposing of their *dijecta membra*.

The whole of the matter which we waste and flood away they collect, either by means of open water-courses or underground drains. This is carried to some vacant space, either in the vicinity of the town or oftentimes to a considerable distance, according as the land

may be obtained or may be available for irrigation after the other operations.

On being conducted into a kind of sump prepared for it, steamed round with gypsum, it is then either pumped or lifted by more primitive means (such as a turbine, wherein the outfall of the sewer gives the power to work the machinery for the raising, and several other severally contrived, something like what we call the Persian wheel, and a sort of chain pump) into two or more reservoirs, which have been formed either by digging out and throwing up the earth to form the banks, or else by materials brought to the spot for the same purpose.

After the sewage has been discharged into one of these receptacles, until it is entirely full, it is left to settle or subside; then the same process is carried on with the next, and so on to as many as the quantity of matter or size of the town requires. By the time the last is full, the water on the top of the first that was charged is left off to irrigate either the surrounding lands, or conveyed to any distance that may be required or desirable by the cultivators.

This course is repeated to the remaining reservoirs; in the meantime, the first is filled again and again, until the solid matter has collected sufficiently to require removing; then the surface water is drained off as much as possible, and in a short time the remainder is dry enough to remove away in carts and waggons; this is done by breaking down the side, or anywhere most convenient. It is then reconstructed, and again made fit for use; the same to the other reservoirs in succession. The sides of these are lined with either gypsum, limestone, or chalk, and where these are abundant, or easily attainable, the banks are formed of them, and great quantities are also thrown into the reservoirs during the time of filling. These banks will at first allow the water to ooze through, but as they are usually upon the same land which is afterwards irrigated, this is of very little consequence, and they very shortly become silted up with the substances suspended, and get eventually water-tight. Except in exceedingly wet seasons, a very small quantity of water ever reaches a river, and when it does so, it is as pure as the stream into which it flows.

These reservoirs are of all manner of sizes and shapes, some round, some square, but are mostly oblong, about 60 yards long, and 20 to 30 yards broad; but this is entirely discretionary and immaterial as to the efficiency; the same with the depth, which varies from 12 feet to 20 feet.

It will be noticed that we have been treating of a case where it has been compulsory to raise the sewage, but where the fall of the land is such as not to require any lifting, there is often a continuous line of these receivers, and on many lands these have certainly been in existence for ages. Then in other instances they are moved about on the same estate; but the same principle is carried out in each.

The smell from these operations is scarcely perceptible, which may be attributed to the absorption of the ammonia by the gypsum and limestone, of which great quantities are drawn away and spread upon the land; also all kinds of ashes are brought to the neighbourhood, and incorporated with the other matters in these receivers.

The expense and management of these works are generally undertaken by the owner of the land which is treated with the manure, and for which payment is made to the authorities of the town; but in many instances they are conducted by the town functionaries themselves, and the produce sold.

In large towns it is not all conveyed to one locality, but often in opposite directions, or wherever it will command the highest price.

In addition to all this, in the best cultivated districts they have in operation a perfect scheme of land drainage, combining all the plans now in vogue in this country, such as drains, bushes, rubble, &c., together with a peculiar way of forming them with flaked and refuse stone, leaving a triangular space for the flow of the water. This is generally conducted into other reservoirs or ponds, which are marvelously well stocked with all kinds of fish, and in many instances form heads for driving innumerable water-wheels for mills, and such like purposes, often several in succession; and in no case is the water allowed to run to waste, for where there is not sufficient fall for mechanical purposes to use it, it is stored for use in dry seasons.

Having thus endeavoured briefly to describe the system pursued for this desirable object by the most ancient nation in the world, we may inquire whether this plan is not capable of being adapted to the requirements of our Legislature? And is it not wise and advisable to insist upon some such method being enforced in this country? Are there not vast quantities of land lying almost waste from the poorness of the

soil in the vicinity of nearly every town in the kingdom? Look at the tracts round London: why does that barren waste, called Barnes Common, on the South-Western Railway, remain in its present uncouth condition? The same with all the other commons? And many parts of the country have wastes far more desirable for our purpose than these instances; but they all require a better soil, a more fertilising power. Many are gravelly or sandy, which are just the geological materials required for our purpose, but at any rate all would make the best deodoriser that can be found, if the sewage water were made to trickle over it after the grosser portions had been deposited in reservoirs.

Then, again, is it not monstrous that nearly all this precious commodity that is collected from the largest metropolises in the world, should be absolutely poured away into one of the finest rivers in the world, either killing or deterring the fish from entering it, and often flowing back again to the spot it originally started from, poisoning the inhabitants with its pestilential odours, breeding typhus fever and all the other ills that flesh is heir to, from the defalcations of our ancestors in not attending to this matter, and utilising those substances which Nature seems to force us to do, or neglect at our peril?

The circumstance that the drainage of every place is conducted to one particular point or line, which is usually the bank of the nearest stream, renders the construction of an intercepting sewer along its sides a plain way of carrying off the proceeds to wherever it may be decided, to convert it into not only the finest fertilising agent in existence, but the most remunerative production for the outlay. *George Burchett, 5, Cumberland Place, Kent.*

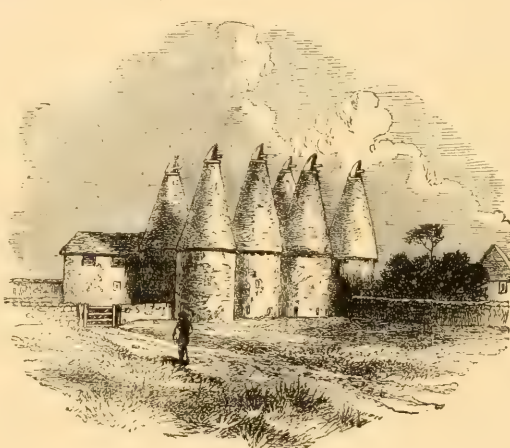


FIG. 60.—GROUP OF KILNS.

OAST HOUSES.*

[We take a last illustrated extract from Mr. Whitehead's paper on Hop Management in the Journal of the English Agricultural Society.]

In many oasts thermometers are always kept for the guidance of the dryers, and in some few self-registering thermometers by which the grower or his bailiff may see at a glance whether the statements of the dryers, as to the wet state of the Hops, or the coldness of the nights, are valid excuses for mismanaging Hops. Before colour and choice quality were indispensable, there was comparatively very little oast-room in proportion to the Hop acreage. Great loads of green Hops were put on the kilns, from 14 to 21 bush, were heated upon every square foot of hair, making it almost impossible for the heated air to pass through with anything approaching to uniformity; the under Hops were drawn down to the hair, while those above remained in *statu quo* until they were turned, which process was several times repeated. Good managers have plenty of oastroom, put their Hops very lightly upon the hair, no more than a bushel or a bushel and a quarter to a square foot, and rarely have them turned more than once, and in some cases not at all. It is held that they should never be turned, as the temperature in the Hops immediately above the hair ought not to be higher than it is just under or about the upper Hops. In other words, the load should be so light as to offer no resistance to the thorough permeation of heated air through every part, and every Hop should be simultaneously dried.

After the load came off, the old custom was to leave the Hops for as long a time as possible spread over the

cooling-room in a thorough draught; then they were raked about, sometimes screened or sifted, and finally trod into pockets or bags by men, the continuous action of whose feet broke the Hops more or less into pieces. The load or oasting is now put into a lump, and after six or eight hours the Hops are pressed into "pockets" by a machine, called a hop-presser, which is fast superseding treading by foot. This machine relieves the men of a work both laborious and injurious to health, and packs Hops that are properly managed nearly as whole as they were picked, with a great saving of time and expenditure. By this machine Hops are put together much more closely than by the old way of treading, while their aroma and general brewing qualities are better preserved. The presser made by Messrs. Garrett, of Maidstone, is much used in Kent and in Worcestershire. This is a capital machine, by which a greater amount of direct pressure can be obtained than by any other yet offered: the price is £27 with weighing apparatus complete. At Farnham and in parts of Kent a more simple machine is used, costing £13. This is not so easily worked, and does not put the Hops so tightly or so evenly together as Messrs. Garrett's presser, which may also be used for straining or packing them more tightly when the market is lost, and they must be kept, or for exportation.

The kilns of old days, a few of which may still be seen in parts of the Weald of Kent and Sussex, were built upon the cockle principle, having chimneys to carry the smoke away from the Hops. These were necessary when wood and household coals were principally burnt; but since anthracite coals and coke have been introduced, chimneys have been abandoned, and open stoves, or stoves housed over with brickwork, or with an iron plate hung over them, are generally prevalent. The hair-level of these primitive kilns was only about 7 feet from the fire; the distance from the hair to the cowl and the width of the aperture at the base of the cowl were matters of no calculation or consideration. In the modern kilns the hair-level is at least 13 feet from the fire, and in all these buildings, whether circular or square, the relative proportions, length and width of the various parts, are carefully observed. It has been ascertained by scientific researches as to the weight, velocity, and desiccating power of heated atmospheric air, and confirmed by experience, that the height of a circular kiln above the hair should be one and a-half times its diameter at the hair-level, and that the opening at the summit for the egress of air should be one-seventh of the same diameter. It is also calculated that, according to the present method of drying Hops, apertures for the admission of atmospheric air should be judiciously arranged and carefully regulated in the lower part of the kiln under the hair, upon the following scale, viz.:—6 feet of aperture (superficial) for a 16-foot kiln, 8 feet of aperture (superficial) for an 18-foot kiln, and so on, in order that the greatest possible amount of moderate draught may pass quickly through the Hops. Hops were formerly stewed dry by concentrating stove-heat upon them. Now the great object is to desiccate them—to drive off their moisture—by a process as nearly resembling the action of the sun and wind as can be suited to the circumstances.

AMERICAN NOTES ON DAIRYING.

Winter Milk.—Thomas Whitaker, of Needham, Massachusetts, gives his method of treating stock in winter, and its results, as follows:—

"In winter I go to the barn at half-past 5 o'clock in the morning, rather sooner, perhaps, than a good many men would like to go. I give each cow a small handful of hay, and then go to grooming them just the same as I should a horse—first the curybroom, then the corn-broom brush, and then the hairbrush—keeping them supplied with hay, a small quantity at a time, for about an hour. Then the boy milks. At night we have a large cut hay with which we mix half a peck of cotton seed meal, and half a peck of shorts. Upon this mixture we pour hot water, and cover with an airtight lid. In the morning we pour on more hot water, and after milking this is given to the cows; at 8 o'clock they are turned out to water; at noon, when the boys come from school, they are fed with hay, and at four o'clock a little more hay; they are then turned out to water. After which they are fed each a pailful of Mangels, Rutabagas, and Carrots cut fine; then cleaned and milked. They each have about a quart of cotton-seed meal, corn meal, and shorts—equal quantities of each; upon this boiling water

* Oast, or oast-house, means a group of kilns with stowage, and a draught of which is given here, for which thanks are due to the kind courtesy of Mr. Macaulay, the editor of the "Leisure Hour." (See a paper in the "Leisure Hour" for August, 1865, by the Rev. J. W. Stratton, entitled "Hop and Hop-pickers.")

* Pockets are made of coarse canvas, 24 feet wide by 4 feet long, containing from 14 to 2 cwt.; they are entirely supplied by "bags."

† Mr. Elliott, of Farnham, makes an improved hop-presser, which is used to a considerable extent in the Farnham district.

is poured, to which cold water is added enough to fill a pail, with a little salt; after this a little more hay, and they are left for the night.

"And now for the butter. We sell 136 quarts of milk a month; in November we sold 57 lb. of butter, in December we shall sell about the same quantity, besides what we have for family use. This is from two cows and a heifer that was two years old last April, and calved in May. The other two cows calved in December last winter, and shall make it all this winter. It pays better to make butter in winter than summer. Churning has never exceeded half an hour, and generally inside of that time. The milk is not scalded, but the cream before churning is brought to a temperature of about 60°."

3. Selecting Milk Cows.—Hon. Charles L. Flint, Secretary of the Massachusetts Agricultural Society, delivered a lecture on the principles of breeding, at the Agricultural Convention at the Massachusetts Agricultural College, from which address we take the following extract:—

"It will not be surprising to discuss the indications of milking qualities, but I must to mention some of the most prominent. First, the milk-mirror, or escutcheon. Guenon, a Frenchman, whose life was passed among cows and dairy cattle, and who was a careful observer, discovered certain marks on the escutcheon, and deemed an infallible sign of milking qualities. It consists in certain perceptible spots, rising up from the udder in different directions, forms, and sizes, on which the hair grows upward, while the hair on the other side of the udder grows downward. The turning up of the hair is an indication of the structure and tissues beneath, and if the mirror is strongly marked, by placing the left hand upon it the veins and network may be felt.

"The milk-mirror is one of the best signs of a good milk, but sometimes this mirror is possessed by cows of inferior quality. In such cases, the other signs of the quality will be wanting. We should find whether the cow possesses such marks as a large udder in proportion to the size of the animal, and soft, thin skin, with loose folds on the sides of the escutcheon, when filled with milk, but shrinking to a small compass when empty; large well-developed milk veins, especially the large ones under the belly, which should extend well forward to the navel, and apparently lose themselves in a cavity in the flesh, into the end of the finger can be inserted. If the cow possesses these in connection with the mirror, she may be taken as a good milker. The escutcheon is found in young calves, and when found well developed, the calf should be preserved for the dairy."

"There are also several external signs, which judges consider indications of milk, most of which are found to fail in individual cases; but a good cow should always have a strong constitution, as indicated by large lungs, which are in a deep, broad, and prominent chest, broad and well spread ribs, a respiratory system strong and regular, a good appetite, and, if in milk, a strong inclination to drink, which a large secretion of milk almost invariably stimulates. In such cows the digestive organs are active and energetic, and they make a substance of good blood, which, in turn, stimulates the activity of the nervous system, and furnishes the milky glands with the means of abundant secretion.

"A bright, sparkling eye, but of peculiar placidity of expression, with no indication of wildness, but a mild, feminine look; small, bright, yellow horns; a small, round, thick, tapering towards the head; fore-quarters small, compared with the hind-quarters, and a thin, yellow, flexible skin throughout, are pretty sure indications of milk."

3. Butter-making in Kentucky.—In a late number of the *Kural New Yorker* we find the following statement of the views and practices of Mr. W. W. Ingram, who has been managing a butter factory at Winchester, Kentucky, for two years past. Presuming that the feed of the cows is of the best character, and that the milk is all right and has been kept at the proper temperature for getting the cream, the first thing to be attended to is—

"Straining the cream for the churn: The cream should be of uniform consistency when it goes into the churn, as it is difficult to make a fancy product when thin, thick, and lumpy particles of cream are placed altogether in the churn. The proper way is to strain the cream into the churn by passing it through a strainer, so as to reduce it to an even or uniform consistency. For this purpose a pan, the bottom perforated with holes, is employed, and by thoroughly mixing the cream and passing it through this strainer, the cream is made all alike. Then, unless the cream is quite thin, water is added, in proportion to one-fourth the bulk of cream. The temperature is raised or lowered until the thermometer is from 60° to 62°. Then, when the churns are ready to be started, two quarts of warm water, having a temperature of 90° to 100°—but not above 100°—are added for every 16 gal. of cream. Now the churn is ready for the cream, and the dashers should not be made to go too fast nor too slow. Mr. Ingram thinks there is no churn yet invented (that he has seen) that will do so good work as the old-fashioned barrel dash-churn. He prefers this style of churn, and in churning the stroke of the dasher should be regulated so as to make 50 strokes per minute. This is another point of importance in making a fancy grade of butter. A great many butter makers spoil their butter in churning, and have no definite idea how the churning should be done. For the repeated reason just mentioned, it is to be demonstrated that the stroke of the dash should not be often than 50 per minute, in order to produce the best results. It is desirable that all the cream should make butter at the same time. If it come unevenly, or particles of cream be mixed up with the butter when it is ready to work, the butter will be injured, and will not keep. After the butter begins to come, add cold water freely, rinsing down the sides of the churn. Then when the churn-

ing is finished take out the butter from the churn and merely rinse off the buttermilk with cold water, using the ladle, and not allowing the hands to come in contact with the butter, even though they be 'clean as clean can be.' Of course it is understood that no one with dirty hands should have anything to do in the manufacture of butter. We do not want a dirty hand or a dirty foot within 10 rods of our 'golden bale of butter.' Now, the rinsing having been attended to, the butter may be salted at the rate of an ounce of salt to the pound of butter, and be particular that your salt is pure. Work the salt in thoroughly and evenly, and do the working of your butter at this time. Stand the side in a cool place, and let it stand 24 hours, when it may be taken up, merely working out 'the loose brine,' and it is ready to pack.

"At the Winchester factory the milk is set in pails surrounded by cold spring water, so that a uniform temperature of from 50° to 60° is maintained. It stands in the pool of water for 24 hours, when the cream is removed. The cream is deposited in pails, which go to the pools, standing another 24 hours, or until it acquires a pleasant acid taste. It is then ready to be churned."

4. The Strippings.—The last drawn milk, every dairyman knows, is the richest. It is important, therefore, to secure this by abstracting all the milk. Besides losing some of the best and richest milk, there is another loss in not milking clean, as it has a tendency to dry up the cow, or lessen the secretion of milk from day to day. It is very difficult to impress milkers with the importance of drawing the stripplings, and the milkers are so used to the habit of finishing their work just as soon as the free flow of milk ceases. Such milkers, it is needless to say, entail a heavy loss on the dairyman in the course of the year, and if they milk many cows they waste more than their wages. Particular attention should be given to the stripplings, especially in those cows which are not immediately to be dried off; and as the subject seems naturally connected with butter-making, perhaps the following method of preserving the milk, recommended by Mr. P. Wright, of Green County, N. Y., may be useful to butter-makers:—

"Procure good White Oak firkins that are perfectly brine-tight; take out the head (first making a small hole, say a quarter of an inch in size), then fill it with cold water; let it stand 24 hours before you are ready to use it; then rub, while wet, thoroughly with fine salt; fill your firkin as soon as possible with milk, and shake it well. The milk should be readily be filled in a week or ten days with sweet butter to within half an inch of the head; then place over it a clean cloth, and fill space with coarse salt; put in the head; then fill with strong brine, previously made with coarse salt, and stop it up."

Mr. Wright says that butter packed in this way, and kept in a cool place, will be as sweet in one year as when first made. *X. A. Willard, in "Western Rural."*

Home Correspondence.

Double Furrow Ploughs.—A series of trials of Howard's new steerable and leverage plough took place in the County Wexford, Ireland, under the management of Messrs. Kennan & Sons, Dublin, who invited me to witness their trials. The steerable plough, which was the first of which took place on the estate of Squire Kirk, near Gorey, on old lea, the soil light, on the greywacke and clay slate rock, on February 27 and 28; there were one wheel and two swing single-furrow ploughs, all in the very best trim, under the management of the intelligent steward, Mr. Young, who is carrying out improvements which must redound to his credit and to the increased wealth of his spirited employer. Howard's B.B. swing-plough, at 64 9, drew 44 cwt.; this B.B., as was, at same depth, was 4 cwt. The B.B. wheel-plough, with the same sized furrow, drew 33 cwt. Howard's N.B. double-furrow plough drew 51 cwt., the furrows being also 64 9 inches. I was astonished to see the mastery with which the three little horses went off with this plough; the three did not weigh more than 25 cwt., while the fine fat Clydesdale horses in the single plough appeared to be quite as hard work, although they must be over 15 cwt. each; this goes far to show that, even for farming, an ounce of blood is worth a pound of flesh. On the 28th, fine work, 5 x 8, was the style requested by the large and highly interested company present. The work by the whole of the ploughs was first-rate; any difference was in favour of the double plough, especially as to firm packing. The draught of the double plough at 5 x 8 was 22 and the swing under 3 cwt., and the double plough under 4 cwt. The company thinking that this was more than easy working land, it was arranged to go the following day to the strongest clay land in the county—in fact, in Ireland. When I arrived on the estate of Ardamine, the property of Mr. S. A. Richards, I was delighted to have the opportunity of seeing the extensive permanent improvement of the estate, and the manner in which the land is being changed into green fields, "flowing with milk and honey," giving richness and happiness to beautiful homes erected thereon. I could not but praise the ability displayed by the talented steward, Mr. Hill, who stands a witness to the fact that Irishmen are equal to any others when fair opportunities are given for the exercise of their abilities. The

fields are being first squared, and good outlets made for drainage; then drains are dug 3½ feet deep—the bottom 12 to 18 inches, being rich manure thrown back and spread over the land, and to obtain a good supply of this fertiliser a wide drain is cut, a channel being cut in the bottom to receive the pipes, and then the inferior subsoil thrown in under the soil; then the marl is spread over the land. On a field in this state the Bedford double-furrow plough was introduced to its roughest work: the ploughman stared, but did not lose confidence in his implement. The horses were of real Irish stamp, three-quarter bred, compact in form. The land lay in 12-foot ridges, the drains running at a high angle to the line of the furrows, which were both wide and deep, giving a good opening for the plough to start, but the wet night had rendered everything very plastic and awkward. The order given, James Curtis went off in gallant style. I was amused at the whispering of the knowing ones over the fix he had got into, through the ridge being watered at one end and the other. By what legerdemain is he going to make a finish with that unwieldy-looking implement? said they; but Curtis was equal to the difficulty; and, beginning with two furrows, he ended with one, leaving two to finish with, which he did in splendid style. The draught at 6 x 9 was 7½ cwt., the three horses doing the work with more ease than the single ploughs, which were working at a low depth. The horses were left to the plough, which all might read the draught for themselves, which did more than any argument to prove the vast economy to be obtained by the use of these double ploughs. *L. P. B.*

Prices of Railway Land.—No doubt many of your readers have had to do with the transfer of land to railway companies. A small owner (one of your subscribers), whose property is about to be invaded by a railway, would feel much obliged to any gentleman conversant with the matter to say through your columns what number of years' purchase on the annual rent may fairly be asked for land taken for such purposes, and on this sum what percentage should be charged for the sale being compulsory. *P.*

London Cattle Cordon.—I was pleased to observe in your issue of last week an admission that the above cordon "is injurious to trade in its many ramifications," and "that it presses hardly upon dairymen and feeders of stock;" but I was scarcely prepared for your conclusion, that there is no urgent necessity for removing the restriction, because it has been all along understood that it should be maintained until the new market is in action. Are your readers aware, sir, that precisely the same arrangement for the separation of foreign animals is in force now that will be in force then, viz., a waterside market, furnished, as I can testify, with every possible accommodation, together with the vital one of completed railway communication with the City dead animal market, and all the manufacturing districts? Where, excuse, then, can be offered for prolonging the injury to trade, and the damage to feeders of stock, to say nothing of the unnecessary and heavy expense of maintaining the police cordon? I observe also that you explain the troublesome 28 days' process, by which a live beast can be removed from the metropolis, so that advantage may be taken of the grazing season. I would therefore venture to ask, is not this in itself a sufficient warrant for at once denouncing that freedom of trade and the freedom of the country now unite in making? *G. Stride, Bank, 41, West Smithfield, and 8, Metropolitan Cattle Market, March 8.*

Societies.

BATH AND WEST OF ENGLAND.

At the last meeting of the Council of this Society, a letter was read from the Registrar of the Royal Dublin Society, announcing that in accordance with a bye-law recently passed, the President of the Bath and West of England Society is *ex officio* an hon. member of the Royal Dublin Society. The communication was ordered to be entered on the minutes, and the Secretary was directed to write a suitable letter of acknowledgment and thanks.

The Earl of Portsmouth having offered a prize of £10 for the best Hampshire Down ram lamb shown at Guildford, and Mr. A. Morrison, of Fonthill, a prize of £10 for the second best animal of the same class, the orders were accepted with thanks, and the class was ordered to stand No. 90 in the prize sheet.

Mr. Herbert Williams, chairman of the Finance Committee, brought up the statement of accounts for the year ending Dec. 31, 1870, showing in round numbers a balance of £1400 in favour of the Society, and an additional sum was ordered to be invested in funds, so as to bring up the amount of the Society's consolidated stock to £1200.

The Journal.—The Council decided that henceforth no advertisements, excepting those relating exclusively to the business of the Society, be inserted in the Journal.

The Meeting of 1872.—A letter was read from the Town Clerk of Dorchester, stating that the local committee are prepared to treat definitively with the Society in reference to the meeting of 1872, and a

200 gs. average at the late Sir Tatton Sykes' sale alone, and many others, partly thorough-bred and partly half-bred mares, amounting to between 300 and 400. The Colonel purchased in two or three years about 150 mares, the best of the old Irish blood, from Austria, and would not buy half-bred English mares, however good-looking, for this stud, because he could not depend on their back blood, and was afraid of their throwing back to the cart or under-bred horse, and so being soft and slow, and therefore bad. From this stud, commencing with the best stallions from England, are bred the stallions which are sent into the country to breed from. So that Austria and Hungary deserve to be mentioned in connection with the stud at Baboules, consists entirely of thorough-bred Arabs. The young stallions from this stud are also free to the breeders. Another stud at Mezhyegyes is of a large breed of horses,—Old Neapolitan, and others, chiefly greys,—and adapted for carriage-horses and heavy artillery. These are also free, and independent of the private studs, the property of the Emperor, for whom I purchased Challenge for 2000 gs. some years since, and one particular of the stud at Baboules, which is beating Kama and others. There is also a stud at Radantz. In this the horses run wild, and have a range of country of between 15 and 20 square miles. The other studs have from 20 to 60 square miles, I believe. All the above information I have to thank the Colonel for, and no officer had a larger experience or better judgment. Now that the national studs are taken out of the hands of the military and placed under the management of civilians, he has retired from the service and lives in England. My friend Mr. Cavaliero, of Vienna, the Weatherby of Austria, has also been kind enough to write me a long letter on the subject, as follows:—

"Vienna, February 5, 1871.

"I received your letter this morning, and hasten to reply to your questions to the best of my knowledge and ability. The brief information I have given you is based on fact; and there is therefore no room for any public assembly. Of late a good deal has been written about English cavalry horses; about the Prussian cavalry feats in the present French war; about the excellencies of the Arab, &c.; but I fancy, after all, that not alone Englishmen, but the whole world, are ready to arrive at the conclusion, that there is no cavalry equal to the British; no breed of horse like your own. At Willesden Padocks there lately stood 50 entire horses from Normandy, from the stud of Mons. de la Ville, transported thither to be the rears of the Prussian manure; no English breeder thought it worth his while to drive the five miles to see the world-renowned brutes—and if 50 Arabs had been standing at the same place, I doubt if there would have been any visitor put in an appearance. This circumstance can at once show that Englishmen are satisfied with their own, whatever they may write. The Prussian-bred horses are better looking than the Austrian; the latter, however, are far superior for their adroitness of movement, their strength, and for their endurance; but in my opinion, for inferior to the English. For God's sake admit of no Arabs to come to your studs. These animals are all very well, and good in their own countries, but when removed they degenerate and sicken; they can instil no quality so good as that which did not die out of the stock horse, as you say. See me over a dozen of your farmers to this country, deprive them of their hunters, put them 12 months on German food, and then ask them if their skins fit them as well as they did before they left home. 'A Quiet and Easy Observer' has written in the *Sporting Magazine*, January 1871, an article, 'The Present condition of the Turf,' which I have translated for the *Sportblatt*, my next number. 'A Quiet and Easy Observer's' remarks do not hold out, and I cannot agree with him when he asserts, because you have been licked your time by the French and German horses that your race or breed of horses is deteriorated, when at the same time the would-be foreign animals, which have proved themselves superior in a certain year or on a certain day, are taken from your own nurseries, and furnished from your own reservoirs with the same seed and dry. 'Easy Observer' asks if this defeat by foreign horses was only an accidental and isolated fact, or was it the sure forerunner of general superiority? I will offer no opinion for the present; but as long as I see the produce of the English and English horses managed, from their most immature age, by Englishmen, I cannot admit of these animals claiming a foreign extraction, nor of the deterioration of the English breed of horses. That horse-breeding and the management of horses has of late years been going wrong on the Continent, no one can deny, but I cannot understand how one can call the colt by Buccanero, or of Lady Elizabeth by Trumpeter, trained by Mr. Hayhoe, jun., of Newmarket, ridden by Madden of Middleham, a German? The English Turf, I think, will be better off, if we make comparison with institutions of the same nature on the Continent, except that all countries admit the same creed, and follow up the same principle and system of breeding; so that, according to 'A Quiet and Easy Observer,' we are all acting on the same system, and giving the most damning evidence of the increasing degeneracy of our horses. Horse-racing on the Continent is an amusement, like many others; people buy flowers and sell lemonade. In Great Britain it is one of her greatest and most important trades, and is a source of revenue to the State. Articles introduced in this business, it would be detrimental to the commerce of England to endeavour to check the progress of this Trade of trades by introducing and establishing into any of its branches any pedantic laws. We do not wish to see the rights of the trade, and the legitimate from the illegitimate part of the trade, and, as we avoid drinking bad port-wine when genuine beverage is within our reach, so it is left to our option to grasp at,

or avoid, taking part in the polluted division. But enough for to-day. And now in reply to your questions:—

- "1. The Austrian Government keeps no establishment for breeding cavalry horses; her wants for the army are furnished by private breeders and dealers.
- "2. To further and facilitate horse-breeding, Government entertains about 4000 entire horses, which are distributed throughout the country, and cover at a low tax. The stallions are partly half-bred English—English Oriental—the lesser part home-bred; but very few thorough-breeds of any race.
- "3. Answered in No. 1.
- "4. When an urgent demand for military horses is called for, cavalry officers are appointed to secure the number of troops required, which they obtain from dealers and contractors.
- "5. Answered in No. 2.
- "6. In certain cases, admitting a stand of 25,000 horses, the annual remounting may be calculated at 10 per cent.
- "7. Remounts under five years old are not admitted. Maximum price, £30 sterling.
- "8. About 13 stone.
- "9. I shall feel most happy in providing you with any information you may require from this country."

Mr. Cavaliero has at different times purchased a large number of mares; some on account of the Government, which have been resold again in Austria and Hungary, and certain sold privately to the provinces, to which the Government contributes, and the mares are purchased here, and resold on their arrival out to the highest bidders, very often realising a good profit. These are all thorough-bred mares, which are thus distributed over the country. In certain cases, during the Government in the first instance, making the purchases which a private individual could not well do. All this shows the great value placed upon the English thorough-bred horse in Austria.

Prussian Cavalry.—I am very much indebted to Count Lehnrdorf, Aide-de-camp and Master of the Horse to the Emperor of Germany, who took the trouble to answer my questions, although actively engaged at the time in the war, and whose letter I give almost entire, as every word is to the point. I hope soon to have the pleasure of thanking him in person, for he intends to be here to buy as soon as he can possible. He has been most admirable, and knows more about our thorough-bred horses than almost any Englishman I know, and he knows all their pedigrees and performances, and where to go and find them:—

"With great pleasure I will answer your questions."

"1. In Prussia 1440, in Saxony and Mecklenburg about 160, make, for the whole north of Germany, 1600 stallions.

"2. About 50 cart-horses for some mountainous countries, 150 thorough-breeds, the rest half-breeds of all classes, from coach horses to the high-bred cockpit.

"3. The Prussian Government keeps three breeding studs, with, altogether, 600 high-bred mares, 50 of them thorough-breeds.

"4. No horses bred by the Government are taken for the army; all the young stock not likely to make good country stallions are sold by public sale at four years old. All horses for the army are bought from private breeders as 3-year-olds, at an average price of 22½ gs., and kept in the stud until they are four years old, when the expenses for each; consequently they cost the Government, till the moment they are delivered to the different regiments, 30 gs. a-piece. Four committees, consisting of three officers and one veterinary surgeon each, are being sent, during the summer throughout the whole kingdom, but particularly in East Prussia (east side of the Weichsel).

"5. Yes; at prices from 6s. to 15s. the mare.

"6. For cavalry, artillery, and the train, for the whole of North Germany (ie is) about 5500 a year.

"7. Four and a-half years old; but they are not wanted to do the service like old horses earlier than six years old.

"8. The French make a great mistake in calling all our cavalry Uhlans, we only mean Lanciers by this expression. The weight our cavalry horse have to carry, viz. rider, saddle, arms, &c., Courassiers (rider 75 kilos.), total about 14½ kilos.; Uhlans (the rider 72 kilos.), total 128 kilos.; Dragons and Hussars (rider about 68 kilos.), total about 119 kilos.

"9. Only horses with a certain amount of blood are bought for the army, particularly for cavalry; common bred ones cannot go fast enough, carrying those heavy weights.

"10. I fancy that the strong point in our breeding good cavalry horses lies in our well and constantly bred half-bred stallions, bred for about 15 or 20 generations in the Government studs, always with the same intention and on the same principles. Private breeding studs are always too often changing their intentions and principles, even often changing their breeders, and I think General Fleury made one of his greatest mistakes when he broke up the Government's breeding establishment at Haras-du-Pin."

I have also been honoured by the following copy of a report sent last year by Lord A. Loftus, from Prussia, on the purchase of brood mares, &c., in England, sent me by the Right Honourable the Speaker of the House of Commons.

"Report on the Purchase of Brood Mares in England."—Although the Direction of the Royal stud have not in that capacity directly purchased brood mares from England for many years, but have rather confined themselves to the purchase of thorough-bred stallions for the purpose of placing in the hands of the breeders, as well as of half-bred stallions (Cleveland, Norfolk trotters, and roasters, and Suffolk cart and draught horses), nevertheless they have indirectly supported a society,

which met last year in Hamburg, for the purpose of buying English thorough-bred, and Norman and Harred mares in England and France. And according to Count George Lehnrdorf, the Master of the Horse, at the cost of the Government, in conjunction with the Brunswick Master of the Horse, Von Gersenvall, undertook to carry out these precautions. These purchases were made in the stud of the thorough-bred mares from the best English studs. The mares, some of which had foals, were sold here to the highest bidders, and the price obtained for them fully covered the expenses. The Direction of the Royal stud also took part in this auction, and competed for mares. It is expected that similar purchases will be renewed on the part of the same society, and that the same Commission will purchase mares this year also. But the Direction of the Royal stud will not make purchases this year of thorough-bred mares, as the breeding of thorough-bred mares is only carried on in one *hara* (Graditz),—the object of the principal breeding establishments being to provide brood mares for the principal *haras*, and as there is a much greater want throughout the country, and amongst the large and small proprietors for brood strong-boned, thickset, half-bred stallions, with good action, than for thorough-bred stallions, which, especially in the western provinces, cannot be disposed of. With respect to the general condition of horse-breeding in Northern Germany, the Direction of the Royal stud has been informed that 6 districts is principally in the hands of small breeders. The State has in every Prussian province a so-called breeding establishment (*langestrich*), which consists of from 80 to 300 stallions. At the commencement of the present season the stallions were distributed over the whole province, and cover, at their different stations, for a small payment of from two to four thalers, the mares, which are sent to them, of both the large and small proprietors. These stallions are in part sent in the principal breeding establishments, Trachen contains 300, Graditz 200, Neustadt 100 brood mares. But the produce of the Royal breeding establishments does not half suffice for the wants of the provincial *haras*, and from 60 to 80 stallions belonging to private owners always remain at home. Since the home stallions are always to be purchased, we have to thank this arrangement, that the export of horses to the South, to France, and to England, is not unimportant, and the Government at any rate are enabled to cover by native produce the demand for horses for the army. In the connection with the export of horses, the horses bought from dealers in England, all the horses required for the army by the increased demand were obtained within the country. The province of Prussia alone, decidedly the richest in the production of horses, supplies the army alone with 3000 horses per annum.

No one takes more interest in the subject of improving and keeping up the supply of the breed of our horses than the Right Hon. E. Denison, the Speaker, who has done me the favour to discuss the subject at different times, and sent me this report to make use of on the present occasion, and gave me his attention to say that he had sent me a letter to show his interest in the subject. I shall presently give what I believe are his views as to what can best be done—that is, supposing that the Government will take no active part in the matter; but, as usual, leave this, a national matter, to be carried out by the talent and energy of private breeders.

I have now shown you from the highest authority what Austria and Prussia, two of the greatest military nations of Europe, think it necessary to do, in order to provide themselves with horses fit for their cavalry. The Emperor Napoleon also has done the same, and he has done it by horses in France, and above all in all the power to encourage racing and the breeding of thorough-bred stock; with what success the annals of our turf during the last few years bear witness. It will be long before France has another ruler who will do as much for her breed of horses, all the best strains being English blood imported into France during his reign. He understood and appreciated England, and did more to cement the union of the two countries, by associating them in their sports, and particularly in racing, than all the republicans have done in the century; but that reign will not, I think, be long, and the princes of the house of Orleans are thorough sportsmen, as we Englishmen know well who have met them in the hunting-field. But in the Emperor we lost a good friend, and whose country we have lost a good friend, whose follow in his footsteps, as far as the national sports are concerned, and the national sports and amusements have much to do with the national character. Should we be what we are without foxhunting and racing? Most certainly not. I believe the publicans have no notion of horsemanship, and it is with shame and sorrow that I have come to this conclusion, that we have allowed other nations to set us an example of how to breed horses for the national use. Still, with all our shortcomings, from want of a system, though I believe the right as I ever did that there are no horses like our own English horses, just as I believe there are no men like Englishmen; no women like Englishwomen; no farmers like English farmers. But as in our army, so especially in our cavalry, having discovered our weakness, it is set about finding out the best way of repairing our errors, and recovering our lost ground. There is no doubt that this is a national question. In my mind there is no doubt that the Government ought to take it up. I do not believe they will, but I believe they should. If they do not, supposing they do not, what then? Well, gentlemen, we have fortunately still left in this country what they have not in many countries, a large number of noblemen and gentlemen with large landed estates, and most of them the right sportsmen, who have a great love for hunting. The great bulk of them are fox-hunters at heart. A few have degenerated and become pouterers on an extensive scale; but they are a very small minority. There will have a race which no

other country has; the very backbone of England, many of whom I see here before me, the gentleman farmer, always a sportsman at heart, who with ample capital and intelligent views combines business with pleasure, and is naturally a breeder of horses, either to ride or sell. These two classes, uniting as they do in every agricultural district, carry great weight, and set the fashion and more, perhaps, in the breeding of horses than anything else. Noblemen and gentlemen do, and may do much; but it is through the medium of the local agricultural societies that I see the means of improving our breed of horses. If the Government will not assist, as perhaps they might in offering prizes of £50 or £100 for the best stallion in each district which has served mares a season at not more than £2, then the Government must make up their minds to pay £40 for good 3-year-olds, and £50, at least, for 4-year-olds—and then they will not get the best. If the local societies will not make up much more money, but by degrees, but not at once. It takes years to get up a good breed of horses, especially when you have let the mares go. It must be done through the stallions—and there are plenty of well-bred horses, if well-selected, and if you make it worth their while to cover at a low price. Perhaps if the London Farmers' Club set the example, and offered a good prize to the best stallion shown at the Royal Agricultural Society's shows at Islington, and who had fulfilled certain conditions, it might also give a spur to local societies; and a strong deputation on the subject to the Master of the Horse, Lord Ailesbury, might be of use—he understands the subject. It will not be of much use to go to the Chancellor of the Exchequer, as he contemplated putting a tax on every brood mare in the country, which certainly looks like an Irish way of encouraging the breed of horses. He had better tax every brood mare going out of it, but then the Free-traders would be up in arms. Free-trade carried to excess in some things is quite as bad as Protection. Recent events have taught us, with the stern logic of facts as regarded as the world over saw, that in believing in the doctrine of Universal Peace we have been living in a Fool's Paradise. The Millennium has not yet come—the lion has not lain down with the lamb—and when he does, as the Yankee said, "the lamb, I guess, will be inside the lion." We must be like the strong man named, especially in cavalry and artillery, and then once more we shall be feared and respected by our neighbours, and the "Civis Romanus sum" of Lord Palmerston will be no idle boast when once more it is understood that the same meaning is conveyed in the words—"I am an Englishman!"

Notices to Correspondents.

ADDEREN REIFERS: *Stewky.* Feed her well after calving, without overfeeding. You may rear the calf, a heifer, notwithstanding the extreme youth of the mother; and a lb. of oilcake daily, with a pound or two of bean meal given with her usual succulent food, will do very well.

BOOKS: *T. H.* "Clater's Cattle Doctor," edited by George Armitage, M.R.C.V.S. (F. Wymre & Co. Bedford Street, W.C.), is the best book on the treatment of cows under different ailments."

Markets.

HAY.—Per Load of 36 Trusses.

SMITHFIELD, Thursday, March 9.

Prime Meadow Hay, 130s. to 140s. Clover, old .. 135s. 145s.
Inferior do. .. 110s. 120s. Inferior do. .. 115s. 125s.
New Hay Prime ad cut do. .. 120s. 135s.
Straw Inferior do. .. 105s. 115s.

CUMBERLAND MARKET, Thursday, March 9.
Sup. Meadow Hay 134s. to 140s. Inferior do. .. 110s. to 120s.
Inferior do. .. 110s. 120s. Prime ad cut do. .. 120s. 135s.
New do. New do. .. 120s. 135s.
Inferior do. Straw 105s. 115s.
Superior Clover .. 138s. 147s. JOSHUA BAKER.

METROPOLITAN MEAT MARKET, March 9.

Best Fresh Butter 20s. per dozen lb.
Second do. 16s.
Small Pork, 4d. 8d. to 5s. 0d.; Large Pork, 3s. 8d. to 4s. 6d. per 8 lb.

METROPOLITAN CATTLE MARKET.

MONDAY, March 6.

We have a moderate supply of Beasts, but trade is dull, and prices on the average are lower. The number of foreign is larger than English smaller. Choicest qualities are not over plentiful, and are pretty readily disposed of, but of other kinds a clearance cannot be effected. The number of Sheep is about the same as of late, and there is no quotable alteration in prices. Calves are rather lower. Our foreign supply consists of 1200 Beasts, 1135 Sheep, and 120 Calves; from Scotland there are 53 Beasts; from Ireland, 320; from Norfolk and Suffolk, 1180; and 397 from the Midland and Home Counties.

Best Scots, Here- *s. d. s. d.* **Best Long-wools** *s. d. s. d.*
fords, &c. .. 5 6 to 10 **Do. Shorn** 5 6 to 8
Do. Shorthorns .. 5 4 to 5 **Ewes & 2d quality** .. 4 0 to 5
2d quality Beasts .. 3 4 to 4 **Do. Shorn** 3 4 to 4
Best Downs and .. 6 0 to 6 **Lambs** 3 8 to 6
H. Breeds .. 6 0 to 6 **Calves** 3 8 to 6
Do. Shorn .. 5 8 to 5 **Pigs** 8 5 to 8
Beasts, 3150; Sheep and Lambs, 15,650; Calves, 130; Pigs, 120.

THURSDAY, March 9.

The number of Beasts is considerably smaller than on Thursday last, but trade is dull, and no advance on Monday's prices can be quoted. The supply of English Sheep is quite good, but last week, but there are very few foreign. Trade is active for choicest descriptions, but a slight improvement on Monday's quotations. Calf trade is dull, and there is difficulty in making late prices.

Our foreign supply consists of 215 Beasts, 260 Sheep, and 135 Calves.

Best Scots, Here- *s. d. s. d.* **Best Long-wools** *s. d. s. d.*
fords, &c. .. 5 6 to 10 **Do. Shorn** 5 6 to 8
Do. Shorthorns .. 5 4 to 5 **Ewes & 2d quality** .. 4 0 to 5
2d quality Beasts .. 3 4 to 4 **Do. Shorn** 3 4 to 4
Best Downs and .. 6 0 to 6 **Lambs** 3 8 to 6
H. Breeds .. 6 0 to 6 **Calves** 3 8 to 6
Do. Shorn .. 5 8 to 5 **Pigs** 8 5 to 8
Beasts, 735; Sheep and Lambs, 5500; Calves, 165; Pigs, 10.

MARK LANE.

MONDAY, March 6.

The supply of English Wheat to this morning's market was again small, and the condition being generally bad, millers were reluctant purchasers, at an advance of 1s. per qr. upon the prices of this day set night. For foreign the demand was limited, at an improvement of 2s. per qr. upon fine spring American, and 1s. per qr. on Russian. Barley, Beans, and Peas were unchanged in value. The Oat trade was quiet, and Russians were 1s. per qr. dearer. Flour brought the extreme prices of this day week.

PRICE PER IMPERIAL QUARTER. *s. s. s. s.*
WHEAT, Essex, Kent, Suffolk. White 47-55 Red 48-57
fine selected runs .. do. 51-57 Red 48-57
Talavera 50-61
Norfolk Red
Foreign 48-50
BARLEY, grind & dist., 30s to 34s. Chey. 43-46 Malt .. 35-41
Foreign .. grinding and distilling 27-33 Malt .. 35-41
OATS, Fife and Suffolk .. 26-28
Scottish and Lincolnshire .. 26-28 Feed .. 25-28
Irish Potato 27-29 Feed .. 25-28
Foreign .. Poland and Brew 26-28 Feed .. 21-26
RYE 32-36 Foreign .. 31-36
RYE-MEAL, Foreign .. 32-36
BEANS, Mazarin .. 43s. to 47s. Tick 49-50 Harrow .. 49-50
Pigeon .. 51s. to 59s. Longpod
Foreign .. Small 45-47 Egyptian .. 42-44
PEAS, White, Essex, and Kent. Boilers 38-40 Suffolk .. 40-42
Maple, 40s. to 44s. Grey 36-40 Foreign .. 36-40
MAIZE Foreign .. 32-35
FLOUR, best marks, delivered. per sack 42 50
ad ditto .. ditto 36-42 Country .. 36-42
Foreign .. per barrel 28-30 Per sack .. 31-40

WEDNESDAY, March 8.

Notwithstanding that the business doing was limited, prices exhibited much firmness, though no improvement can be quoted. The show of English Wheat was small, but the receipts from abroad were large. The attendance of millers was thin, and the inquiry for all descriptions was inactive, but extreme prices were realised. There was a fair supply of Barley, which sold cautiously at previous quotations. Malt was dull, without change in value. Oats, the supply of which was fair, experienced a limited sale, at full prices. Beans and Peas were steady, both in value and demand. For flour a slow inquiry prevailed, but prices ruled firm, especially for country marks.

ARRIVALS OF GRAIN, &c., INTO LONDON BY WATER CARRIAGE.

	Wheat.	Barley.	Oats.	Flour.
English & Scotch ..	620	20	—	—
Irish ..	—	—	—	—
Foreign ..	21,950	3060	3650	{ 15,950 bbls.
	22,570	3080	3650	

LIVERPOOL, March 7.—There was only a moderate attendance, and millers bought reluctantly at last Friday's rates, which are 1d. to 2d. per cental over last Tuesday. Flour quiet, at a nominal advance of 6d. per barrel on the week. Barley and Beans unaltered. Peas 6d. per qr. dearer. Oats 2d. per bushel. Oatmeal 2d. per load higher. Indian Corn quiet, without change.

AVERAGES.

	Wheat.	Barley.	Oats.
Jan. 28 ..	52s 6d	35s 5d	22s 8d
Feb. 4 ..	52 10	35 4	22 11
— 11 ..	53 7	35 8	23 9
— 18 ..	53 11	35 7	23 7
— 25 ..	53 9	35 10	24 5
March 4 ..	53 2	35 5	24 7
Average ..	53 3	35 6	23 8

SEED MARKET.

The spring demand having now fairly begun, there is considerable activity in our markets. Quantities of American Red continue to be shipped to France; this of course keeps our stocks here in narrow limits. Under the influence of the home and foreign demand, American Red has advanced fully 2s. per cwt. during the week. English seed is without alteration. Fine Trefoil seed is in better request. Alsike seed is dearer; white Clover about the same. Imported Italian continues scarce and dear. Perennial Ryegrasses move off freely, at enhanced currencies. Spring Tares are 2s. per qr. dearer. Rape and Mustard seed are both very firm.

JOHN SHAW & SONS, Seed Merchants,
16, WATER LANE, LONDON, E.C.

ENGLISH WOOL.

During the last week there has been an active demand both for home trade and export, and everything appears to be in favour of decidedly higher prices between this and clip day.

HOPS.

BOROUGH MARKET, March 8.

Messrs. Fattenden & Smith report that the demand for all descriptions is of a purely retail nature, and of the two, being in favour of purchasers. Choice samples are extremely scarce, and are held for full rates.

SUTTONS' PRIZE MANGEL SEED.

IMPORTANT NOTICE.

SUTTONS' MAMMOTH LONG RED.



Suttons' Mammoth Long Red Mangel.
Introduced by Messrs. SUTTON Four years since.

For three successive years—1868, 1869, 1870—this variety was awarded the first Prize at Birmingham.

Owing to the extraordinary demand for the above MANGEL, Messrs. SUTTON regret they are unable to supply more than 20 lb. to any one customer.

Price, 1s. 6d. per lb.

Messrs. SUTTON recommend their Improved

ELVETHAM GIANT LONG RED,

As the next best variety to their Mammoth.

Price, 1s. per lb., cheaper by the cwt.

From H. N. MIDDLETON, Esq., Dorchester.

"My crop of Elvetham Mangels is astonishingly fine."

From the Wexford Independent.

"In the show of roots, Mr. Kinsley (Mr. Walker's Steward) was a host in himself. The Elvetham Mangel, transplanted after a crop of Vetches, were monstrous, and exceeded anything in the way of Mangels ever grown. The seed was procured from Messrs. Suttons' Royal Berkshire Seed Establishment."

From Mr. ANDREW NANCE, Portsmouth.

"I have had the largest crop of Mangel I ever saw from your Elvetham; I therefore order 80 lb. of that kind this season."

The following excellent kinds can also be supplied:—

	Per lb.—s. d.
Good Yellow Globe ..	0 9
Good Long Red ..	0 9
Suttons' Selected Yellow Globe ..	1 0
Suttons' Yellow Intermediate ..	1 0
Suttons' Red Globe ..	1 0
Suttons' Giant Long Yellow ..	1 0

For further particulars of SUTTONS' HOME-GROWN FARM SEEDS, see SUTTONS' FARMER'S YEAR BOOK for 1871,

Illustrated, now ready, 6d. Post Free.

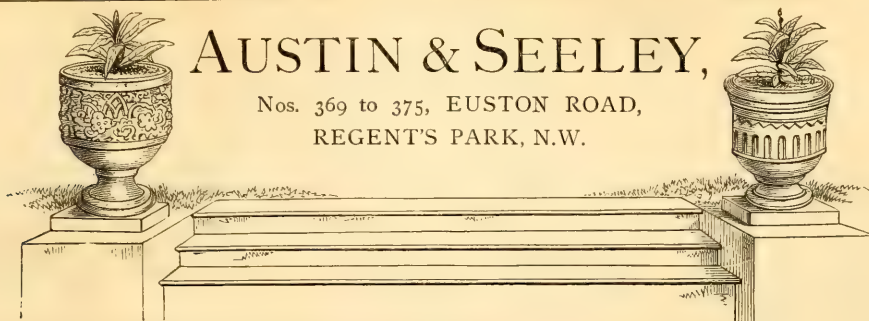
Gratis to Customers.

ALL GOODS CARRIAGE FREE

(except very small parcels).

Five per cent. off for Cash payments.

SUTTON AND SONS,
SEEDSMEN TO THE QUEEN, READING.



A. & S. having had frequent applications for VASES of a substantial character for Aloes and other similar Plants, have been led to Design a series specially adapted to the Corners of Steps. Patterns and Prices will be forwarded to any gentleman who may wish for a pair, and will be so good as to state the size of his plinths.

A copy of this large Tazza has stood forty years in their Show Yard, continually filled with earth.



A. & S. particularly wish it to be understood that the earth need not be removed from their Vases during winter.

DIAMETER OF THIS VASE,
8 feet.

THE SAME FORM,
5 feet.

A. & S. respectfully solicit the attention of the Nobility and Gentry to a class of work which they have the means of producing better than any one else, and Specimens of which may be seen in the Gardens of the ROYAL HORTICULTURAL SOCIETY, the PUBLIC AVENUE GARDENS, REGENT'S PARK, and the Gardens of the ROYAL BOTANIC SOCIETY. Those Vases having now been in use some years, and remaining filled with earth during the severest winters, afford ample proof of the durability of their work.

AUSTIN AND SEELEY'S STOCK NOW COMPRISES

200 designs of FOUNTAINS, at from £10 to £400.

24 SUN-DIAL PILLARS, at from £2 to £9.

20 BASKETS, from 15s. to £35.

14 SHELLS, from 12s. to £15.

52 STATUES.

44 SMALL FIGURES.

70 FIGURES of ANIMALS and BIRDS.

300 kinds of FLOWER VASES, at from 10s. to £50.

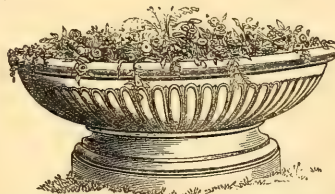
PEDESTALS of all sizes.

18 FLOWER BOXES for Windows.

BALUSTRADING.

34 BAPTISMAL FONTS.

26 CRESTS and FINIALS for Gate Piers.



A great variety of Designs, suitable for either Flowers or Conservatory Fountains or Fish-Basins.

Price from £10 to £50.



ORNAMENTAL COPINGS TO WATER BASINS, OF ANY SIZE.

Illustrated Price Lists free on application to
THOMAS GREEN AND SON, Leeds and London.

BY HER MAJESTY'S



ROYAL LETTERS PATENT.

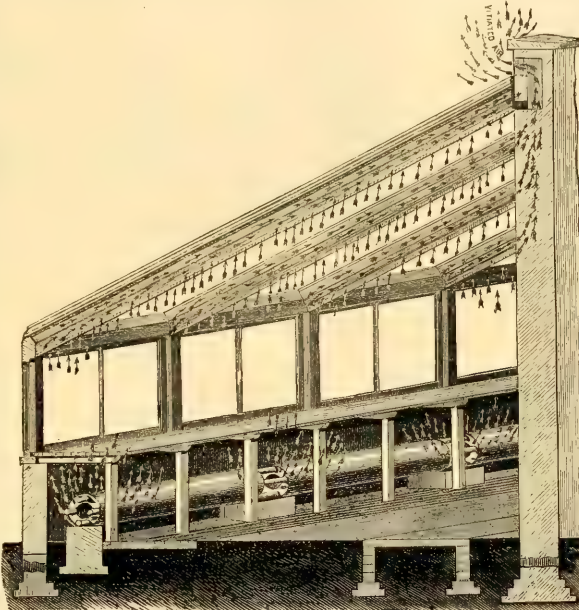
ORMSON'S NEW PATENT SYSTEM OF VENTILATING HOTHOUSES,

Combined with his PATENT VENTILATING HOT-WATER APPARATUS, may now be seen in working order at the Works, Stanley Bridge, Chelsea; and Gentlemen about to build, Gardeners and Horticulturists generally, are invited to inspect this great improvement in Horticultural Building. These Ventilating Hothouses and Ventilating Hot-water Apparatus, secure perfectly, at all times, that zephyr-like movement of the atmosphere in hothouses, which has been so long desired by the most eminent horticulturists.

The following Extracts from the Horticultural Press will serve to explain the means by which the above-named results have been attained,

From the "GARDENERS' CHRONICLE," August 6, 1870.

"At the late exhibition of the Royal Horticultural Society at Oxford, Mr. Ormson, King's Road, Chelsea, showed a model house in which provision was made for winter ventilation, by ensuring that the air should be duly warmed before its admission. The accompanying illustration will serve to explain how this is effected. The form of pipe employed is that of a hollow cylinder possessing a heating surface equal to four 4-inch pipes, or more if necessary. The external air is admitted through a tube, nicely adjusted to valves in the front wall, and connected to the interior of these cylinders, where, as a matter of course, it becomes rarified, and consequently forced out through openings provided in the cylinders, into the house, by the denser air which is constantly pressing in; such a stream of warmed air rushing into either a hothouse or apartments will, according to the laws of pneumatics, keep the air of such places constantly moving through the displacement of the cooler particles by the warmer, and *vice versa*, so long as a portion can find an escape; and this Mr. Ormson has provided for by hollow rafters having iron panels perforated on their lower side, and a valve at the top of each rafter communicating with the chamber shown at the top of the back wall, through which it escapes by iron gratings in the face of the wall above the glass roof. This plan of heating will also be highly beneficial in public and other buildings where large masses of people congregate together, as the vitiated air constantly passes away, and its place is supplied by fresh warmed air, which, unlike the cold draughts usually admitted by windows, would neither chill tender plants nor give cold to individuals. The hothouses themselves, while possessing stability in an eminent degree, are rendered light in appearance by the use of very large glass, of extraordinary thickness, and the plan of glazing is such that no putty is exposed to the destructive influence of the atmosphere. Abundant means are also provided for opening sashes in hot weather in the usual way. The ventilators are opened and closed simultaneously by machinery. The plan elicited much approbation from practical men, and seems well suited for the purposes it is intended to fulfill."



From the "FLORIST AND POMOLOGIST," for October, 1870.

"THE VENTILATION OF HOTHOUSES.—That a stagnant atmosphere in hothouses is inimical to the well-being of plants, there can be no question. Abundant testimony might be adduced to prove that in ill-ventilated hothouses not only are etiolated growth and thin, sickly foliage the rule, but also that red spider and other insects are more difficult to keep under than when abundant ventilation is at the gardener's command. But it is well known to cultivators of tropical plants, and of forced fruits, that something more is wanted than the means of allowing a blast to blow. At length, however, a plan has been brought before the gardening world worthy of far higher commendation, and which if it does not supply all that the cultivator can wish for, goes a long way towards doing so. We allude to Mr. Ormson's new system of warming and airing hothouses, a model of which was exhibited at Oxford, at the Royal Horticultural Society's show, and which the accompanying engraving will the better enable the reader to understand."

"By means of this novel system, a continuous supply of air, deprived of its chilling properties, may at all times be uninterruptedly supplied to a forcing-house, even during the coldest night or day of the whole year, without the possibility of injury to the most delicate plant. It will be seen from the figure that the ordinary 4-inch hot-water pipes have been dispensed with as the heating medium, and hollow hot-water cylinders presenting a large heating surface (as much as four or six of the ordinary 4-inch pipes)

From an article on Ventilation in "GARDENERS' CHRONICLE," Sept. 24, 1870, by Mr. D. T. Fish.

"The highest art in the ventilation of plant-houses is the effecting of sufficient change of air with the least loss of caloric; and to do both without suddenness or violence, that cause draught, the change of atmosphere should be slow and thorough, not rapid and partial. The analogies of mountain and sea breezes are wholly out of place when applied to the ventilation of plant structures. Within

these we should rather imitate the motion of the air on a still summer's day. It is here, again, that I think Mr. Ormson's perforated rafter the right thing in the right place. By providing so many outlets, draughts—cold, cutting, killing—are rendered impossible."

"For the purpose of agitating the entire atmosphere I am also of opinion that the lower the fresh air can be admitted into the house the better. In this respect also I approve of Mr. Ormson's arrangements. As a whole, they seem well adapted for effecting a thorough change of atmosphere without exposing the plants to draughts of cold or incursions of dry air. They seem well adapted for admitting as much air into the house, and as little heat out of it, as possible, and distributing the fresh air impartially through every portion of the atmosphere."

From the "JOURNAL OF HORTICULTURE," July 28, 1870.

"Mr. Ormson exhibited models of his New Patent Ventilating Hot-water Apparatus, which appears meritorious, the cold air being admitted into the centre of the cylinders. Combined with this the rafters are made hollow and faced with perforated iron, whereby all stagnant and vitiated air is carried off by ventilators in the back wall, and which can be regulated at pleasure. As a means of ventilating in winter this method of Mr. Ormson's is, we think, very excellent. The glass used by Mr. Ormson is of immense thickness, being what is known as 32-oz., and is fixed in grooves, thus doing away with front putty, which is always expensive to keep in repair."

substituted. These cylinders present the ordinary external surface for radiation of heat, and, in addition, an internal surface, forming a chamber by means of which the external air, after being brought in through valves in the front wall, is allowed to escape into the house at openings between the cylinders, as shown by the arrows. The air thus becomes warmed before coming in contact with the plants, and by the force of gravity is diffused through the house, escaping through hollow rafters by means of nicely adjusted valves into a chamber in the back wall, and from thence into the open air, through gratings provided for that purpose. There is a valve or ventilator at the top of every rafter, and a valve is fitted to each of the cylinders. In order to properly moisten the warm air on escaping from the cylinders, zinc or iron pans are provided to fit the top of the cylinders, which may be placed over each opening, or elsewhere, at the option of the cultivator. By such an arrangement it is evident that no stagnant or vitiated air can remain in the building, but, on the contrary, an atmosphere in motion, constantly replenished with a stream of fresh air from without, will be flowing through it. It will be sufficiently evident that although the engraving shows a lean-to house, the same principle is equally applicable to other forms of structure; and we should also state that sashes and lights are hung in the usual way, so that in summer additional air may be given to any extent required. We may fairly congratulate Mr. Ormson on the successful working-out of a good practical idea."

Provision is made for carrying off ALL CONDENSATION, so that ALL DRIP and DAMPNESS is EFFECTUALLY PREVENTED. These structures are remarkably strong and light in appearance. The GLASS used being in LARGE SQUARES and of GREAT THICKNESS, the usual REPAIRS will be DONE AWAY WITH, and it will also be HAIL PROOF. There is NO PUTTY exposed to the action of the sun and atmosphere, EITHER INSIDE or OUTSIDE OF THESE HOTHOUSES, and PAINTING will be REDUCED to a minimum.

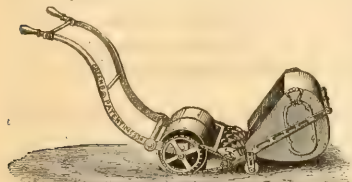
HENRY ORMSON, HORTICULTURAL BUILDER TO HER MAJESTY,
AND HOT-WATER APPARATUS MANUFACTURER TO THE COMMISSIONERS OF HER MAJESTY'S ROYAL PALACES AND PUBLIC BUILDINGS,
AND TO THE ROYAL HORTICULTURAL SOCIETY,
STANLEY BRIDGE, KING'S ROAD, CHELSEA, LONDON, S.W.

Great Reduction in Prices for 1871,

OF GREEN'S PATENT SILENS MESSORS

OR
NOISELESS LAWN MOWING, ROLLING
AND COLLECTING MACHINES.

During the last few years our Machines have been submitted to numerous practical tests, and found to possess all the advantages in working and keeping a Lawn in the greatest possible state of perfection. We therefore have no alterations to report, as they are unnecessary.



The above Machines have carried off every Prize that has been given in all cases of competition.

They are warranted to be superior to any others. We guarantee them to give entire satisfaction, otherwise they can be returned, free of cost to the purchaser. With the increased facilities we possess for the Manufacture of Lawn Mowers, we are enabled to Sell them at a reduced rate on former years, as will be seen from the following Scale of Prices:—

To cut	8 inches	Price	£	s	d	
" 10	"	"	3	0	0	Can be worked
" 12	"	"	4	0	0	by one person.
" 14	"	"	5	0	0	
" 16	"	"	6	0	0	This can be worked
" 18	"	"	7	0	0	by one person on an
" 20	"	"	7	10	0	even Lawn.
" 22	"	"	8	0	0	By Man and Boy.
" 24	"	"	8	10	0	

Upwards of 1000 Machines of different sizes to select from at our London and Leeds Show Rooms.

Prices of HORSE, PONY, and DONKEY MACHINES on application.

Repairs executed with efficiency and despatch, both at Leeds and London Establishments.

GREEN'S IMPROVED PATENT ROLLER,

FOR
LAWNS, DRIVES, BOWLING GREENS,
CRICKET FIELDS, and GRAVEL PATHS,
Suitable for Hand or Horse-power.



PRICES OF ROLLERS, fitted with Shafts,

Suitable for Pony or Horse-power.

Diameter	Length	£	s	d	Diameter	Length	£	s	d
30 in.	32 in.	10	0	0	30 in.	60 in.	15	10	0
30 in.	36 in.	10	15	0	30 in.	72 in.	17	10	0
30 in.	42 in.	11	15	0	30 in.	84 in.	19	10	0
30 in.	48 in.	13	10	0					

PRICES OF HAND ROLLERS.

Diameter	Length	£	s	d	Diameter	Length	£	s	d
24 in.	32 in.	7	10	0	20 in.	22 in.	3	10	0
24 in.	26 in.	4	10	0	16 in.	17 in.	2	15	0

These ROLLERS possess many advantages over all others; they are made in two parts, and are free to revolve on the axis, affording greater facility for turning, and the outer edges are rounded off, or turned inwards, thus avoiding the unsightly marks left by other Rollers. They are manufactured of the best materials, and are got up in a manner surpassing any ever yet brought out.

The ROLLERS, 24 by 26 inches, 20 by 22 inches, and 16 by 17 inches, are also made in one part, at a reduced price; and for Rollers of that size, will be found to answer many requirements, as the handle can be reversed to either side of the Roller at pleasure.

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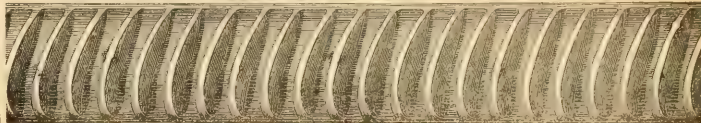
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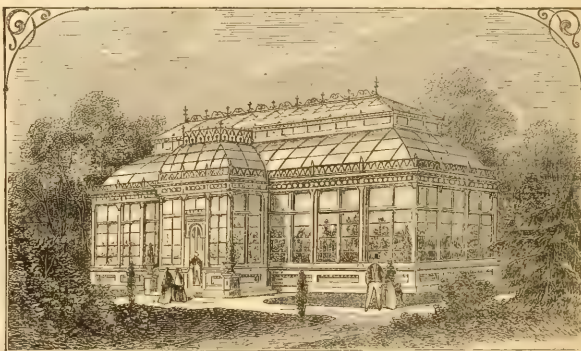


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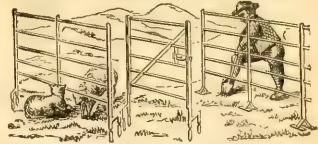
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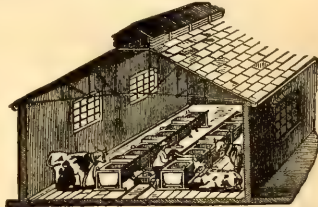
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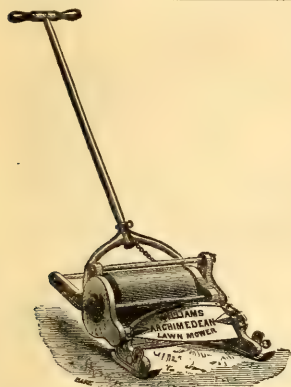
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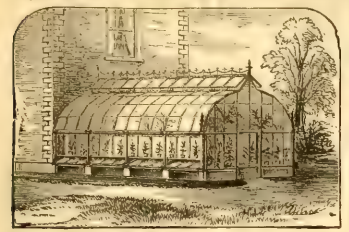
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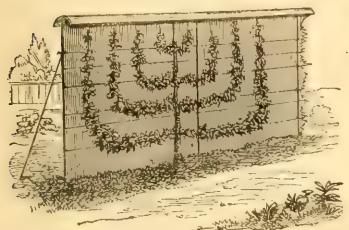
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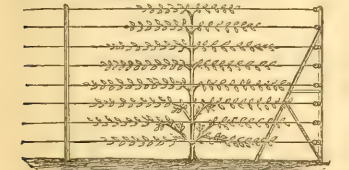
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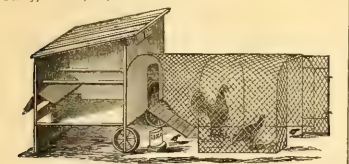
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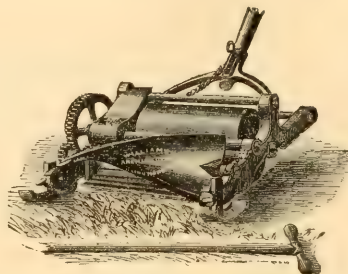
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N.B. The above Engraving is from a Drawing made by Messrs. SUTTONS' own Artist in autumn of 1869, and first appeared in SUTTONS' "AMATEUR'S GUIDE" of 1870.

The Orders received last Season were far more than could then be executed, and we are again nearly sold out.

It has this Season been procured from Messrs. SUTTON by about Forty of the leading Nurserymen and Seedsmen, whose names were published in the *Gardeners' Chronicle* of February 18 (p. 197).

Besides many others, the following Letters were received last Autumn by Messrs. SUTTON:—

From Mr. F. W. BENTLEY, *Second to Lord Norbury, Valence, Waterham.*
"Oct. 26.—The Flourball Potato is of first-class quality, a great cropper, and quite free from disease."

From Mr. JOHN HALLAM, *Edison.*
"July 22.—I never had seeds that gave me half the satisfaction. I gained first prize with your Red-skinned Flourball Potato. Thirty completed."

From Major CLARKE, *Wilton Park, Devonshire.*
"Oct. 26.—The Red-skinned Flourball Potato is very prolific, quite free from disease, very handsome, and beautifully white."

From the Rev. H. H. DONALDSON, *Westwell Vicarage, Ayrshire.*
"I have found your Red-skinned Flourball an admirable Potato, prolific, and unequalled for baking."

From Col. J. LE COULTEUR, *Belle Vue, Jersey.*
"Oct. 26.—Half a peck of Red-skinned Flourball Potatoes produced 185 lb. weight; they are a fine size, excellent and mealy; bony; no sign of disease."

From JOHN E. STANLEY, *Esq., Uppington, Wiltshire, Salop.*
"Nov. 2.—I consider your Flourball Potato the best I have ever grown, both as to quality and quantity; they are quite free from disease, and remarkably uniform in size, with a shallow eye and fine clear skin."

From Mr. B. BISHAM, *Gardener to the Right Hon. Lord Ormonde, Wexford, Ireland.*
"The Red-skinned Flourball Potato you sent me is a most extraordinary kind producing tubers varying from 1½ to 2 lb. weight. Certainly the largest Potato I have ever seen."

From the Rev. A. G. BOODLE, *Mells, near Frome.*
"The Red-skinned Flourball Potatoes you sent to me were remarkably large when dug. They both boiled and roasted well, and have been entirely free from disease."

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MYATT'S PROLIFIC KIDNEY
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EARLY DALMAHAY ROUND
EARLY PROLIFIC ROUND
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EARLY SEEDLING
" HANDSWORTH
" GOLDEN GLOBE
" ROUND FRAME
" MARTIN'S GLOBE
" FORTYFOLD
" COCKNEY
" FLOURBALL

EARLY KING
" BRITISH QUEEN
" LUTHER
WHEELER'S MILKY WHITE
" FINE KIDNEY, TRUE
BERKSHIRE KIDNEY
WALKER'S IMPROVED REGENT
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ROYAL ALBERT HALL, KENSINGTON GORE. OPENING BY Her Most Gracious MAJESTY THE QUEEN, WEDNESDAY, March 22. CHEQUES AND POST-OFFICE ORDERS for shares should be paid to CHARLES TILLOTSON TOWNSEND, Royal Albert Hall. For Prices of Seats see following Advertisement.

ROYAL ALBERT HALL, KENSINGTON GORE. OPENING BY Her Most Gracious MAJESTY THE QUEEN, WEDNESDAY, March 22. Reserved Seats for the Opening of the Hall by the Queen may be obtained at the following rates:—

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Stalls, each 4 0
Balcony Seats, numbered, each 2 0
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SIL MICHAEL COSTA, will be given.

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The Royal Horticultural Society's Gardens. The Society of Arts John Street, Adelphi.

Michell's Library 33, Abchurch Lane, Cheapside.

Mr. A. Hays 4, Royal Exchange Buildings.

Messrs. Chappell & Co. 10, New Bond Street.

Handel Festival Ticket Office 2, Exeter Hall, Strand.

Mr. Austin St. James's Hall, Piccadilly.

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MEETINGS FOR THE ENSUING WEEK.

MONDAY, March 20.—Entomological 7 P.M.

WEDNESDAY, 21 Royal Botanic (First Spring Show).

THURSDAY,

SOME time since, when commenting on fruit markets, we remarked, that "the fruit markets of the world are not much indebted to the dwarfing processes for their supplies;" and this we admit to be true not only in reference to the market supplies for the masses, but also to the main part of the supplies for private families who indulge in the luxury of a garden. Nevertheless there is, we believe, a place in the economy of gardening, both for ORCHARD-HOUSES and for the POT CULTURE OF FRUIT TREES; and it is with the view of indicating what this position is that we now turn to the subject.

What, then, are the circumstances under which the culture of orchard-house fruits may be deemed advantageous and worthy of adoption? Not, certainly, as we have already urged, as a means of supplying fruit for the million; nor, indeed, as a means of providing the necessary supply for a large private establishment, though in the latter it may sometimes be very usefully introduced as an adjunct, as in the case of the pot fruit trees at Blenheim, to which we referred last summer, wherein the admirably managed Cherries, Plums, and other fruits Mr. LEE had provided, were in every way worthy to appear on the ducal dessert table, as indeed, we believe, was their destiny.

The true and most important application of the orchard-house system of growing fruit trees, it appears to us, to enable amateur cultivators who have but limited accommodation, and who have not the advantage of the services of skilled gardeners, to obtain in an easy and tolerably certain process a considerable amount of fruit, which they could not obtain so readily in any other way. The squib's gardener may adopt it as an adjunct to his main resources, either for yielding auxi-

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liary crops, for testing certain varieties of fruits, or for the production of handsome little trees for the dessert table; and the experimentalist, or the raiser of new fruits, may have recourse to it in order the more speedily to arrive at results; but, after all, it is the amateur with his small garden, the amateur who has not the leisure, or knowledge, or convenience, to manipulate the choicer sorts of fruits according to the ordinary methods of culture, nor the assistance of skilled labour to supply his own deficiencies in these respects, on whom orchard-house culture must be regarded as conferring a real and unmistakable boon.

Let us try to bear out and illustrate this view of the matter by citing an example within our own knowledge. Last summer we had the privilege and pleasure of studying the orchard-house system, and of witnessing its results, in a small country garden in Surrey. In this garden, devoted partly to vegetable culture and partly to the growth of flowers, and tended by one labouring gardener, who, however, had thoroughly mastered its details, were two span-roofed orchard-houses, each about 60 feet long, in which were grown annually, besides a considerable collection of Lilies, some 166 fruit trees in pots, consisting of Peaches, Nectarines, Apricots, Cherries, Plums, Pears, and Apples, besides pot Strawberries, which latter do exceedingly well. Of the former more delicate fruits we need only say that the crop was profuse, and the fruit of full average quality according to the respective varieties, some sorts, as might be expected, proving better than others, both as regards size and quality. The Pear trees, especially, were pictures of successful management, such as we shall never forget; and we feel sure that in no limited garden, with limited appliances, such as existed in this case, could such a crop of choice fruit and such a variety have been obtained under any other system of culture. We have since had an opportunity of tasting some of the fruit thus grown, and found it in every way first-rate in quality.

The treatment adopted in this case is to crowd the trees into the houses for the winter as thickly as they can be packed, and in this position they remain during the period of flowering, since at that stage they require very little space. Subsequently, when the fruit is set, and the danger from spring frosts over, usually about the beginning of June, the harder sorts, such as Plums and Pears, which ripen their fruit in greatest perfection out-of-doors, are drawn out and set in sheltered places outside. The tenderer fruits thus get the full benefit of the house space when they most require it, with the result previously recorded, while the harder sorts, as Plums, Apples, and Pears, are in due time plunged in the open ground, near the pathways, where they can readily be watered; for on the constant and unflinching attention to watering—copious waterings, two or three times a-day in very hot weather—depends the swelling of the fruit, the quality of which is at the same time so well brought out by the other conditions of growth, that the fruits thus obtained have generally carried off first prizes when exhibited, a sufficient proof that they thus acquire both size and quality. A few of the more prominent examples are noted as follows:—

LOUISE BONNE DE JERSEY PEAR.—A cylindrical-shaped tree 5½ feet high and from 2½ to 2½ feet in diameter, and growing in a 13-inch pot, bore 73 fruits, all well swelled fruit of full average size, the choicest sample measuring 5½ inches in length and 9½ inches in circumference. Another plant, in a 13-inch pot, bore 42 fruits; and a third tree, of about the same size, in a 16-inch pot, bore 82 fruits.

WILLIAMS' BON CHRISTEN PEAR.—Of the fruits of this excellent Pear, some measured 5½ inches in length, and 10 inches in circumference, and some 6½ inches in length by 9½ inches in circumference.

MARIE LOUISE PEAR.—A dwarf standard, of compact form, in a 16-inch pot, the tree 4 feet 10 inches high and about 2 feet in diameter, bore 45 Pears, some of which measured respectively 5 inches long by 8½ inches in circumference, and 5½ inches long by 8½ inches in circumference.

WINTER NELIS PEAR.—A loose bush tree, 3 feet 6 inches high and 3 feet through, in a 14-inch pot, bore 73 fruits, of which the circumference varied from 7 inches to 7½ inches, the length being 4 inches.

EASTON BEURRE PEAR.—A compact bush tree, 4 feet high by 3 feet diameter, growing in a 15-inch pot, bore 47 fruit, selected samples of which measured 5 inches long by 10 inches in circumference, and 4½ inches long by 9½ inches in circumference.

GLOU MORCEAU PEAR.—A loose bush tree, about 3½ feet high, and the same in diameter, in a 14-inch pot, bore 40 Pears, which measured 5 inches in length and 8½ inches in circumference.

TRIOMPHÉ DE JODOIGNE PEAR.—A loose bush tree,

3½ feet high and 4 feet through, growing in a 15-inch pot, bore 68 fruits, the measure of which in the sample examined was 6 inches in length and 9½ inches in circumference.

MARCHE À LA COUR PEAR.—A compact bush tree, 4 feet high by 3½ feet through, in a 15-inch pot, had a crop of 77 fruits, the measured samples of which showed the following proportions: 10½ inches and 10½ inches in length, and 8½ inches and 9 inches in circumference respectively.

MELON APPLE.—A dwarf standard compact tree, 4 feet high by about 4½ inches in diameter, in a 13-inch pot, bore 33 Apples, the circumference of which was 8½ inches.

These were a fair sample of the collection of Pears and Apples, the produce of which, in some cases, really appeared marvellous, not only in regard to quantity, but also as to size, for although the fruits above referred to were the largest to be found on the trees, yet the majority of the crop was very little, if at all, inferior.

The very successful picture of orchard-house pot fruit culture to which we have here referred, was to be seen in the garden of G. F. WILSON, Esq., at Gishurst Cottage, Weybridge, who has herein amply proved his fitness to occupy the chair of the Royal Horticultural Society's Fruit Committee, which he so worthily fills. Some splendid fruits of Josephine de Malines Pear from this collection were exhibited not long since at South Kensington; Mr. WILSON's Louise Bonnes have, we believe, taken the first prize for flavour at the Crystal Palace autumn show against 36 competing single dishes; and we remember that some superb examples of the Northern Spy Apple, from the same source, were figured a few years since in the *Florist and Pomologist*. The success which attends Mr. WILSON's practice is, no doubt, in some measure the result of experience, but it is sufficient at least to show that orchard-houses and pot fruit trees are not mere toys, but that they may be turned to good account in the garden of the amateur.

THE intentions of the Government with respect to the SAMPLE POST and other questions relating to Post Office management, were explained in the House of Commons on Tuesday last by the Postmaster-General, from whose speech on this occasion we quote the following passages:—

The Post Office had never relaxed the essential condition of the postage being established, that nothing should be sent by pattern post except patterns. He quite admitted that the rules of the Post Office in that respect had been evaded to a considerable extent, and that it was quite impossible to distinguish between patterns and other articles sent by the carrier. Suppose a gentleman had a sorter had to decide between an ounce of Picotée and half a pound of grass seed. The latter might be a sample, but he would, perhaps, decide that it was not a sample, while he would pass the other, which might be no sample. Such a distinction therefore must be absolutely given up. The transition post had been a great evil, and it was maintained, it was absolutely necessary that parcels should go by post, but it was very important, in a matter of this kind, to try to arrive at some system which has in it the elements of finality. In politics unsettled questions were the worst, and the greatest mischief, and in commercial affairs also they had the worst possible consequences; for people did not know where they stood, and could not make the necessary calculations. The next point that he wanted to consider with regard to this matter is, that should the rate of the postage of these parcels be 1d. or 2d. or 3d. or 4d. or 5d. or 6d. or 7d. or 8d. or 9d. or 10d. or 11d. or 12d. or 13d. or 14d. or 15d. or 16d. or 17d. or 18d. or 19d. or 20d. or 21d. or 22d. or 23d. or 24d. or 25d. or 26d. or 27d. or 28d. or 29d. or 30d. or 31d. or 32d. or 33d. or 34d. or 35d. or 36d. or 37d. or 38d. or 39d. or 40d. or 41d. or 42d. or 43d. or 44d. or 45d. or 46d. or 47d. or 48d. or 49d. or 50d. or 51d. or 52d. or 53d. or 54d. or 55d. or 56d. or 57d. or 58d. or 59d. or 60d. or 61d. or 62d. or 63d. or 64d. or 65d. or 66d. or 67d. or 68d. or 69d. or 70d. or 71d. or 72d. or 73d. or 74d. or 75d. or 76d. or 77d. or 78d. or 79d. or 80d. or 81d. or 82d. or 83d. or 84d. or 85d. or 86d. or 87d. or 88d. or 89d. or 90d. or 91d. or 92d. or 93d. or 94d. or 95d. or 96d. or 97d. or 98d. or 99d. or 100d. or 101d. or 102d. or 103d. or 104d. or 105d. or 106d. or 107d. or 108d. or 109d. 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lodge at the entrance, for the superintendent's residence, is built after the Belgian model, with an archway through the centre of the lodge, forming an admirable light gate. A broad gravel walk leads to the mortuary chapels, the right hand of which is set apart for the burial of the dead according to the rites of the Church of England, that on the left for the use of the Nonconformists. They are divided by a massive central tower, containing a bell and a fine-toned bell, half-ton in weight, by MEARS, of Whitechapel. The basement of the tower forms the two vestry rooms. The walls are faced with flint; the windows, doors, and dressings of Bath stone. The two chapels are very similar in their arrangements and general appearance, though slightly different in shape. The central avenue is continued at the rear of the chapels to the extremity of the ground. A space of 4 acres is held in reserve, winding gravelled walks, and beds with shrubs, &c., give it a park-like appearance. The ground has been divided into sections and sub-sections, and into about 15,000 grave spaces, by MESSRS. HINDS & SON, of Ramsgate, and a lithographed plan is to be furnished. The building works have been substantially carried out by Mr. H. BELL WILSON, of Canterbury; the groundwork and general formation by Mr. MESTON, of London.

— The schedule of another of the great North of England HORTICULTURAL EXHIBITIONS—that to take place at LEEDS on June 7, and subsequent days—is now before us, and is of a comprehensive and liberal character. Some of the principal prizes to be contested for, are—£15 for 12 Stove and Greenhouse Plants, £10 for 12 Foliage and Flowering Plants, £8 for 6 Orchids, and a like sum for 12 Pot-Roses, £8 for 12 Stove Geraniums, £3 for a collection of Fruit to consist of 6 kinds. In several classes, £6 is offered as a 1st prize for 6 plants, as, for example, Heaths, Azaleas, Roses, and various groups of Pelargoniums, including Zonals, Nosegays, and Variegated.

— The MAXIMUM TEMPERATURE of the air in England during the week ending March 11 ranged from 63°.5 at Northampton to 54°.8 at Wolverhampton, with a mean for all stations of 56°.9. The minimum was 37°.5 at Leith to 51°.4 at Greenock, with a mean for the several stations of 54°.8. The extremes of the MINIMUM TEMPERATURES in England were 37°.9 (at Liverpool) and 30° (at Hull), and the mean for all stations was 34°.2. In Scotland the extremes were represented by 39° (at Edinburgh) and 32°.5 (at Paisley), with a mean for the different stations of 34°.8, or 6° above the mean for England. It will thus be seen that the nights in Scotland were slightly warmer than those in England, whilst the days were warmer in the latter than in the former, and to such an amount as to cause the MEAN TEMPERATURES in England to be nearly 2° warmer than in Scotland, the values of this element being 45°.5 and 43°.6 respectively. The highest mean temperature at any station in England was 46°.9 (Portsmouth), and the lowest was 44°.1 (Newcastle). In Scotland the extremes were 46° (Paisley), and 41°.7 (Aberdeen). RAINFALL.—Week after week during the present year, almost without intermission, we have had to record the large falls of rain in Scotland as compared with those in England; it will not, therefore, surprise our readers to notice the great disparity between the largest falls in England and Scotland during the week under discussion; thus, 0.59 inch (Birmingham), and 0.58 inch (Wolverhampton), against small when compared with 2.4 inches (Paisley), and 1.85 inch (Greenock), while the means of the two countries show a difference of 0.67 inch,—the values being, for England, 0.41 inch, and for Scotland 1.08 inch. (See Mr. GLAISHER'S Tables in our present issue.)

— A short time since, a valued correspondent recorded in our columns a case wherein she had found a LEMON in which all but two of the carpels or "quarters" were filled with acid pulp as usual, while the remaining two were filled with sweet juice; further, we are told that there was nothing on the outside of the fruit to indicate the difference within. This case is interesting in relation to the ZARIAKIA and TRIPACIAL Odd-shaped trees (*Guttifera Chrysocarpa*, 1855, p. 628), which it is alleged that fruits of a compound nature are produced; compound in that the fruits present the characteristics of two distinct varieties, more or less blended together, or simply in juxtaposition. The mode of origin of these fruits is a mystery. They are supposed to be illustrations of GRAFT HYBRIDIZATION; but the evidence is insufficient to warrant us in doing more than treating the hypothesis as a plausible one. In the case above referred to, there is no evidence forthcoming of any grafting having taken place, and no testimony as to any "crossing" having been effected. We are disposed to look on this case as one in which, from some unknown cause, acid is formed or deposited in certain cells, and sugar in others.

— In the columns of *Nature* some correspondence has taken place as to the date of appearance of the male and female CATKINS of the HAZEL. One correspondent averred that the male catkins appeared before the female blossoms; while Mr. A. W. BENNETT contended that the flowers of the two sexes were developed

at the same time. Our own experience goes to show that both disputants are right. In a hedge that we have occasion to pass almost daily, some male catkins were in full bloom in the middle of January. At that time the female flowers were hardly visible; at the present time, however, as Mr. BENNETT says, both male and female flowers are open together, and there are the old withered catkins still hanging on the bushes. It would appear from this, that while there is a succession of male flowers, there is but one crop of female blossoms. Can this be true? If so, what is the object of the early flowers? Another point worth notice is the varying position of the male and female catkins respectively. The most usual arrangement is for the stamens-bearing catkins to be placed on the same branch as the pistilliferous flowers, but higher up; but in some cases now before us, the arrangement is reversed, and the embryo nuts at the end of the branches, or if at the sides, still above the male flowers. In one case, the female flowers are immediately at the base of the stamens-bearing catkin,—a very unusual position.

— In a recent number of the *British Medical Journal*, Mr. C. ROBERTS, alluding to the use of DISINFECTANTS, makes the following remarks on the use of sulphur:—

"Sulphurous acid is exceedingly inimical to organic life, and is probably equally potent in destroying organic poisons. The great objection to its use has always been its irritating effect on the respiratory organs; but, even when used in quantities in which it is not capable of affording tolerable comfort, it must be a powerful disinfectant. To illustrate this, I may mention that sulphur was found to be the most powerful remedy for the Vine and Hop disease (Oidium Tuckeri), which committed great ravages here and on the Continent about the years 1855 and 1856. On investigating the action of the sulphur, I found that it was due to the presence of a trace of sulphurous acid, which is always present in common commercial sublimed sulphur; and, when sulphur was still more highly impregnated with the gas, its beneficial action is very much increased. I believe also that the use of sulphur ointment in the cure of scabies is due to the presence of this small quantity of free acid: and its action may be increased by increasing its quantity. In a recent number of the *Pall Mall Gazette* there was a statement that the cholera was rampant in Southern India, and in the gunpowder factories in India than elsewhere. This is probably due to the presence of sulphur and sulphurous acid. If, then, so small a quantity of the gas suffices to destroy a rank vegetable growth, the cholera, which is so much more numerous in the gunpowder factories in India than elsewhere, can be comfortably breathed, may fairly be expected to destroy minute organic poisons and germs. For disinfecting hospitals, prisons, schools, and private houses not occupied, nothing is required beyond burning sulphur with closed windows and doors, as recommended by the health officers. Charging the room with steam would probably facilitate the disinfection by condensing on and precipitating any floating particles of cuticle or other matter. For local applications, solutions of the gas in alcohol are recommended. Mr. JOSEPH GAMGEE, are useful; and for disinfecting water-closets, drains, &c., sulphur highly saturated with the gas—and it takes up a very large quantity—would answer very well; but some of the other disinfectants are probably more convenient for this purpose.

— The COCOA-NUT PALM is always an interesting plant, whether we consider it in the light of its great economic value, or as a plant of difficult cultivation in our islands. A few words on its history and cultivation in Sumatra, gathered from the late Dr. MUEHLER'S "Introduction to the Prodromus Florae Sumatrae," may not be without interest. Its area is limited only by the lower temperature of the higher hill country; everywhere else it luxuriates, and is universally planted, occupying a position of importance next to Rice. At an elevation of 3000 feet the Cocoa-nut ceases to bear fruit, and appears to be beyond the range of sufficient heat. Nor does it flourish in the lower lands when not protected from inundations; it then becomes sickly, and a prey to the ravages of beetles. The nature of the soil has also some influence on their health, for in some places, which are not subject to inundations, the trees often languish, and are destroyed by beetles, but in another part of the same district, notwithstanding that the ground lies very low and is waterlogged, the trees flourish by the sandy nature of the soil, the clayey stratum being there interrupted. All this confirms what RUMPHIUS, and, after him, MARSDEN, has recorded, that the Cocoa-nut loves a sandy soil. It is not only around the farms that this tree is found, but also near the seaports and maritime places. Where there is a great demand for food it is planted in abundance. It grows well in low sandy soil, near the sea, where it bears fruit in five or six years, whereas in only does so after seven to ten years in clayey soils. From the coast inland it decreases in rapidity of growth, owing to the diminution of temperature, and it then only bears fruit when it is full grown, whilst along the coast a child can gather the fruits. In more elevated situations it no longer bears any fruit at all. The small neighbouring islands are everywhere covered with Cocoa-nut Palms along the coast. In consequence of the germination of the nuts accidentally transported by the waves, in the same manner as is the case on the coral islands of the South Pacific and the Indian Oceans. The fruits appear to be used by the natives everywhere as food in almost every conceivable way, as in other

countries, and it is also extracted; but the stems, the fibres from the stems, the leaves and husk of the fruits are not made use of in Sumatra as in other parts of the tropics.

NEW ZEALAND FLAX.

ATTER numerous attempts, extending over many years, to make New Zealand Flax a marketable article in European commerce, there seems at last some prospect of its taking a place amongst our imported fibres. The article is pretty well known to our fibre dealers, for it has occasionally been shipped in small quantities, always fetching a high price, and generally acknowledged for its superior quality. No one has ever had the least doubt as to the actual value of the fibre itself when once properly cleaned; the difficulty has been in the process of cleaning. A great many machines have been introduced into New Zealand, but all have failed until in 1867 a machine was produced, which was so far perfect as to considerably lessen the time and cost in cleaning and preparing the fibre. We are glad to find that the subject is being made one of interest in the colony, for notwithstanding that much has been written and said about it, no one, we think, has so well spoken as Capt. F. W. Hutton, in a lecture on New Zealand Flax, delivered before the Auckland Institute last July. A few of Capt. Hutton's own words will help to hear out the truth of our assertion:—

"In commencing the study of any manufacture with the view of trying to improve it, it is advisable, indeed necessary, to examine carefully the processes which have been formerly used, and try to discover the reasons for each; and when we turn to the manufacture of New Zealand Flax we find much to guide us in the haphazard observations and experiments of the Maoris, for they produced a fibre from their best plants of a purity of colour few European fibres can equal, and the Maoris are capable of producing a material of that oiliness of feel and glossiness of appearance which is seen in their best hand-prepared 'thore.' The Maoris used two different processes for different kinds of Flax. With the best kinds (thore) they simply took the flax, rubbed it with their hands to open the bundles, and removed the small quantity of tissue that remained, by scraping it with their nails. The inferior kind (haro) they first scrape with a shell, having sometimes previously steeped it in water, to soften the skin; they then soaked it in the water for from two to four days, then beat it with their hands, and then scraped it again; then soaked it again, and then bleached it, and dried it on poles, and they then beat it with sticks to remove the remaining tissue. It will thus be seen that the chief features of the system they employed for the commoner kinds of Flax are very similar to those which we now employ, for in both the fibre is first cleaned by mechanical means from the tissue of the leaf, it is then soaked in water, dried, and beaten before sending to market, and those mills which depart from this system, either by boiling their Flax, or by only rinsing it in water instead of soaking it, produce an inferior quality of fibre. We have, however, no process as yet that answers to beating on stones while wet, and I have not yet satisfied myself as to the object which was intended to be attained by this process. It might have been to break up the fibrous bundles and make them more silky, or it might have been to break up the cellular tissue that remained, so as to allow the contents to escape in the second soaking; or it might only have been to help the removal of the tissue by the hand and scrape of the flax. If the latter be the case, it would be worth while to try to discover a process by which we could also effect it, but in a more economical manner; but if either of the latter was the object, it would be unnecessary for us, as our machines, by one process or another, would produce fibres much better than both the scrapings of the Maoris.

"If, however, science has not as yet improved upon the system, it has generally improved upon some of the processes that they followed, and the speed with which the fibre is cleared from the tissue has converted an unprofitable employment into a profitable one. There is, however, still a wide field for scientific observation and experience in the manufacture of Phormium fibre.

"The Flax plant is well known to be highly variable, but no attempt has as yet been made to describe these varieties in a scientific manner, and consequently great confusion exists among the names. At present, the colour of the leaf, and more especially the colour of the midrib and margins of the leaf, have been taken almost exclusively as the distinguishing marks of the different varieties; but these are altogether unreliable, for not only do the colours of the margin differ in old and young leaves, but often different leaves of the same plant, and even different parts of the same leaf, have differently coloured margins. The attempt, for instance, to distinguish a 'thore' from a 'haro' or orange margin, would certainly lead to many mistakes, and the same may be said of common swamp flax have margins identical in colour with true 'thore'; and it appears that habit of growth, shape of the leaf, size of the flower-stalk, and shape of the seed-pod, are far more important than colour of margin, or even colour of leaf of the plant.

"There can, I think, be no doubt but that at least two distinct species of Phormium exist in these islands. Dr. Hooker, in his 'Handbook of the New Zealand Flora,' admits two; although at the same time he expresses an opinion that they are varieties of the same plant. His opinion of so distinguished a botanist must carry with it great weight, but it is quite possible that even he may have fallen into error through not having had sufficient opportunities of examining the plants in their living state, and having, in consequence, been misled by specimens with wrong names attached to them. Indeed, it seems almost certain that such has been the case, for he describes the pod of P. Colensoi as similar to that of P. tenax, but

smaller. It is of considerable importance that the existence of these two kinds of Phormium should be recognised, for they produce fibre of very different strengths.

Captain Hutton then describes the four most important varieties, namely, the Harakeke, or common swamp Flax; the Paritawha, or yellow hill Flax; and the Tihore, all forms of *P. tenax*; and the Whararika, the best and strongest variety of *P. Colensoi*. In the province of Auckland, *P. Colensoi* is rare in comparison of *P. tenax*, but in some parts of the South Island the reverse appears to be the case. The variety known as tihore seems the most valuable for all purposes, but the kinds that should be cultivated would depend upon the nature of the soil; for swamp Flax of excellent quality could be grown in places where the superior tihore would hardly live.

The quality of the fibre of *P. Colensoi* seems to vary considerably in the different soils and situations in which the plants are grown; in the North it appears generally very inferior, but there appears reason to suppose that in the South it yields a fibre of the highest quality. The leaves of the different varieties of New Zealand Flax vary from 3 feet to 14 feet in length, and from half an inch to 5 inches in breadth in the widest part of the leaf; so tall, indeed, and bushy do the plants grow in favourable situations that it is said a man on horseback is easily obscured by a single plant. They appear to grow all the year round, but more rapidly in spring and summer than in autumn and winter.

What is always spoken of as the gum present in the leaves of New Zealand Flax, and which is the great obstacle to its proper and rapid cleaning, Captain Hutton shows to be of three distinct kinds.

Firstly, an actual gum found only on the outside of the upper surface of the lower parts of the leaf. It swells but will not dissolve in cold water, but readily does so in boiling water, and it is also easily removed by mechanical means.

Secondly, a bitter principle and a mucilage contained in the cells. The former, it is thought, might be used as a dye or stain for wood, for on allowing a strong solution of it to stand for some days, a brown insoluble substance falls to the bottom, much in the same manner as indigo, and if it should prove of any value at all, the cheap rate at which it could be prepared at or near the mills ought to secure it an extensive sale. The mucilage is easily removed by soaking the fibre in running water for three or four hours.

Thirdly, a kind of cement, which holds the fine fibres firmly together in bundles. It is insoluble in cold water and acids, but dissolves slowly in boiling water and alkalis; therefore, while the gum is removed by the action of acids, the cement is not affected, and the strength of the fibre consequently unimpaired. "It will thus be seen that the strength of the fibrous bundles depends entirely upon the cement that holds the ultimate fibres together; and if this is dissolved, either by hot water or alkali, the whole would separate into a mass of fluff, with no coherence or strength, the fibres of which it was composed being under half an inch in length."

A quantity of New Zealand Flax specially prepared for the European market attracted some attention in London a few months since, and realised from £27 to £41 per ton; and though at the time the particular attention of spinners, and those engaged in the linen trade, was drawn to the fibre, it is considered by experienced persons practically acquainted with the fibre in New Zealand that it will never be able to compete with European Flax or other fibres used in the manufacture of fine textile fabrics requiring bleaching, though it may be found useful for the coarser unbleached fabrics, such, for instance, as sail-cloths. It however appears principally adapted for ropes, twine, cordage, &c., and for such purposes may worthily compete with Manila Hemp, and fibres of that class. *John R. Jackson, Kew.*

COCCI OF THE ORANGE TREES.

COCCUS LIMONII, *n. sp.*

At the meeting of the Scientific Committee of the Royal Horticultural Society, on January 18 last, Mr. Alfred Smees submitted some Lemons attacked by a Coccus, which he believed to be undescribed, and which this year, for the first time, had done much mischief to the Lemon plantations in Sicily. The Committee referred it to me to examine and report, and the circumstance has suggested to me that it may be useful for the readers of the *Gardeners' Chronicle* to have a brief account of different kinds of Coccus that are known to attack the different species of Orange tree, including the present remarkable novelty.

The Cocco that have been found on the Orange trees are five in number, and belong to two different sections—the one of which (*Coccus proper*) is characterised by the female having a swollen bag-like body, without limbs or apparent articulations, and the other (*Lecanium*) by the female having articulations and limbs. Both live under a limpet-like shell, of different form and appearance in every different species, and which is either the extended skin of the back of the female below, or something exuded from it. The species are the following:—

1. *Coccus Limonii*, *n. sp.*—The new species exhibited by Mr. Smees.

Like Mr. Smees, I have failed to find any notice of

this in any entomological work, and the appearance of the fruit attacked is so remarkable, that if it had been previously observed at all, it is almost certain that it would have attracted attention, and been prominently noticed.

The Lemons exhibited by Mr. Smees looked exactly as if they were suffering, or just recovering, from a very bad attack of the smallpox, and as if the inflammation around the pustules had not yet disappeared—only the colour, instead of being red was green, and deepest towards the middle, the rest of the Lemon being of its usual yellow colour. Fig. 70 will give some idea of its appearance.



FIG. 70. Lemon affected with Coccus.

Since receiving the specimens brought by Mr. Smees, I have heard of others being met with in shops throughout the country, and generally described as being an ugly mottled colour instead of bright green and yellow, and some of them quite covered with the scales. It has been suggested to me that this difference may be due to their coming from a different habitat, which, if correct, would be interesting as indicating a simultaneous appearance of the creature in more countries than one, but I rather imagine the difference in appearance to be due to the Lemons having been longer or drier kept in one shop than another, for I observe that Mr. Smees's green and yellow ones lose their green colour and assume this mottling after they have begun to dry up.

Mr. Smees pointed out (see *Gardeners' Chronicle*, (p. 77)) that the skin of these injured Lemons would neither take up salt nor sugar. I may add that the juice of the Lemon itself has lost its aromatic smell and taste. It still effervesces in saline draughts, but its flavour is gone. The skin is thicker where the insect rests, but I can see no other change.



FIG. 71.—Coccus Limonii.



FIG. 72.—Rostrum of *C. Limonii*.

The Coccus scale is a round flat white disk, a little darker or brownish in the middle. On raising the scale the insect is seen below, apparently in no way connected with it. I have only seen the female, but in all stages. It is a pale semi-transparent slightly yellow bladder or bag, without limbs, but with a rostrum buried in the skin of the Lemon. In some of the larger specimens all trace of segmentation or articulation was gone—in others there was a faint trace of the usual insect rings, with two faint longitudinal channels along the middle of the back, which then seemed to have something like a faint double row of small tubercles. Generally speaking, however, it looks just like a fleshy bag with irregular corrugations (see fig. 71). The rostrum, on being withdrawn, appears to be simply the mouth of the bag, with a quantity of transparent hairs or fringe of ragged threads about its opening, but on pressing the instrument represented in fig. 72 is to be seen, probably a double-acted piston, at any rate a double-barrelled sub-ventral tube, each tube with two fork-like branches at the root.

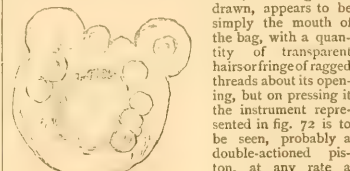


FIG. 73.

The whole of the instrument, except the tips, is faintly longitudinally grooved or marked with lines.

Under the larger scales the insect is occasionally seen to be surrounded with eggs, and in other cases I

have observed several young Cocco in their scales already settled below the mother-scale, as shown in fig. 73. *A. Murray.*

THE AMATEUR GARDENER.

Spraying Bulbs: The Crocus.—Those who love gardening for its own sake, and those who regard the art as merely affording a pretty appendage to a residence during the pleasant months of the year, are generally distinguished clearly enough by the aspect of their gardens during the early spring—say from the beginning of February to the middle or end of April. There may be neatness in both cases; but the garden of the latter will have a dull and blank appearance during that period, while that of the former, the real amateur, will put on as bright an appearance in the spring as in any part of the year. There are many flowers which shine out gloriously under a spring sun—the Hepaticas for instance; but we shall leave these for the present, and also the Hyacinths and early Tulips, which come later, and confine ourselves to the Crocus as eminently adapted to make a garden beautiful and attractive in February and March. With us this flower has been in its glory for a fortnight, and will be so for ten days more if wind and rain do not make an untimely wreck of them. Besides clumps of the flowers scattered here and there, our longest path is bordered with them, every variety procurable, from the yellows, which bloom the earliest, to the white, cream-coloured, and blue, the latter varying from a light cerulean to a dark purple, and most of the kinds striped in various shades and degrees. This collection began to be gathered together about ten years back, and has during that time been enriched with many seedling varieties, as they have been presented to the public by the Dutch growers.

Few visitors enter our garden at this season without an exclamation of surprise at the gay beauty of the scene, and a resolution to cultivate the Crocus in future for the benefit of their own domains. But then comes the difficulty, the large number necessary to be planted to produce a similar effect. A clergyman visited us one Ash Wednesday, when the sun was bright and warm, and he was so struck with the gay appearance of our parterres, that he said, "Where can I get the roots? I will get a few hundreds." As his garden was as large as our own, and quite as well fitted for the spring decoration, we told him that hundreds would not do, but that he must extend his purchases to thousands. This, we could see, had a damping effect, and his garden never received the contemplated improvement. We must say at once, that it is only a liberal planting of this flower which will produce the results we are writing about; for it will take about a thousand roots to make a good show in a circular bed of about 4 yards in diameter, if planted thickly and close to the circumference. We take up our Crocuses once in three years, and the last time we did so, our stock amounted to between 30,000 and 40,000, large and small, besides the siftings, which seemed innumerable, and which were sown broadcast in the rows at the time of replanting. It should encourage gardeners to be liberal in their original purchases of this flower, to know that there is no better investment, since the average increase is three flowering roots for one yearly, besides small corms which rapidly grow larger.

We prefer mixing the colours, but others like to keep them separate. A border, either in a straight line or circular, with the colours kept distinct, would certainly be a fine sight, but the trouble would be greatly increased. Our plan has always been to plant with the Crocuses, Hyacinths, Tulips, early and late, and Pheasant's-Eye Narcissus; and by that plan we have a pretty border from February to the middle of May. In the latter month, too, as the summer advances, we intend to occupy the borders in the summer, sometimes Stocks, at others Asters, or the two mixed together. Last year we had patches of Everlastings, the Helichrysum varieties; but although they bore us an abundant crop of fine flowers for winter use, they looked weedy and shabby in the foliage, and we shall not repeat the experiment. The finest successors of the bulbs are the various sorts of Pelargoniums, which improve as the year goes on, and are only despoiled of their beauty by early frosts.

The fine sorts of Crocuses do well in pots. Nurserymen publish every year a number of seedling varieties, and this spring we have had 30 sorts in pots. Some of them are exceedingly beautiful, especially the striped varieties, with a white or pale blue ground. But out of these 30 named sorts there are not more than ten so distinct as to be worth keeping up, the others being scarcely distinguishable from those well known. In potting, we use 3½", and put six in a pot. The pots must be bedded to the brim, and have all the rains which fall, and may be brought to the windows when the colours begin to show. *H. B.*

ENGLISH PARK SCENERY.

The magnificent parks associated with the mansions of the nobility in this country have in all ages excited the admiration of foreigners. Even the American, with his almost boundless expanse of "rolling prairie," has been struck with their extent and general grandeur of appearance. Oaks, Beeches, Ash, and Chestnuts of colossal size; avenues of Elms, with branches inter-

laced so as to form living gothic arches; lakes, if not so large as Michigan—from which Niagara is chiefly fed, at least of size proportionate to other features in the landscape of which they form a part; herds of deer quietly browsing under sylvan shade; these together with charming undulations of surface, rich verdure, and the numerous other objects of interest that are brought here and there prominently into view in the course of a drive to the mansion, all deservedly claim universal approval. When Waverley wished to give Fergus MacIvor some idea of his uncle's park at Waverley Honour, he said, "It rather resembles a forest than a mere park;" and doubtless in ancient times, when timber was of less value than at present, parks were heavily wooded. The forest character, however, has long since given place to beauty in the shape of picturesque scenery, for the most part the creation of such men as Brown, Repton, Loudon, and others, to whom we are indebted for many charming pieces of artificial landscape.

But it is to Kensington Gardens that I now more particularly wish to direct attention. These, taken in connection with Hyde Park, may be considered to form one of the most rural, and at the same time most fashionable promenades in Europe; while the parti-

cular view which I have selected for illustration, must have formed a subject of admiration to all who have had an opportunity of seeing it. Let us suppose that the beholder is standing on the drive in Hyde Park leading from Victoria Gate in the Bayswater Road to the Serpentine Bridge, the first thing that will attract his attention is the Royal Palace of Kensington, the birthplace of our Queen, in the distance, and of which, owing to its somewhat sunken situation, no such favourable view can be obtained elsewhere.

Until very recently, the gardens here were cut off from the Park by means of a ha-ha, or sunk fence, which, however, is well removed, inasmuch as both Hyde Park and the gardens in question now equally form one great public recreation ground. Between this point and the Palace is apparently a long uninterrupted glade or vista of grass about 60 yards in width; this, as shown, seems to be unbroken, but in reality it is not so; as, sleeping in the hollow or low level of the middle distance, are the waters of the Serpentine, although they are concealed from view from the exact spot from which our observation is made. The treatment of the wood or plantation on either side of this vista is most satisfactory. It consists of some fine timber trees, broken up sufficiently to prevent their giving to the glade before us the character of a formal avenue, and yet not so much scattered about as to destroy its unity of expression. In the summer time these gardens are thronged from "early

morning till dewy eve," with thousands of gaily dressed Londoners, who enjoy themselves as much under the grateful shade of these trees as if they were miles in the country.

In the composition of this view three materials are, professionally speaking, employed, viz., ground, wood, and a building. The formation of the ground is always important, being either convex, concave, or a plane. By combinations of these are formed all the irregularities of which ground is capable, and the beauty of it depends on the degrees and the proportions in which they are blended. Both the convex and the concave are forms in themselves of more variety than a plane. Either of them may, therefore, be admitted to a greater extent than can be allowed to the other; but levels are not, therefore, wholly inadmissible. These principles in the case of Kensington Gardens have received little illustration, inasmuch as nothing in the way of art seems to have been employed in improving the surface of the ground.

Planting within view of a mansion should always have ornament for its principal motive. The disposal of trees in a park, either singly or in groups, should be regulated by the views from the principal apartments of the house, so as to avoid obstructing any desirable

houses recently put up there, which are sadly out of place; they nevertheless contain some 300,000 bedding and sub-tropical plants for summer decoration.

Hyde Park and Kensington Gardens have been rightly described by men of taste as open country ornamented with timber, fountains, lakes, and streams, embodying as much variety as is to be found in the heart of one of our best English counties, and affording as much seclusion in some parts at certain hours as if one were on a farm in "Old Virginia." The whole has been treated with a broad and noble appreciation of natural beauty quite different from what one finds in public parks either on the Continent or even, as yet, in America. This it is which makes our parks doubly refreshing to townspeople, tired of straight lines and formal streets, while the contrast heightens the natural charm. Hyde Park and Kensington Gardens, taken together, contain nearly 800 acres, is it therefore to be wondered at that foreigners look with a sort of bewildered astonishment at the vastness and wealth of a city which can afford such a space for the pleasure of air and exercise of its inhabitants?

The broad glades and shadowy lawns in Kensington Gardens afford more privacy than Hyde Park; they are, therefore, more the resort of pedestrians, and



FIG. 74.—A VIEW IN KENSINGTON GARDENS.

scenery. A few trees may, consistently with beauty, be dispersed singly; but where grouped they should present no regular form, nor be too much crowded or forest-like. However they may be planted, they should partake of what is considered rural beauty and simplicity. The planting in Kensington Gardens is ancient in style, but is nevertheless very appropriate to the situation; the trees, as a rule, are in straight lines, forming broad avenues and groves, and afford protection from the scorching heat of a summer's sun and also shelter from wind, while wide open glades of grass, such as are to be found in one view complete in itself, and form enjoyable promenades when shade is not required. Through these glades, too, suitable views of Hyde Park, even as far as Park Lane, can be obtained.

The Palace, which forms the building seen in the distance in the sketch, is perhaps not so appropriately situated as it might have been, but still it is snug and retired considering its proximity to so large a town as London. The building itself is in the Elizabethan style, and, like most such structures, the park-like gardens coming close up to its walls; more recently, however, a small flower garden has been formed in front of it, which is enclosed with an iron fence. It is square, and is decorated with flower beds round the margin, simple in form, but nevertheless suitable to the character of the ancient building with which they are associated. Not so, however, the series of little glass-

especially form the recreation ground of hundreds of children, who enjoy the green turf, shaded in places by ancient Elms, the growth of centuries.

In style, Hyde Park is what may be termed the old English picturesque, simple and unique, without sensational effects, while Kensington Gardens exhibit a little of the Dutch.

The annexed sketch may be taken as a representation of park scenery such as few who are unacquainted with London would expect to find so close to a city of such gigantic proportions.

On some recent alterations rendered necessary by the erection of the Prince Consort's monument, now almost completed, and also on some other new features recently introduced into these gardens, I may have a word or two to say on a future occasion. J. Newton, Oxford Terrace, Hyde Park.

Home Correspondence.

White Lady Downe's Grape.—A *bona fide* acquisition in Grapes, especially in late keeping sorts, is something that all Grape growers will gladly hail. I had the good fortune to see White Lady Downe's in September last, and again last week at Dalkeith, hanging on Vines contiguous to some of the black variety of the same name, and they are undoubtedly a well-

matched pair. With the exception that the berries in the white sort had changed from the denser colour of fruit newly ripened, as they appeared in September, to a fine golden yellow, there was no perceptible difference when I saw them again last week; they are as well-conditioned now as they were six months ago, and I have no doubt but that Mr. Thomson will have both White and Black Lady Downe's in the autumn, and fresh in the end of April. The white variety is superior to the black in some important respects; the bunches, while of the same shape, are larger, not owing to any favour in cropping, for they were both cropped alike, and rather heavily, but the white is in all respects a more vigorous sort than the black, and, in my own experience at least, it is slower to start, coming away more leisurely and sturdily than even the other. It is superior also in flavour and in the texture of the skin—and flesh—the skin in particular is considerably thinner, and the flesh is more melting and sugary. I believe it is the best late hanging white Grape we have, and that no other will keep so well and long. It is unfortunate that a new grape so distinct and superior should be already confounded with and substituted by an old and inferior sort—Forster's White Seedling. That variety, which has been sent out in some cases as White Lady Downe's, is no better in its regards keeping at all than the Muscadine, and does not resemble White Lady Downe's in any respect. It is inconceivable how the two could be confounded one with the other, for they differ as much in growth, foliage, bunch and berry, as any two varieties of Grapes could well do. *Wm. Sutherland, Monto.*

Rhododendron Nuttallii.—Although "Amateur," whose letter appears at p. 310, only asks for advice from some of your professional correspondents, I am tempted to mention the glaucous kind of half hardy Rhododendrons, known as Nuttallii, to produce the splendid heads of blossom of which, unfortunately, it is so chary, he may yet be glad to hear how another amateur induced his plant to bloom, after waiting nearly five years, and being, season after season, disappointed by seeing growth and nothing but growth. Having a fine plant with three good branches, and my gardener being quite tired of seeing it do nothing but make vigorous shoots year after year, he at length determined to try an experiment with it, and accordingly, about the middle of July, when it had made its young wood for the year, he placed it behind the garden door, where, during nearly the whole day, the door was shut back upon it, and stopped all water, save what was necessary to life at long intervals, saying, "This treatment will either induce the plant to form flower-buds on the young wood, or will kill it." I am happy to say that the former alternative turned out to be the result of the treatment, and by the end of autumn, three fine flower-buds were set, one in each young shoot. Of these one damped off, but the other two opened, the one producing eight, the other seven beautiful flowers. I have succeeded in crossing two of these with the pollen of the orange variety, *Javanicum aurantiacum*, and have just now sown the seed produced from this hybridisation, which it is to be hoped will produce some new varieties in the course of some five or six years. *W. E. G.*

In answer to "Amateur" (p. 310), allow me to inform him that the method recommended by the Editors and the restrictive pot system are the best methods he can follow to induce this beautiful Rhododendron to flower. I have a very large plant in the conservatory here that flowered last season, and will do the same this. It was turned out-of-doors from the end of June until October. It is in a 20-inch pot, and has not been potted for several years. *E. Bennett, Enville.*

Grass and New Boiler.—It is some time since Mr. Fish was here, and in consequence he has only been able to make a general statement respecting my new boiler. I may, therefore, be allowed to supplement his remarks by giving a few statistics as to the quantity of pipe which it heats, in a similar manner to those supplied by Mr. Baines. This might be of some service to your readers, as I consider the boiler in question to be the most economical one yet used, and to save labour and fuel. In general we can leave it safely for ten hours if required, and from seven to eight hours in severe weather. This in itself, I think, no mean recommendation. I never have the fires banked up, nor do I use any damper, having instead a close-fitting sliding door to the ash-pit, which is regulated according to the amount of heat required, and the length of time we wish to leave the fire unattended. The first house which I have mentioned is a span of 16 feet, 11 inches, and the second is a span of 20 feet wide, and 15 feet 6 inches high, which is divided into three compartments. The first of these is 57 feet 6 inches long; the second, 47 feet 6 inches; and the third 45 feet in length. The latter division is heated by 12 rows of 4-inch pipe (540 feet), and we began forcing on December 30, the temperature maintained varying from 55° to 70°. The middle division has eight rows of pipe (376 feet), and we commenced forcing on February 1, at a temperature ranging from 55° to 70°, afterwards increasing it from 65° to 80°. I now come to the orchard-house, which is 100 feet long, 25 feet wide, and 18 feet high, and in which we have roofed viney 150 feet, 20 feet wide, and 15 feet 6 inches high, which is divided into the sides, and two at the

ends (640 feet). The temperature in this house was raised on February 1, and now varies from 45° to 65°. We have also three pits, 22 feet long, in two of which are four rows of 3-inch pipe (two for bottom and two for top heat); whilst in the other there are two pipes, only enough heat to keep out the frost being required. Two of these pits are respectively filled with Strawberry and miscellaneous plants, the third being just started with Cucumbers, and having in all about 260 feet of piping. In another late pit there are eight rows of 4-inch pipe (556 feet), together with a flow and return pipe through a viney to the boiler (319 feet), making a total of 2691 feet. One boiler was used to heat the whole of this, but we have now two in work, having put up another in December last. The dimensions of the boiler are as follows:—Length, 42 inches; width, 18 inches; and height, 25 inches. These proportions make a good-sized and well-shaped furnace, and any one who will put their hand in the ash-pit will soon become convinced of the value of having water under the fire as well as above it; besides, this arrangement gives 14 feet of flue round the boiler. If coal were used instead of coke it would be more powerful, and would require less fuel and attention, and if made of wrought iron instead of cast, I have no doubt it would be quicker in action and more powerful still. The boiler here is made of cast iron, five-eighths of an inch thick. I have had no experience with wrought iron, having always objected to it on account of its rusting when out of use, but I have lately seen two boilers taken out after much use and they were as clean as cast iron. I should like to have the opinion of some of your correspondents on the lasting qualities of wrought iron boilers, and also if the thickness of the metal makes any difference in the action. *W. Griss, Ely.*

Severe Frost in Scotland.—The night of the 14th inst. was one of the most severe frosts that I remember having ever witnessed for any single night at this advanced season. There were heavy showers of rain, hail, sleet, and snow during the day, and at 4 o'clock the snow began to fall regularly, and continued to fall for 7 o'clock, covering the ground to the depth of 4 inches. About 8 o'clock the sky was clear, and showed by the brightness of the stars that we were going to have an intense night's frost. On looking at the thermometer this morning (the 15th, 7 o'clock) I found both maximum and minimum registered 27° of frost. The thermometer stand is in the centre of the garden, 4 feet from the ground, and facing the north. This place is 14 miles distant from the Frith of Clyde, and 400 feet above sea level. *A. Pettigrew, Gr. to the Marquis of Bute, Dunfries House, Dumfries, N.B.*

Early Æsculus (Horse Chestnut).—I enclose for your inspection a young shoot of the above; the whole tree is getting fast into full leaf, while those within a few yards of it, and others on the estate, are no farther than the enclosed bud (No. 2). Is it a distinct variety, or have you accounted for it? I am almost sure it is the same every year, always a long way in advance of any others. *Edward Bennett, Enville.* [The case is not infrequent, and is only to be referred to variations of individual habit, like the famous Glastonbury Thorn. Eds.]

Asphalte for Garden Walks.—Will "A Country Clergyman" (p. 309) be so obliging as to give the exact proportions of the different materials he recommends for asphaltum garden walks, and a plain statement of his *modus operandi*? The objections, to me, of asphaltum as a material for garden walks have always been, first, its colour, and secondly, the expense of carriage of the necessary items of which it is composed, and that of mixing and spreading, &c., which would be considerably greater than simply getting and spreading gravel, or the best substitute for it within reach. I have never seen the new asphaltum which has been laid down in Cheapside and Holborn, and shall be further obliged to "A Country Clergyman," or any other correspondent, who will kindly say what is its colour. *C. F. P., The Grange, Kingston, near Taunton.*

Can any of your readers kindly say what is the composition of the asphaltum so much praised by "A Country Clergyman" at p. 309—that laid down in Cheapside and Holborn? *Ally.* [The asphaltum is a light cream, something like that of pale greyish Roman cement. Eds.]

Orchid Cultivation.—Many letters appear from time to time in the *Gardeners' Chronicle* on this subject, with all sorts of ingenious theories about them; but I do not often find amongst them any that account of the general behaviour of the plants under particular circumstances; and it is this only which can be of any use or interest to an Orchid grower, because they come from all sorts of different climates and situations, so that no two of them are alike in the treatment which they require, added to which cultivation in houses makes so much difference in them, that of two Orchids from the same branch, one will grow in a house as freely, or more so than in a native forest, whilst the other can hardly be kept alive; or perhaps one will grow best on a piece of wood, whilst the other can only be grown successfully in a pot with loam, and no peat or leaf-mould at all. I subjoin a few facts from my experience of particular species, some of which are very considerably different from what I have ever seen stated. Last winter one of my

houses got down to within a degree or two of freezing one night, with the following result:—Killed entirely: *Pilumna laxa*, *Eriopsis biloba*, *Odontoglossum citrosum*, *O. Insleyi*, *O. Phalænopsis*, *Cattleya speciosissima* (small plant); all these had matured their growth before the winter. Much injured (last winter bulbs being killed): *Cattleya pubulosa*, *Epidendrum macrochilum*, *Stanhopea Wardii*, *Bucephalus*; one or two other *Stanhopeas* which had not finished their growth; *Trichopilia tortilis*, *Dendrobium chrysotoxum*, *Lycaste* (?), like *L. lanipes*. Very slightly injured: *Cattleya speciosissima* (on a block), *Sobralia macrantha*, *Acropora Loddigesii*, *Anguloa Clowesii*, *Oncidium obryzatum*, one or two *Laelia purpurata*. Unhurt: *Cattleya citrina*, *Laelia albidula*, *L. purpurata*, *L. Perrinii*, *L. Odonatoglossum odontatum*, *O. Pescatorei*, *O. Bluntii*, *O. grande*, *O. triumphans*, *O. Uro-Skinneri*, *Brassavola glauca*, *Epidendrum vitellinum*, *E. erubescens*, *Stanhopea oculata*, *S. tigrina*, *Sophranites grandiflora*, *Coleogyne cristata*, *Lycaste Skinneri*, *L. cruenta*, *L. Deppii*, *Vanda cerulea*, *Maxillaria picta*, *M. Harrisoniae*, *Zygopetalum Mackayi*, *Acinetia Humboldtii*, *Oncidium flexuosum*, *O. crispum*, *Dendrobium speciosum*, *D. Hillii*, *D. densiflorum*, *D. nobile*, *D. chrysanthum*, *D. Cambridgeanum*, *D. Devonianum*, *D. Jenkinsii*; these last four were making young growths, which were in the tenderest possible condition, from half an inch to an inch long. The young growths were unhurt, and continued to grow all through the cold weather. Although so indifferently to cold, I find the young growths of *D. Jenkinsii* extremely impatient of wet at all times of the year. Some of them (*Oncidium crispum*, and *Dendrobium Cambridgeanum*) were grown in the hottest place in a viney, without any protection from the sun, all through the summer, and are in the finest possible state of health. *Cattleya pubulosa* also requires no shading from the sun, and *Dendrobium nobile* and *Cattleya speciosissima* scarcely any; *Sobralia macrantha*, which in its native country is said to grow in very hot sunny places, requires shading when grown under glass in England. I generally try all plants in the full sun until I see signs of their being the worse for it, because I am sure that, if it is not so, they will get the better of it. I have seen no signs of any of them getting the worse for sunbaking. No doubt most species of Orchids require more or less shading; and some, *Odontoglossum Bluntii*, for instance, should never have a single ray of direct sunshine, except perhaps during two or three of the darkest months of winter. *C. W. Strickland, Hildenley, Malton.*

Button-holes for the Boat Race.—Your correspondent "A. D." reminds me that *Scilla bifolia* and *S. sibirica* may not be in bloom on the day of the race. The former, I know, is already over in some places, but I hope *S. amœna* will be there to follow it. If *S. sibirica* has passed by, *S. nivalis* would supply its place, or, in its absence (and it is not a common plant), *S. italica* will doubtless be in flower. In addition to the blues already named, Cambridge can now command *Nemophila* in Covent Garden Market. I ought to apologise to the gentle *Myosotis* for omitting it previously. Some of the purple kinds of *Pulmonaria* are now out, and *Omphalodes verna* ought soon to be—both eligible for the university whose colour is that of the deep blue sea. The friends of the university whose colour is that of the distant sky would do well to search the greenhouses of all their acquaintances for flowers of *Witsenia corymbosa*. *W. T.*

Looker's Acme Garden Frame.—Some high sounding names are given to things very often undeserving of them; but I think Mr. Looker has not over-rated his invention by calling it Acme. It is a vast improvement on any I have previously seen or used. The light character of the earthenware chair causes it not to press so heavily on the ground as bricks; the ventilation at the top is so much improved, that the plants can be grown under them. I have one case fitted with *Cos Lettuce*, in itself quite a picture; and for plants of any description it is an admirable contrivance. Mr. Looker has lately made ends to his frames, which give a good finish to them, and no amateur's garden will soon be considered complete without one or other of these most handy contrivances. *Veritas.* [It is necessary to add that "Veritas" is a distinguished witness. Eds.]

Symphytum asperum.—I see one of your correspondents wishes to know who has plants of this. It is a perfect weed with me, and though very pretty I am obliged to banish it into the shrubbery. *H. Harpur Crewe, The Rectory, Drayton-Bauchamp, Tring.*

Raising Plants on Turf.—In noticing your correspondent's remarks at p. 309 I feel somewhat annoyed, being no doubt the person referred to in his attack, but I raise myself to let the missile pass underneath. However, at the same time I feel that the person as "A. D." has done so much to benefit the public, that he should be signing his name in full, or that he should be firmly branded, that people may better know him. All his remarks in reference to "a suspiciously northern signature" are uncalled for, misapplied, and, as any one else can see, for no good. His very first period carries with it the character of the writer in its heart. It is to be hoped for the future that "A. D." will not molest any

more men of respectability, and that they may be prepared for the doom that awaits him. To use "A.D.'s" own material lightly against himself, I subscribe myself, though I cannot pretend to be, *Suspiciously Northern*.

Soft Water Tanks.—"Think" may rely on these being made secure and watertight, if properly done. The Fine pits at Perdiswell had exactly such tanks made for bottom-heat, 4-inch pipes running through them, and during the seven years I was gardener there they proved perfectly watertight. *Ed. Bennett, Enville.*

—I would suggest that your correspondent "Think" should use packing-pipes (where they enter and leave his tanks) with vulcanised indiarubber rings or bands. *James McPherson.*

Visitors to Nottingham.—In answer to "Kalmia," allow me to inform him his wishes have been anticipated. So far as nurserymen exhibitors and visiting gardeners are concerned, I have already secured bed and board for 50 at the hotel most used by the gardeners of the locality, and at the same house a large room sufficient for the evening reunions will be placed at our disposal. At Oxford I had to pay for 6d. a night for the half of a bed, six in the same room, and get my meals where and how I could. Here I have arranged that all who send their names to me on or before June 20, shall be provided with three meals a day, bed and attendance, in the best hotel fashion, at 10s. 6d. per day. To this I think no objection can be taken, as the expenditure I will guarantee shall be first-class, and the charge speaks for itself. What the "authorities" intend to do in the way of entertainment I cannot pretend to determine, but from the constitution of the Visitors' Committee, I should say the *dilettante* hangers-on of the Society, those who can afford to pay, will alone be thought of, while the "real working men"—those who make the show—will be allowed their usual privilege, of taking care of themselves. For my own part I have no sympathy with the charity-crawling system of visiting a town. If the followers of a royal society cannot afford to pay their own expenses, better for them to remain at home than accept the hospitality of strangers. I know the British Association, in its visit to Nottingham, did not increase its *prestige* by the touting proclivities of some of its adherents, and for that reason I am anxious that the Royal Horticultural Society should stay upon the ground, and leave no stain behind. So far as my mind admits, I shall provide accommodation for my personal friends, and some of my neighbours interested in gardening will do the same on my recommendation. But were I a visitor to, instead of a resident in, the town, I should as soon think of seeking quarters at the union workhouse as of accepting a billet in the house of a stranger of whom I had no knowledge. Further, I may add, it is more tedious like that of a man of no entertainment of some kind will be provided one for the exhibitors, visiting gardeners, and their friends. Special trains will be provided to Chatsworth, the Dukeries, and similar places in the neighbourhood, and several of the manufactories where the Nottingham fabrics in lace and hosiery are made and prepared for market will be open, by card, to visitors. In the course of a few days I hope to have a small collection of neighbouring amateur and professional gardeners to act with me, and through the assistance of my friends here, to give a hearty reception to those professional friends who may come from a distance. Of this more anon. The complaint of "Exhibitor" is not an unreasonable one. The sacrifice of fruit through a four days' show is something lamentable, but is not altogether without a remedy. Both at Leicester, when the weather was exceptionally parching, and at Oxford, where the Society's *employés* sweeping the tents with about as much consideration for the plants, or fruit as ignorant men might be expected to exercise. There are, however, two ways of meeting this difficulty, first by throwing a sheet of scrim over the fruit and rare plants when the tents are closed for the night; and secondly, by copiously watering the gangways at the same time. I do not mean a sprinkling from a watering-pot, but a regular soaking from a small water-can provided for the purpose. This would be very different from the water thrown on the plants, and render the tents much more cool and agreeable to visitors. A little forethought of this kind may do much to remove "Exhibitor's" objection to a four days' show. Puffering fruit at great shows is something new to me. Here five years ago we had a large exhibition, and up to the close I had not a complaint of injury to fruit, though nearly 20,000 of the working class were admitted on each day. After the close the law of *modus et tenor* was not strictly observed, and fruit strayed into wrong baskets, and, to the disgrace of some of the exhibitors, hard terms were used. Dust, however, is the enemy most to be dreaded. *W. F. Ayres, Nottingham.*

Blue-spotted Woodpeckers.—Can any of your readers put me in the way of procuring the two blue-spotted woodpeckers, either through their gamekeepers or by any other means? I will willingly pay any reasonable expense that may be incurred in getting them; there are none in Scotland where we have keepers. My friend, Mr. Barnes, late of Bicton, sent me five just before he left, but I am short of the greater

and the less spotted woodpeckers. *Chas. Cadner, Stackstead, near Manchester.*

Potatoes Grown from Transplanted Shoots.

As the Potato planting season is coming on, it may interest some of your readers to be reminded of what I did last year with transplanted shoots. At the end of last season your were good enough to insert my process and success *in extenso*. It was shortly as follows:—When the Potato shoots were about an inch high, I gently pulled them out of the ground, and set them in rows, at the usual distance apart, and the result was, that from a row of transplanted shoots I obtained as large a yield as from a row put in entire. As several shoots can be taken from each Potato, I must claim economy as one advantage of my process. There is another advantage which is theoretical at present, but which I hope may prove to be fact—the prevention of disease. When the shoot is drawn out of the ground, a little tuft of roots comes with it, but not a particle of old Potato; my experiment has proved that this plant is capable of an independent existence, but if it had remained in contact with the old decaying Potato, it would have absorbed some of its degenerating juices. Might not these effete fluids form a centre of disease? Fever is produced in man by reabsorption of his own deteriorated secretions, and possibly the Potato may be subject to the same law, where we have the easy method of avoiding contamination. *A. E. Barrett, Grimston, Norfolk.* [The amount of produce was stated (1870, 1828), and this, with the experience of Mr. Barrett, recorded at p. 1316, 1870, should certainly induce growers to turn their attention to this subject. *Eds.*]

Proof of the Growth of Seeds.—A few days since I supplied a gentleman with some grass seeds for his lawn, and, to my astonishment, he brought me a pot sown with the above and raised in the "Waltonian case," which has come up thick and good. I think if farmers generally would try the above plan on Mangel, Turnips, &c., it would prevent much disappointment and expense, as the seed can be proved in a few days. *F. May, 35, Brydges Street, Covent Garden.*

Zinc Water-paint.—Some time since I copied out (I presume from *Scientific Review*) the different ingredients necessary for making water-paint. Having a quantity of painting to do every summer I thought it might be useful to me, and so I sent the experiment on my office in the house. I took the copy to a chemist to mix up a gallon of zinc water-paint fit for use, exactly as inserted in the *Gardeners' Chronicle*, when, to my surprise, the gentleman of the pestle and mortar said to me, "This gives a general idea of what is required to make water-paint, but the proper quantities for mixing a gallon of it is left for you or I to make out; it would cause me to make several trials before I could hit the proper quantities, which would probably make the paint an expensive and uncertain matter." Knowing what large quantities of different paints are annually used in the gardening world, I think it would be a great boon if your correspondent would state the proper quantities of each ingredient of this paint, for the benefit of owners of large gardens and horticultural establishments. *M. A. F.*

Fungophobia.—I have forwarded for your inspection two pieces of rootlets: the one is that of a Rhododendron, the other that of a Holly. Both, as you will observe, have taken firm hold of a bit of dead stick or piece of root, which appears to have been buried in the soil, and near the roots of the Rhododendron in question. The rootlets, you will observe, not only cling on, I should rather say, embrace, tightly the decaying tissue, but have made their way through the solid woody tissue, leaving intact, in both cases, a portion of the epidermis of the dead organisms. More beautiful illustrations of the process by which Nature, through the agency of the true organisms, assimilates those of the dead, could scarcely be desirable. How you "Fungophiles" can preach to us such doctrine as "Beware of bits of stick—the dead of Nature devours the living," &c., I am at a loss to know; and I am proud to be able to furnish you with this proof that the case is quite the reverse, for here is the process itself caught in full operation. Let Nature by all means go on as she has begun, burying her sticks and leaves; we may accept it as a process wisely arranged for our good. It has always worked well, and I fear we now live at a time too remote from the commencement of time itself, to accept doctrines which teach us to believe that natural laws are wrong. Because a Botrytis for a time devastated our Potato fields, and an Oidium our vineyards, why should a groundless alarm be raised about Fungi? I beg to thank Mr. Ingram for the high compliment he has done me by thus abusing me. I would never pass down the stream of time, dubbed a good culture, than a bad philosopher. A Prime Minister once said that he was guilty of the awful crime of being a young man. Could it be credited that the "education of gardeners" has already reached that stage of perfection when it also appears to be a crime for the modern gardener not to be a philosopher? *Wm. Miller, Combe Abbey Gardens, March 9.*

Seedling Vine, Carlisle's Canticle.—Can any one of your numerous readers inform me if the above

Vine is in existence—a seedling raised by the late Rev. Samuel Hanna Carlisle, of Romford, in Essex, which was sold at his sale on December 16, 1841? Any information as to its whereabouts will be esteemed a great favour by *Bruce Carlisle, Dumfries, N.B.*

Gardeners' Discount.—Your leader of March 4 has struck a chord which I hope will not cease to vibrate till amongst us the custom of percentage be unknown, and bribery and corruption left to members of Parliament and other honourable gentlemen. I fear that my class cannot do much. We are struggling amongst ourselves for the crumbs that drop from the table of the leviathans of the trade, and dare not run the risk of losing a single order. It appears to me that the chief difficulty lies in the view taken of the custom by gardeners themselves, and their feeling will be the better understood from the following reminiscences than by any explanation I can give. A. B., who is now head gardener at a good establishment, went for his first place to a customer of my predecessor; in due course the account was presented, and submitted to the gardener for verification. He requested that he might be allowed to pay it, as the trade allowed something to the gardener on payment of the account. The gentleman paid the account himself, but said that the gardener expected something, and asked if he should take it; he evidently did not see anything wrong in the one paying or the other receiving. My predecessor was a very good terms with a gardener named Smith, and had done so for some fifteen years. One day, in the course of conversation, Smith informed him that he knew of several gardeners who did not deal with him because they had been told that he was backward in the payment of percentage. On another occasion a young man who had been put into a good situation applied for percentage before he had been at the place six months, and, because the result of his application did not answer his expectations, wrote a letter, resulting later in a long and angry correspondence. I then, for the first time, was reminded to me to remember that on one occasion lately percentage offered as delicately and as weightily as I could, was refused. Your suggestion that gentlemen should pay their own accounts, will not tend to destroy the practice you denounce, at least not in a great degree. For my part, I can ill afford to lose a customer, but can worse afford to carry an uneasy conscience, and will take care that when no percentage is given the customer shall receive a corresponding letter. It is ridiculous to me to remember that on one occasion lately percentage offered as delicately and as weightily as I could, was refused. Your suggestion that gentlemen should pay their own accounts, will not tend to destroy the practice you denounce, at least not in a great degree. For my part, I can ill afford to lose a customer, but can worse afford to carry an uneasy conscience, and will take care that when no percentage is given the customer shall receive a corresponding letter. It is ridiculous to me to remember that on one occasion lately percentage offered as delicately and as weightily as I could, was refused. 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there is nothing wanting. This year, too, the disease slightly manifested itself in the late vinery here, from the very same cause. I have, therefore, determined henceforth to cut the Grapes about the first week in December, and preserve them in bottles according to the French method, as a safe expedient to avoid the evil. Some which I cut at the above date have been still in very good condition. I have also endeavoured to prove that the principal cause of this evil centres in an impoverished condition of the Vine; and the cases I have cited in proof of the same should lend some weight to my conclusions. I will now wind up by stating another fact in connection with this subject, viz., "the restrictive principle of Vine growing will produce a very much larger percentage of shankers than the extension system;" the why and the wherefore I leave your readers to surmise. *Thos. Simpson, Bromfield, Cheshire.*

Camellias.—In growing these for dinner-table decoration I have produced the best plants in a compost consisting of two parts loam and one part of peat, to which a little coarse white sand and pounded charcoal was added. I pot them about the middle of March, use plenty of drainage, and press the compost firmly about the roots. I place them in a nice growing temperature of about 60° to 65°, and shade them from bright sunlight until they have finished their growth. They are then gently hardened to the full light, and are placed out-of-doors for a couple of months in a position where they are somewhat sheltered from the mid-day sun for the first three weeks. They are afterwards fully exposed, and care is taken to keep the pots free from worms, to give water when they are nearly dry, but never to allow them to become either too wet or too dry. The plants are placed under cover about the third week in September, are afforded plenty of air night and day, except in frosty weather, and are slightly syringed once a week to keep the foliage clean. If wanted in flower by the middle of December, the house containing them must be closed early in the afternoon, and the plants must be syringed daily from the commencement to November, as much fire-heat as will keep the night temperature about 50° must be applied, and the syringe must be kept going when the sap is in motion, though the expanded blooms should be wetted as little as possible. Under this treatment they do well if kept free from insects, and a fair number of buds is allowed to expand, say one to each shoot, and two where luxuriant. *V. R.*

Horticultural Boilers.—The excellent article on horticultural boilers (p. 235) by Mr. Baines, will, I hope, open the eyes of many intending purchasers of new boilers as to the kind they ought to select. The many monstrosities advertised yearly in the shape of new boilers, no doubt render it puzzling to gardeners and amateurs to choose the best one, especially as they are all said to be infallible in their working. In the late severe winter I have had the opportunity to put a severe test, and they have gone through without a flaw in the working. They are on the old saddle principle, made of rivetted iron, and have been in use 11 years, and, with the exception of two or three defective rivets, they have wanted no repairs since erected. Three of these boilers are placed side by side, working into one flow, and the number of feet of 4-inch piping for top and bottom-heat, and of 6-inch piping for the return, and nothing more, has been accurately measured. These boilers will burn anything in the shape of sifted ashes, small coals, or coke rubbish, and I contract with a colliery in the neighbourhood for their small coal at from 3s. to 4s. a ton, according to its size. Of course if I had to replace these boilers with others, I should select the flued saddle, as I have no doubt, from what Mr. Baines writes about it, that it is the most economical and efficient boiler yet invented. *William Toller.*

In the *Gardeners' Chronicle* of June 13, 1868, you gave illustrations of two boilers which had been designed and used by my late much respected friend, Mr. O. Rhodes. Mr. Rhodes improved upon these, and designed oval tubes as presenting more surface to the fire, and being also more economical as regards consuming fuel. Five of these were, I believe, erected at the gardens of Ambrose Bassett, Esq., Clapham Common, and perhaps Mr. Baker would kindly tell us how long they have been in use, and how they succeed. Two of the round horizontal tubular boilers were used to heat some houses at Leyton, the residence of F. G. Wilkins, Esq.; perhaps Mr. Ward will also tell us how they stand the test, both as regards utility and economy of fuel. Mr. Rhodes erected many more, but his early death prevented their being brought more prominently before the public. I have bought the boiler, which he termed the Horizontal Flue Tubular boiler, was pulled out to erect another, as an experiment. This original one, I hear, was sold at his sale for £2; if the purchaser has used it, perhaps he will also give his experience of its use. My predilections, from long observation, have been always in favour of horizontal in preference to upright boilers, and I trust, now the memory is charged with the experiences of the late severe weather, something may be elicited as to the most useful for general and continued work. *William Hale.*

New boilers, like new Pelargoniums, will, I fancy, soon be at a discount, for until we really find one far in advance of any now in use, we shall not feel

inclined to remove those that have done us good service, for new and untried ones. I have 12 saddles of various descriptions and one upright tubular boiler at work here, and contrary, perhaps, to expectation, I certainly find the tubular the most powerful and economical of them all, so that I have during the past winter wished in my heart they were all tubular. The other day, when at Worcester, a new boiler, made for the Earl of Berkeley, by Messrs. Jones & Roe, Broad Street, was just leaving the establishment; it was a welded wrought-iron one, of large size, and certainly had the appearance of being a most powerful and sensible-looking boiler; but as the makers have not patented it yet, I am forbidden to give any description respecting it. No doubt Mr. Westland will tell us all about it when he has proved its efficiency. Again, Mr. Cannell has favoured me with a very accurate description of one will shortly be in the market, which bids fair to be the boiler of the day, and if I am not mistaken, will, like his Vine extension system, a step far in advance; others, no doubt, will soon find their way into the field, but unless something better than either of the above, the makers will do well to keep them at home. *E. Bennett, Enville.*

Propagating Azaleas.—My experience in the culture of Azaleas has been principally in Belgium, a country which is considered by most people to be in a flourishing condition as regards horticulture. The Belgians have almost entirely given up the system of propagating Azaleas by cuttings, saying that it is at best a faulty one, as they require so much smothering under bell-glasses, during which process much of the damp off, added to which many of the finer varieties have not the stamina to produce free-growing plants; therefore, instead of cuttings they propagate almost exclusively by grafts. The stocks employed are raised from seed (collected from the most vigorous varieties), which is sown in pans filled with fine leaf-mould, mixed with a little white sand. The seedlings are pricked out into fresh pans as soon as they are well up, and nicely developed cotyledons, care being taken to avoid breaking the stems, and they are carefully repotted two or three times, till they are large enough to be potted separately. The manner of grafting employed for the Azalea is the cleft graft, or, as the French call it, *greffe en fente*. The strongest stocks are grafted in the month of August, the graft being placed on the new wood, and taken with great facility; the weaker ones are grafted some weeks later, on the last year's growth. After grafting they are placed under light in a warm house, the roots being kept in slanting position, with the graft uppermost, or towards the light. When they are well taken the wrapping is undone, and the plants are staked, to prevent the grafts breaking out; straightening is generally needless, as the seedlings grow as upright as possible. The second year after grafting the plants are put out into beds on the approach of summer; these beds are raised on the earth, being taken out to the depth of 10 or 12 inches, and the sides enclosed by an edging of boards; they are filled with well decomposed leaf-mould, in which the plants are plunged, *sans pots*. To protect them from the excessive heat of summer, and also from early frosts, they are shaded by boards made into squares about the size of ordinary frame lights, and supported by a simple inch rail running round the bed, and sustained at intervals by props. During the autumn many of the best plants are sold and packed off with the balls of earth just as they are, and the remainder are taken up and potted for the winter. This is the manner in which I have seen them cultivated for sale, and I think the system has many advantages, amongst which are obviously these: that you get more vigorous plants, in a shorter time, and generally longer lived ones than those grown from cuttings; added to which you may flower your seedlings before grafting them, and with have the chance of raising new and sometimes very valuable varieties. Amongst the seedlings shown last year at the Brussels exhibition were many which will greatly enrich our collection of these beautiful plants. *A. H. Pearson, Chitwell.*

Foreign Correspondence.

PARIS: JARDIN DES PLANTES.—[At the moment of going to press we have received the following letter from M. Decaisne, the eminent French botanist and pomologist, who presides over the Jardin des Plantes at Paris. The destruction effected in that establishment was alluded to in our columns, p. 239. We are compelled to omit the list of *desiderata* enclosed by M. Decaisne until next week, when we shall probably have some further remarks to make on this subject.]

The noble and delicate generosity extended by the English nation to France, the sympathising articles published in your journals with reference to the disasters caused to the stoves of the Jardin des Plantes by the Prussian shells, and particularly the offers that have been made to me on the part of the Royal Botanic Society of London, through its President, His Serene Highness Prince Teck, induce me to send you forthwith the list of plants which we have lost.

You know already that our Orchid-house, our fernery, one front of the large Palm-house, the aquarium, and a stove wherein were placed plants most

interesting in a botanical point of view, were demolished, and the contents exposed for several hours to a frost of 14° F.

The effect of the shells on the monocotyledonous plants was very singular, and different in different cases; thus, the Pandanads, Cyclanthids, and Dracenas had their leaves and young stems completely cut off (*réduites en chaques*) by the explosion of the shells, while the Bromellads were uninjured alike by the concussion and by the cold, which destroyed contiguous plants of other families.

Our losses are very severe, as you may judge by the annexed list, which I might have extended considerably, but I feared to make it too long, lest it should be thought to be exaggerated. You may rest assured, however, that the list is far below the mark. I omit altogether about 500 species, which I hope to procure by-and-by from other sources.

The collections of the Jardin des Plantes differ mainly from those of your most celebrated establishments in their wholly scientific character. Our houses are not open to the general public, and thus we are enabled to grow a considerable number of plants which have little attraction for the populace, either on account of their luxuriant foliage or the brilliancy of their flowers. I do not, therefore, deceive myself when I say that our losses in certain families are irreparable. I do not speak of the lapse of time which must pass before the old established plants which formed the ornament of our stoves can be again seen. I allude simply to old plants of unassuming aspect, but which for that very reason are rarely to be met with.

I pass over this lamentable portion of our history, to call special attention to certain families of plants whose representatives are entirely destroyed, and which we should greatly desire to recover from your generous countrymen, such as the Pandanads, the Nepenthes, the Cyclanthids, the Orchids and the Ferns, in which your collections are so rich. But who will restore to us the Malpighiaceæ which our illustrious predecessor, Adrien de Jussieu, got together with so much pains? Who can give us back the old plants which were deposited here by such men as Aublet, Commerson, or Du Petit Thouars? For many years our stoves must bear the traces of these losses. *Delessert, Préparateur de Culture, au Muséum d'Histoire Naturelle, Paris.*

Societies.

ROYAL HORTICULTURAL: *March 15.*—Lord H. Gordon-Lennox, M.P., in the chair. At the conclusion of the usual preliminary business of the meeting the Rev. Mr. J. Berkeley drew attention to some of the more important of the subjects exhibited. First to come under notice was a specimen of *Trietela porrifolia*, a plant which, like *T. ulmaria*, was very pretty, but had the very bad habit of smelling like Garlic. Mr. Bull exhibited a specimen of *Mesua ferrea*, which at first sight would appear to be a Brownea, but the *Mesua* had simple though seemingly pinnate leaves, whilst those of the Brownea were truly pinnate. The plant was a native of the East Indies, where its wood was so hard as to be called iron-wood, and where, under the name of nagkesur, its dried flowers are found in almost every bazaar. The latter, as well as the bark, were said to be sweet-scented, and had some medicinal properties. Mr. Berkeley then alluded to some specimens of this killer of the potato, which he would be found more fully commented upon below, and exhibited a piece of the bread eaten in Paris during the siege, which was far worse in its composition than anything seen in Ireland during the memorable famine. Nothing but absolute famine, he thought, would induce any one to eat it.

Mr. Bateman first directed attention to what he considered to be the most beautiful of all vegetable productions, the *Amherstia nobilis*, flowers of which had been sent to the meeting from Chatsworth. Lady Ashburton's, and other splendid Orchids, then came under review, the lovely *Odontoglossum roseum*, a comparatively rare species, being mentioned as being a native of the cool parts of Peru, a locality which, from the difficulties experienced by collectors in getting their productions down the river Amazon, at a distance of 100 miles, is only recently not so well known as it should be. He had received a letter from Mr. Hanbury, of Clapham Common, requesting information on the species of Vanilla, the pods of which come into commerce, and some of which he had much inspected, and was anxious to be told by which of any one who had pods of either of the species would be kind enough to lend him them, so that they would be able to gather as much information as possible respecting them. It was then stated that the bazaar arranged to be held in the Conservatory on April 19 would be held in the Council-room and arcades adjoining it, instead.

Scientific Committee.—Dr. T. Thomson, F.R.S., in the chair. The Rev. Mr. Berkeley stated that he had examined the fronds of the *Todes*, exhibited by Mr. A. Smea at a previous meeting, but had failed to detect any *Fungus* therein, the filaments of the mould having been eaten by a species of mite.

Mr. Wilson Saunders sent specimens, showing the effect of frost in tearing asunder the woody fibres in *Erica medeolares*, and in *V. vagans*; also specimens of Oak timber split by lightning in a somewhat similar manner.

From Mr. M. Ellacombe came specimens of the corms of *Crocus Imperatorius* and *speciosus*, showing large thickened spindle-shaped roots, which the Secretary considered to be a provision for the production of the new corn.

far, and the student might well rise from the perusal of this easily read book and find himself, for all practical purposes, nearly as ignorant as he was at the outset. As a guide in the laboratory it will be useful to beginners.

THE WEATHER.

STATE OF THE WEATHER AT BLACKHEATH, LONDON, FOR THE WEEK ENDING WEDNESDAY, MARCH 15, 1871.

1871. MONTH AND DAY.	At 9 A.M.				Hygrometrical Deflection from Normal at Blackheath, 5th edition.			
	Reading of				Barometer reduced to 32° Fahr.			
March.	Barometer reduced to 32° Fahr.	Thermometer.	Wet Thermometer.	Dew Point.	Degree of Humidity.	Weight of Vapour in a Cubic Foot of Air.	Gr.	Gr.
9 Thurs.	30.10	42.8	40.0	36.6	79	5.2	7.5	2.6
10. Friday	30.10	42.8	40.0	36.6	79	5.2	7.5	2.6
11. Saturday	30.10	42.8	40.0	36.6	79	5.2	7.5	2.6
12. Sunday	30.10	42.8	40.0	36.6	79	5.2	7.5	2.6
13. Monday	30.10	42.8	40.0	36.6	79	5.2	7.5	2.6
14. Tuesday	30.10	42.8	40.0	36.6	79	5.2	7.5	2.6
15. Wednesday	30.10	42.8	40.0	36.6	79	5.2	7.5	2.6

1871. MONTH AND DAY.	TEMPERATURE OF THE AIR.				WIND.				RAIN. In Inches.
	Highest.	Lowest.	Range in Day.	Mean.	Direction.	Force.	Horizontal Movement.	Vertical Movement.	
9 Thurs.	49.4	33.7	15.7	41.3	S.W.	5	525	0.19	0.19
10. Friday	49.4	33.7	15.7	41.3	S.W.	5	525	0.19	0.19
11. Saturday	52.2	34.1	18.1	43.2	S.W.	5	525	0.19	0.19
12. Sunday	50.8	34.0	16.8	42.4	S.W.	5	525	0.19	0.19
13. Monday	53.4	35.5	17.9	44.5	S.W.	5	525	0.19	0.19
14. Tuesday	51.7	38.0	13.7	44.9	S.W.	5	525	0.19	0.19
15. Wednesday	42.7	28.9	13.8	35.8	N.W.	5	525	0.19	0.19

- March 9.—Overcast in the middle of the day, and rain fell heavily. Generally cloudless at other times. A violent gale.
 10.—Generally cloudy till night, then cloudless.
 11.—Variable amounts of cloud prevalent. Rain fell during the early morning.
 12.—Generally overcast, but clouds passed over very rapidly. Thin rain fell occasionally; strong wind.
 13.—Cloudy throughout, but fair at night. Rain fell heavily at times, and hail also fell in the morning.
 14.—Variable amounts of cloud prevalent. Hail and rain fell at times.
 15.—Snow fell heavily between 7 A.M. and 10 A.M. Generally cloudy throughout.

TEMPERATURE OF THE AIR AND FALL OF RAIN AT DIFFERENT STATIONS, DURING THE WEEK ENDING SATURDAY, MARCH 11, 1871.

NAMES OF STATIONS.	TEMPERATURE OF THE AIR.				FALL OF RAIN.			
	Highest.	Lowest.	Range in Day.	Mean of all.	Highest.	Lowest.	Range in Day.	Mean of all.
Portsmouth	48.2	31.7	16.5	40.0	0.2	0.0	0.2	0.1
Blackheath	57.3	37.1	20.2	47.2	0.4	0.0	0.4	0.1
Bristol	52.1	32.5	19.6	42.3	0.4	0.0	0.4	0.1
Birmingham	62.8	31.5	31.3	47.2	0.4	0.0	0.4	0.1
Wolverhampton	51.8	31.4	20.4	41.6	0.4	0.0	0.4	0.1
Sheffield	51.0	31.0	20.0	41.0	0.4	0.0	0.4	0.1
Norwich	56.0	30.0	26.0	43.0	0.4	0.0	0.4	0.1
Nottingham	51.3	35.0	16.3	43.2	0.4	0.0	0.4	0.1
Bradford	51.0	35.0	16.0	43.0	0.4	0.0	0.4	0.1
Liverpool	60.7	39.7	21.0	50.2	0.4	0.0	0.4	0.1
Manchester	51.0	35.0	16.0	43.0	0.4	0.0	0.4	0.1
Salford	55.5	35.5	20.0	45.5	0.4	0.0	0.4	0.1
Leeds	55.0	35.0	20.0	45.0	0.4	0.0	0.4	0.1
Hull	55.0	35.0	20.0	45.0	0.4	0.0	0.4	0.1
Sheffield	55.0	35.0	20.0	45.0	0.4	0.0	0.4	0.1
Edinburgh	56.7	39.0	17.7	47.9	0.4	0.0	0.4	0.1
Glasgow	56.0	35.1	20.9	45.6	0.4	0.0	0.4	0.1
Dundee	52.0	34.0	18.0	43.0	0.4	0.0	0.4	0.1
Aberdeen	51.4	32.7	18.7	42.1	0.4	0.0	0.4	0.1
Paisley	55.0	35.5	19.5	45.3	0.4	0.0	0.4	0.1
Greenock	51.0	35.0	16.0	43.0	0.4	0.0	0.4	0.1
Leith	55.0	34.8	20.2	45.0	0.4	0.0	0.4	0.1
Perth	55.0	36.0	19.0	45.5	0.4	0.0	0.4	0.1
Dublin	56.7	33.0	23.7	44.9	0.4	0.0	0.4	0.1

JAMES GLAISHER.

Garden Operations.

(FOR THE ENSUING WEEK.)

PLANT HOUSES.

WHERE grown in pots, *Daphnes*—the most delicately scented of evergreen greenhouse shrubs—will now have nearly finished flowering, and will require the little attention in the matter of potting, training, &c. There are two things in connection with the potting of these gems that should always be borne in mind—they should never receive large shifts, that is, be over-potted; and their pots should be perfectly and liberally drained. If the soil be once permitted to become sour through imperfect attention to these matters, ill-health will be certain to follow. Then there are other points appertaining to their culture in pots, which should not be overlooked. The practice of cutting them back is of very questionable utility, even when we are almost certain that the plants would break well afterwards. It is a far better practice to encourage them to make as much young wood as possible, and to trust to this to wholly furnish the plant. Varieties of the indica type should never have their flowering branches cut off, because each one so taken away deprives the plant of the three or four branches which are already shooting as well as the flowers; even if the old wood break freely, flowers

or robust shoots are seldom obtained therefrom. Every one, with convenience at his command, should now, instead of potting them, turn them out into the open border, where they will grow freely, and where they may be induced, with perfect immunity from injurious consequences, to submit to the useful process of cutting and come again," which so materially enhances the value of such plants in the estimation of most cultivators. The soil which the thrive best in consists of equal parts of good fibrous peat and loam, with a good dash of silver sand and a few pieces of charcoal (about the size of acorns) in admixture. Look well after red spider on such plants. *Daphne indica alba odorata* is particularly liable to these pests when grown in pots; so also are *Ceanothus*, *Brugmansias*, and others which are grown in the open borders and are almost constantly in leaf. Those who require a fair-sized specimen *Chrysanthemum* may now put in the requisite number of cuttings. Those who grow for exhibition purposes have these, no doubt, already rooted and potted off. To grow fair average specimens of *Chrysanthemum*, cuttings struck early in May and grown on well will afford all that is requisite, and, in addition, save a great outlay of labour. Stove plants which have a pendent habit of growth, and form conspicuous objects when hung up, such as *Torenia*, *Echinanthus*, and the beautiful indigo-colour berried *Coccyxanthus discolor*, may now be potted, if not already done, pinching back the young shoots when growth has freely commenced, to induce a free and uniform growth over the pots on all sides alike. Cuttings of many kinds of stove plants may now be put in, including *Begonia*, *Aphelandra*, *Fuchsia*, *Pentas*, &c. Pot off *Balsams* and *Cockscombs* when, sown early, they have attained to the necessary size. Persist in keeping them up near to the glass, so that all the light possible may be assured them.

FORCING HOUSES.

Amateurs and others who possess glass structures wherein Vines are grown in company with a variety of other plants should, where not already done, make preparatory arrangements for the Vines starting into vegetation. The canes should be well dressed over with the usual admixture of lime, soot, sulphur, &c., and in whitewashing the internal walls of the house, a good sprinkling of flowers of sulphur should be mixed up with the lime and water. A fine day should be chosen for this operation, so every plant can be removed into the open air to facilitate air washing and drying of every part. Clean each plant before it is taken into the house again, and when they are all returned to their places, a good fumigating should be given, or, what is better, two moderate ones upon successive nights. When the Vines are smeared over with the mixture above stated they should be carefully bent and be tied along the front of the house in neatly arranged bunches, so that they can be removed and replaced without injuring the young buds. If the harder kind of plants, necessarily maintained within such structures, such as *Verbena*, *Calceolarias*, &c., are placed along the front shelves, and under the Vines, the latter may be damped over with the syringe two or three times daily without injury to the other inmates, and to their own lasting benefit. Give to *Pines* now showing for fruit as uniform and favourable attention as possible. If after the plants have shown for fruit the heat in the tan-beds shows symptoms of a decline, let them be renovated at once, and an opportunity will also be afforded to weed out any which up to the present time show no symptoms of fruiting. By these means a more general system of treatment may be entered upon. With the exception of the period when they are actually in bloom, syringing and all other means of causing humidity may, and, indeed, must, be kept up. They will also require some liquid manure, the quantity of which must be regulated according to the size of the pots and the kind of compost in which they are growing. If they are grown in good crude, unctuous, and fibrous loam, properly prepared, a liberal use of wholesome manure-water will prove of very great benefit to them. During the flowering and fruiting season the plants should be occasionally turned round, so that the sun's rays may be used to the beneficial purpose on all sides alike. During fine warm days, this period, the fires should be totally dispensed with at mid-day after the heat has been got up in the mornings, but they must be lighted betimes in the evening.

HARDY FLOWER GARDEN.

Give to *Violas* in general, which are grown in pots or frames, a liberal supply of wholesome liquid manure. Plants of the Neapolitan variety grown in pots should, immediately they have ceased to produce flowers, be planted out into a sheltered sunny border, and have a little finely-sifted leaf-mould put in amongst their branches, in which sucker-shoots will readily form, and be a preparatory for dividing about the middle of the month of May, in order to have the plants to form plants for blooming next winter. Many kinds of *Boltonia* Plants may now be transplanted out of store pots or pans into cold frames or pits, without any aid whatever from artificial heat; but such an amount of protection must always be at hand as will secure them from the damaging effects of occasional severe frosty nights, which, in the order of things, may yet be expected. This protection may consist of mats, straw, or of any other of the innumerable

devices which those engaged in gardening under difficult conditions have resort to, but the operator should never allow himself to be "caught napping." Seeds of many tender annuals may now be sown where there is the convenience of a Cucumber or Melon frame, or the pots may be placed on warm sunny shelves in the greenhouse. I refer to such as *Marigold*, *Perilla*, *Verbena*, *Geranium*, *Verbena*, *Verbena*, *Globe Amaranthus*, *Joe Plants*, *Balsam*, *Asters*, *Marigolds*, *Tobacco*, *Stocks*, &c. Finish planting *Ranunculus*—a much neglected flower, and *Anemone*. Hoe neatly and tidily amongst spring-blooming plants in beds, such as *Myosotis*, *Bulbs*, &c. Edgings may now be made of *Thrift*, *Double Daisies*, *Pinks*, *Arabis*, *Aubrietia*, &c., where old ones have become ragged and unsightly. Bring turf-laying and walk-turning operations to a finish.

KITCHEN GARDEN.

I can add but little to former suggestions in this department, excepting it be that *Asparagus beds* should be finally forked nearly over. Make small sowings for an early supply of *Beet*, *Onions*, *Parley*, &c., and if not already done, of *Turnips*, *Leeks*, and *Carrots*, as suggested a week or two ago. Make, also, successional sowings of *Broad Beans*, *Pas*, and *Spinach*, and earth-up such of the two former as are already through the soil. Sow also many individual herbs as *Chervil*, *Coriander*, *Sweet Basil*, *Parley*, and *Hamburg* or large-rooted *Parley*; and if the weather keeps open, seeds of *Cardoons*, upon an open, sunny aspect. For the rest, see that mice or birds do not destroy your Peas, Beans, or other crops already in the ground. W. E.

Notices to Correspondents.

COMFREY: W. D. F. Roots of this plant can be had by applying to the Brunswick Road Nurseries, Gloucester; and to Messrs. Butler & McCulloch, Covent Garden. CONIERS: T. W. Thobbia Lobbi of horticulturists (it has never been described) is a variety of *T. gigantea*. Its special characteristic is its bright yellow colour, and that the Cyprian produces many individualities when grown from seed, that we can never be certain to have characteristic types from seedlings. The red-brown foliage described by you is a variation of Lobbi which we have not met with. The difference in habit which also may be met with is not greater than we see in many Conifers. The same difference may be seen in *Cupressus macrocarpa*, in *Pinus Cembra*, and more strikingly than in anything else in the Irish and the common Yew. A. M.

FUNGUS AND ALGA: P. M. B., *Shrewsbury*. The Fungus from the Laurel that you refer to *Corticium* is *Stereum rugosum*, and the Fungus (?) upon Moss which you compare to jelly is an Alga, probably *Ulothrix* fragilis.

GARDENER'S WIDOW: M. A. P. Write to the secretary, Gardeners' Royal Benevolent Institution, 14, Tavistock Row, Covent Garden.

GOLD FISH: A Constant Reader wants to know why a hundred gold fish that he purchased three years ago and placed in a pond in his garden have not multiplied; and if there is any book on the management of fish in ponds.

HOW TO MAKE A KITCHEN GARDEN SELF-SUPPORTING: *Scilla*. We cannot answer your question. We can only give you general advice, which may be applied to all cases, as we have no means of knowing the exceptional conditions of your establishment. It will pay to cultivate a garden, to grow fruit, vegetables, &c., provided you find a ready and good sale for them. If, however, it is your intention to cultivate the various fruits, vegetables, &c., for your own use, and you have no other means of sale, then to sell the remainder, so as to defray the expense of the whole, you will not succeed in making your garden self-supporting. The competition in all trades is so keen now, that those who devote their entire attention to making vegetable growing pay, find but a small margin. To make it self-supporting, you must forego your own tastes and pleasures, and grow only that which will sell well, and this can only be learned by experience. Grapes, if well grown, will just about pay for attention bestowed on them. Wall fruit, such as Peaches, &c., will not pay for the labour. The fernery will not return you anything. Two men ought to manage an ordinary garden of 1½ acre; but, if you are so minded, plenty of work may be found for double the number.

HYDRAULIC LIME: R. G. asks if some of our readers will inform him where he can procure hydraulic lime for making concrete walls.

INSECTS: J. C. Your decayed Sealake shoot was infested (as was decayed vegetables are) with the common small Snake Mite. The plants want carefully going over with a sharp knife, and all the diseased parts cut off and burnt. This should have been done at the end of last autumn. J. O. W.

LARSPUR AND LUPIN: A. M. Certainly not of the same family. Larspur (*Delphinium*) belongs to *Ranunculaceae*, Lupin (*Lupinus*) to *Leguminosae*.

NAMES OF PLANTS: H. F. B. R. 1. *Begonia fuchsoides*; 2. *B. semperflorens*.—*A. Suberba*. *Heeria rosea*, usually known as *Heterocentron*, and *Heeria rosea*, usually known as *Heterocentron*. The Cornelian Cherry, *Cornus mas*.

VINE DISEASE: G. T. You have got the new Vine disease. Pick off every affected leaf and burn it at once. The insect is present, but seems to be very active, and you may possibly check it, but you will not be able to do so if you delay. M. J. B.

WATER-CRESS BEDS.—Will any of our readers be good enough to inform a correspondent what should be the value of Water-cress beds, per acre, in fine running water, about 17 miles from London?

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GRASS SEEDS

FOR ALL SOILS,

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For nearly forty years we have given the subject of laying down land to Pasture our most careful attention, and from a long and practical experience of the Soils of this and other countries, we are enabled to prepare Mixtures for every description of Soil, which need only be mentioned in sending the order.

FOR PERMANENT PASTURES,

Prepared for the following Soils and purposes:—
STIFF CLAYS. LIGHT SANDY SOILS.
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GOOD BLACK PEATY SOILS.

BEST QUALITY, **28s.** to **32s.** per Acre. Carriage Free. Two Bushels of Grass Seeds and 12 lb. of Clovers supplied per acre.

SECOND QUALITY (good), **20s.** to **26s.** per acre. Special Estimates given for large quantities.

UNSOLICITED TESTIMONIALS,

SHOWING THE SUPERIOR QUALITY OF

SUTTONS' PERMANENT PASTURE MIXTURES,
20s. to 32s. per acre. Carriage Free.

From J. J. MECHI, Esq., *Tiptree Hall, near Kidport.*
February 5.—"Your Grass Seeds are so pure and well selected that I have often spoken of them to those who required them."

From J. L. WILLIAMS, Esq., *Boya Vie, Navan, Meath, Ireland.*
March 30.—"Last year I got from you Permanent Pasture Grass Seeds for 30 acres, which I laid down one-half of a so-acre field (Irish). I am very much pleased with the way the Grass Seeds have answered, and I now want to lay down the other half of the field in the same manner."

From J. WARD, Esq., *Round Oak, Greenham, Newbury.*
July 4.—"The Permanent Grass Seeds for about 30 acres, supplied by you last year (the greater part sown with Bailey), have given me great satisfaction, and produced a crop (this dry season) of about 45 tons of good hay; 4½ acres of which have fed five head of cattle during the spring."

FOR PARK GROUNDS, &c.

18s. per bushel (2½ bushels per acre), carriage free.
From Mr. HENRY AWOCK, *Agent to Lady Gray.*—"The Grass Seeds you sent last year, for seven acres in the middle of Oxen Heath Park, is the best herbage I ever saw."

FINE LAWNS AND CROQUET GROUNDS.

BY SOWING
SUTTONS' LAWN GRASS MIXTURE,

Which forms a choice velvety turf in a very short time. For making New Lawns or Croquet Grounds, 3 bushels or 60 lb. is required per acre, or 1 gallon to every 6 rods (or perches) of ground.

For improving those already in Turf, 20 lb. should be sown per acre.

March, April, and May, are the best months for sowing.
1s. per lb.; 2s. 6d. per gallon; 20s. per bushel.
Carriage Free.

From Mr. J. MERRICK, *Gardener to S. Foster, Esq., Le Court.*
January 21, 1868.—"The seed you sent me last year turned out uncommonly well. Several gentlemen who came to Le Court could scarcely credit, from the appearance of the lawn, that it was sown in May. In August it was as fine and thick as I have seen some lawns that had been laid down for three years."

Special Estimates given for Large Quantities.

LAYING DOWN NEW, OR IMPROVING OLD, GRASS LANDS.

FOR THE BEST PRACTICAL INFORMATION ON THE ABOVE SUBJECT, SEE

PERMANENT PASTURES,
a New Illustrated Work,

By M. H. SUTTON, F.R.H.S., &c.

"If you want to grow the right sorts of plants, you must sow the right sorts of seeds, and you cannot do better than send for Suttons' paper on Laying Down Grass, which you will get by sending to Reading."—*Agricultural Gazette.*
Opinion of Professor Buckman, Esq.—"I do not know of anything to equal it." Price, 1s. post free.

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For Ordinary Soils—Best quality, 26s. to 30s. per acre.

Second quality, 20s. to 24s. per acre.

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Second quality, 20s. to 26s. per acre.

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"My Lady Carbery is glad to say Messrs. Carter's Seeds (Grass and Green Crops) have proved excellent, and been much admired in their results."

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BARLEY, and Black and White OATS.
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Samples and prices sent free on application. Prize Medals, 1851, for Wheat; 1865, for "Excellent Seed Corn and Seeds."

To the Trade.—Agricultural and Garden Seeds.
H. AND F. SHARPE are now prepared to make a special offer of the above Seeds, comprising TURNIP, CABBAGE, CARROT, MANGEL WURZEL, GARDEN PEAS and BEANS, &c., grown from the finest selected stocks, and free from adulteration of any kind. They are all raised in splendid condition. Seed Growing Establishment, Wisbech.

CLEAN CLOVER SEEDS, at market prices, New and Unadulterated:—
RED ALSIKE. WHITE DUTCH. YELLOW COW GRASS. WHITE SUCKLING.
For samples and lowest prices apply (stating quantity required) to SUTTON AND SONS, Seedsmen to the Queen, Reading, Berks.

Early Feed for Sheep and Cattle.
SUTTONS' IMPROVED ITALIAN REE-GRASS.
The earliest and most productive in cultivation. Should be sown in March and April to produce a succession of valuable cuttings during the year. If sown alone, 3 bushels are required per acre. Price 8s. per bushel, cheaper by the quarter. Carriage free.
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MR. JAMES FRASER (of the late Firm of J. & J. Fraser, Lea Bridge Road), undertakes HORTICULTURAL VALUATIONS of every description. SALES BY AUCTION, &c.—Maylands Farm, Romford, Essex, E.

WHOLESALE AND RETAIL SEED ESTABLISHMENT to be LET, 7, Borough Market. For particulars inquire of MR. JAMES FAIRHEAD, Park Lodge, Sydenham, S.E.

FOR SALE, an old established NURSERY and SEED BUSINESS, with a few acres of London, containing about 14 Acres of General Nursery Stock, numerous Glass Structures, Seed Shop, Dwelling House, &c.
For particulars apply, by letter only, to G. H. H. C., 47, Bessborough Gardens, Finsbury, S.W.

To BE LET, by Tender, in two Lots, the remaining portion of the HOOKFIELD GROVE ESTATE, situate close to the South-Western Railway Station. Lot 1, about 39 Acres of excellent Pasture Land, with Farm Buildings and garden. Lot 2, a detached Cottage with Capital well-kept Garden, out Garden and Orchard, containing together about 5½ Acres.

A Plan may be seen and particulars and conditions of Letting obtained from the BAILIFF on the Estate, and of Messrs. DEBENHAM, TEWSON, and FARMER, Auctioneers, Surveyors, and Land Agents, 80, Chancery, E.C.; or whose Office must be delivered not later than 12 o'clock on FRIDAY, March 24.

Pair of Angora Cats.
FEMALE ANGORA CATS. Very handsome, tame, and affectionate. Or would be exchanged for Prize Poultry, or liberal exchange of Bees in good hives.—H. S., 17, Chancery Lane, E.C.

SALES BY AUCTION.
City Auction Rooms,
38 and 39, GRACECHURCH STREET, CITY, E.C.

MESRS. PROTHOROE AND MORRIS will SELL by AUCTION, without reserve, at 12 o'clock, on TUESDAY, March 21, at half-past 12 o'clock to the minute, a first-class collection of CARNATIONS, PHOTOPHYTES, and FINEST stock of an eminent Grower; a quantity of Standard and Dwarf PEACHES, hardy American Plants, including the new CAMELLIAS and AZALEA INDICA coming into bloom, selected SHRUBS, FRUIT TREES, DAHLIAS, FUCHSIAS, VERBENAS, GLADIOLI, LILUMS, &c.

On view morning of Sale, Catalogues had at the Rooms as above, and of the Auctioneers and Valuers.

In Liquidation.—Stafford's Nurseries, Hyde.
MESRS. HADFIELD AND JOHNSON will SELL by AUCTION, on MARCH 20, 21, 22, 23, 24, 25, and 30, at 12 o'clock, Station Street NURSERY, STAFFORD, a large and valuable stock of FRUIT TREES, EVERGREENS, GREENHOUSE, STOVE, and ORCHIDS, and various other plants, and a large quantity of FRUIT TREES, including the new CAMELLIAS and AZALEA INDICA coming into bloom, selected SHRUBS, FRUIT TREES, DAHLIAS, FUCHSIAS, VERBENAS, GLADIOLI, LILUMS, &c.

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VERY IMPORTANT SHORTHORN SALES,
COMPRISING MANY PRIZE ANIMALS.
THURSDAY, April 20.—The FIRST CLASS HERD belonging to MR. MOHAMMAD, at Stanwick Farm, Harrogate.
FRIDAY, April 21.—The entire HERD, the property of DAVID WILKINSON, at Houghton-le-Skerne, Harrogate.
WEDNESDAY, April 26.—At Whitwell, near Clitheroe, the very FIRST CLASS HERD, the property of MR. EASTWOOD, of Thorney Holme.
THURSDAY, May 4.—The large and old established HERD belonging to JAMES GIBBY, Esq., at Boynton Hall, Cuddesley, Essex.
THURSDAY, May 11.—Mr. R. SEARSON'S large and well-known HERD, at Cranmore Lodge, Market Deeping.
THURSDAY, May 18.—The entire HERD, bred by the late Lord WALSHINGHAM, at Merton Hall, Tooting. The celebrated FLOCK of SOUTHDowns will be sold on THURSDAY, June 20.
Further particulars of these Sales will be fully Advertised, and Catalogues &c., may be had of JOHN THORNTON, 15, Langham Place, London, W.

Packington Hall, Warwickshire.
IMPORTANT SALE OF SHORTHORNS.
MR. STRAFFORD has received instructions from the Executors of the late Earl of Aylesford to announce for SALE by AUCTION, without reserve, on TUESDAY, May 9 next, at Packington Hall, near Coventry, the Entire and very Superior HERD of Pure SHORTHORNS, consisting of about Thirty-six Head of Bulls, Cows, and Heifers, descended from some of the most fashionable blood, whilst the Prices recently won by this Herd at the Birmingham and Smithfield Shows fully attest to the merits of the same. Prominent amongst them will be found several of the prize cow Blushing Bird, purchased at the Bushey Grove sale in 1862; also a few Blanches, Knight of the Garter, and other prize animals. Since lately used have been 6th Grand Duke (10,879), 2nd Duke of Cambridge (10,900), 3rd Duke of Cambridge (10,901), 4th Duke of Cambridge (10,902), 5th Duke of Cambridge (10,903), 6th Duke of Cambridge (10,904), 7th Duke of Cambridge (10,905), 8th Duke of Cambridge (10,906), 9th Duke of Cambridge (10,907), 10th Duke of Cambridge (10,908), 11th Duke of Cambridge (10,909), 12th Duke of Cambridge (10,910), 13th Duke of Cambridge (10,911), 14th Duke of Cambridge (10,912), 15th Duke of Cambridge (10,913), 16th Duke of Cambridge (10,914), 17th Duke of Cambridge (10,915), 18th Duke of Cambridge (10,916), 19th Duke of Cambridge (10,917), 20th Duke of Cambridge (10,918), 21st Duke of Cambridge (10,919), 22nd Duke of Cambridge (10,920), 23rd Duke of Cambridge (10,921), 24th Duke of Cambridge (10,922), 25th Duke of Cambridge (10,923), 26th Duke of Cambridge (10,924), 27th Duke of Cambridge (10,925), 28th Duke of Cambridge (10,926), 29th Duke of Cambridge (10,927), 30th Duke of Cambridge 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42 English counties, 25 answered this question in the affirmative, 6 say it is done or not required, and 11 replied, "not much." Considering the large areas—whole counties in some cases—occupied by chalk and limestone rock, where land drainage exists naturally, it may be concluded from these answers that land drainage is being executed wherever it is wanted. Of 33 Scottish counties in like manner, 18 answer "yes," and in only 6 are the replies in the negative. The practice of enlarging fields by removing useless fences is another subject on which a similar set of questions has been put. In 35 English, four Welsh, and 15 Scottish counties, hedges and fences are being removed, to enlarge the area of fields—leaving seven, eight, and thirteen counties respectively in which little or nothing is being done in this direction.

Is steam cultivation being adopted? The answers are hardly so encouraging as we should have expected them to be. Considering the advertisements we read of this and that system—that they are to be witnessed in operation in every county in the country—one is surprised to learn from Mr. FONBLANQUE's correspondents that steam cultivation is "in use" in only 19 English, three Welsh, and five Scottish counties. We believe either that this return is inaccurate, or that the words "in use" are meant to convey the idea of being in common use. We are further told that machinery for cutting corn is increasingly adopted almost everywhere. Forty-one English counties, 11 Welsh, and 26 Scottish counties, answer the question on this point in the affirmative; and in only two, out of the whole 52 counties in the island, is the answer "no." As to machinery for preparing corn for market, however, the replies are somewhat surprising. All English and Scottish counties say, as one would expect, that machinery for preparing corn—by which we suppose threshing and winnowing machinery is meant—is increasingly employed. In every Welsh county, on the other hand, we gather from the tabulated answers that the common flail and fanner are still at work.

It seems certain that the beet-sugar manufacture will prosper in this country as it has prospered in Germany and France. Mr. CAIRD's address—as chairman of the meeting which assembled on Wednesday evening last week, at the rooms of the Society of Arts, to hear Dr. VOELCKER on this subject—contained much satisfactory evidence to this effect. Mr. DUNCAN, who has been beet-sugar works at Lavenham, reports that on a capital of £12,000 there engaged he has, even with an inadequate supply of roots, made a clear return of 15 per cent., after writing off a considerable sum for interest and depreciation. He also says, that having had only 4500 tons of roots supplied to him, he had made less than he otherwise would. "If he had had 6000 tons, he would have made a profit of 6s. a ton; 7s. if he had had 7000 tons, or 8s. if he had had 8000 tons—simply because only with the larger amount could he have fully employed his machinery." He also says that nobody should enter into this enterprise unless he be in a position to complete the process of sugar manufacture; because, if he confined himself to the manufacture of syrup, he could not always be sure of a market; and the syrup could not be kept any considerable time. At the same time, the smallest factory which, in his opinion, would pay, involved a capital expenditure of about £9000. The manufacture of sugar, however, from English grown roots appears from all this to be a perfectly safe and successful speculation.

And there is no reason, in our soil or climate, or other circumstances, why this should not be. Our Sugar-Beets are as rich as those of any other country, and our coal is cheaper; and these are the two chief elements concerned. Dr. VOELCKER's analyses of the roots of 1870 show a proportion of sugar, in Irish roots, varying from 10 to no less than 15 per cent., and in English roots, varying from 10 to 13 per cent. "The summer and autumn of 1870, no doubt, were highly conducive to the development of much sugar in root-crops, and probably the Beetroots which were raised in England and Ireland, in 1870, were richer in sugar than they are likely to be in average seasons. Still, considering that we now have three years' recent experience on the cultivation of Sugar-Beets, there is no reason why this crop should not be profitably cultivated in many parts of the United Kingdom. In a good season, from 18 to 20 tons of Beets, of as good a sugar-producing quality as

in France or Belgium, may be grown without much difficulty." Moreover, "the farmer will run very little risk by trying the experiment to grow Sugar-Beets instead of common Mangels, for if he cannot obtain a good price for his roots from the sugar-manufacturer he can use the Beets for cattle food; and, although he may not grow so heavy a crop as he does when he plants common Mangels, it has to be borne in mind that 1 ton of Sugar-Beets is quite as valuable, as cattle-food, as at least 1½ ton of good common Mangels."

We take these extracts from the full report of Dr. VOELCKER's admirable lecture on this subject, in last week's Journal of the Society of Arts, of which we hope to give a fuller account next week.

—A SMALL supply of English Wheat at Mark Lane on Monday sold at previous week's rate; Wednesday's trade still supply limited. The number of beets at the Metropolitan Cattle Market on Friday was short, choice kinds sold at good prices—as did sheep. There was little alteration on Thursday.

—It may be worth calling the attention of our readers in the Wolverhampton district to the fact that Saturday next, March 25, is the last day on which any entry of farms for this year's PRIZE-FARM COMPETITION can be made.

AN ORDER of the PRIVY COUNCIL has been issued, under powers contained in the Contagious Diseases (Animals) Act, 1869. It directs that the following animals and articles shall not be landed in any port or place in Great Britain—Cattle brought from any place in the territory of the French Republic, or from any place in Belgium; cattle, sheep, or goats having been on board any vessel at the same time with any cattle brought from any such place; the following articles brought from any such place as aforesaid—meat, and hides, unskinned, uncleaned fat, horns, manure, or hay.

The Council of the CENTRAL CHAMBER of AGRICULTURE have caused a letter to be addressed to the CHANCELLOR of the EXCHEQUER, in which they recall to his recollection that he had expressed his conviction that it is impossible to levy a revenue of nearly £7,000,000 upon a single article of agricultural produce without very much interfering with the cultivation of the land and with the business of those who are engaged in it, and that as it is exceedingly undesirable that a most important class should live in a state of chronic discontent, deeming itself ill-treated, nothing would give him greater pleasure than to gratify agriculturists in the matter of which they complained; that he would look favourably upon a reduction of the Malt-tax, and would be very glad if it were in his power to reduce it, and that if he could hit upon any means of setting agricultural industry free, and could redress the complaints which he admitted were exceedingly fair and reasonable, it would afford him great pleasure to do it. The Central Council, representing the Chambers of Agriculture, trust that the hopes of relief which are now entertained by agriculturists in the proposals are about to be realised; believing that a reform of the oppressive malt duty was only postponed last year in order to accomplish the important remission of the sugar duties; and the Council earnestly entreat his attention to the pressing claims of the growers of Barley and the consumers of beer.

—A committee of the London Farmers' Club has reported on the necessity of some UNIFORM SYSTEM of WEIGHT or MEASURE in the sale of agricultural produce, and the general committee of management of the Club have adopted their report. In it they say that any legislative effort to thoroughly establish any uniform system of weight or measure must be compulsory to be effective, and that looking to the interest and convenience of the producer, they express the opinion that a uniform system is desirable, and is most practicable by a standard of weight:—

"It is still further to be wished that such uniformity might extend not only through the United Kingdom, but over the whole of the civilised world; as it is almost impossible to overrate the advantage to the farmer of being able to tell for himself at once how his own market stands in comparison with Paris, Chicago, Limerick, or Stettin."

"To render this principle perfect in its action it would of course be desirable that the same names for weight and measure should be employed in all countries, in which the metric system is adopted; kilogram and hectogram are, after all, not so very un-English in their sound, as we are already sufficiently familiar with telegram, diagram, monogram, and so on. Metre also, the unit of length in the metric system, is even more thoroughly English. We have it in an almost infinity of words in composition, such as dynamometer, lactometer, thermometer, and hydrometer. These are surely quite as difficult to master as hectometre, kilometre, or dekametre. Issued with the approval of the International Decimal Association, these weights and measures would be easily calculated by tens, hundreds and thousands; and it is said that a knowledge of the tables has already been acquired with remarkable facility by children in our schools."

To this committee, then, it appears that the metric system has a promise of obtaining uniformity of weight and measure than any scheme which has so far been propounded. At first the terms may look like 'hard

words,' but when these come to be analysed they are quite as significant as those still almost mystic phrases, a bushel and a gallon."

—THOMSON'S ROAD-STEAMER has been successfully adopted by Lord DUNMORE to the direct traction of a three-furrow plough. At a public trial on the 28th ult., the following results were obtained:—

"The field to be ploughed, lying immediately below the ancient tower of Dunmore, had lain in pasture for 40 years, not having been ploughed since 1831. It had rained heavily for a day and two nights before the trial, and also heavily that morning, and as the field had never been drained it was exactly in that state in which it had so often been declared that it was impossible for a traction-engine to drag itself over the land, much less a plough. However, at the given signal, the road-steamer started, and dragged the plough after it in the easiest and smoothest manner imaginable. The work executed was really admirable. The furrows, 6 inches by 10 inches, were beautifully turned over, closely packed, giving a good shoulder and a capital seed-bed. Indeed, so splendid was the work, that on comparison the furrows were found to be deeper and more uniform than those of the same 45-acre field by some double-furrow horse-ploughs for a prize competition. The land ploughed by the road-steamer was in so heavy a state that a one-furrow horse-plough, which was drawn through it as a test, marked by the same implement a very uneven pressure of 140 lb."

"The success of the ploughing by direct traction was in every way complete, and Lord DUNMORE, in responding to the hearty congratulations of those who had witnessed it, expressed only one regret, and that was, that the expense of the road-steamer could not be with them that day."

"Lord DUNMORE showed by some careful calculations, for which we have not space, that he can plough with his engine at 19s. 6d. per day, doing 5 acres in that time. His calculations are based on getting 20 days' work out of the steamer every year."

—The Times thus calls attention to Messrs. HOWARD's tubular boiler.—Messrs. J. & F. HOWARD, of Bedford, are the patentees of a steam boiler [with which our readers are already conversant], the effect of many iron tubes, each forming a small boiler, and between and round which the flame and heated gases from the furnace are allowed to play. The tubes are so connected by other tubes at their extremities that their aggregate yield of steam can be used just as if it came from a single source, and the great advantage of the arrangement is that the steam pressure can be enormously increased without danger. The tubes are each tested to a pressure of 500 lb. to the square inch; and are commonly worked under a pressure of 140 lb. Any explosion would be limited to a single tube, and, as the fragments of this tube would be confined by the outer case of the boiler, the only immediate effect would be the extinction of the fire by the water that would escape. . . . The newly-built steamer Fairy Dell, the first vessel fitted with HOWARD's safety boilers, arrived in the port of London on Thursday afternoon on her first trip from Sunderland, and left again on Friday morning for Yarmouth, to take in a cargo of flour for France. Notes were taken on Friday on the voyage to Yarmouth, and it was found that a run of about 18 miles occupied 80 minutes, and that the coal consumed was 320 lb. The average steam pressure was from 140 lb. to 150 lb. on the square inch. From these data it may be inferred that the Fairy Dell would burn only about half as much coal as a vessel with engines and boilers of the usual kind. Let it be supposed that an ordinary tramp would require 1500 tons of coal for the voyage to China and back. She would take, say, 1000 tons at 10s. per ton, in the North, and would buy 500 tons in the Chinese ports at 40s. per ton, thus spending £1500 in coal. A vessel with engines and boilers like those of the Fairy Dell would need only 750 tons for the double voyage. She would obtain the whole of this in the North at 10s. (£375), thus effecting a saving of £1125 in money, and increasing the available tonnage for freight by 258 tons on the voyage out, and by 375 tons on the voyage home.

—We extract the following passage from Lord VERNON's letter to the Times, illustrative of the need for complicity in our offer of relief to the FRENCH PEASANT FARMERS:—

"The conclusion of peace will remove the chief difficulties from the path of those who desire to send seed corn to France, to give a helping hand to the French peasantry, who, through no fault of their own, have, with their families, become the victims of all the requirements incident to military operations. The support we have hitherto received from the great agricultural districts, and the continuance of that, are very many thanks to the hands from the fear that the corn might be eaten by Uhlans horses. Others have been moved by the more immediate, but not more distressing, wants of urban Paris to support them, which has been raised and administered by the energetic committee over which the Lord Mayor presides. Peace has now been ratified; the immediate wants of Paris have been relieved; those of the peasantry in the agricultural districts remain. The same story of woe reaches us from all parts of France within the area of military operations, and from all parts of the country taken by the enemy. We are now distributing corn in the Départements de la Somme to any peasant-farmer whose holding does not exceed 50 acres, giving to each selected individual one quarter of wheat, or sufficient to cover four bushels of barley, or 100 lbs. of French English public, which has already been so nobly exerted in favour of different forms of suffering caused by the war,

is not entirely exhausted, I would earnestly entreat them to make one more vigorous effort in favour of those whose misery, lying in many instances at a distance from the wealth of populous places, may escape notice. If unrelieved, there is nothing but famine before them. It is ours to excite hope by affording the means of immediate employment. The sowing season has already arrived, and will very shortly have passed away. For this reason, if the benevolence I most earnestly advocate be exerted at all, it must be exerted at once."

—We take from the *Chamber of Agriculture Journal* the full text of the resolution on the JURY SYSTEM adopted by the Warwickshire Chamber of Agriculture the other day, and of which the abridged form in which they were given in our columns at p. 281 conveys the erroneous impression that it was desired by the Chamber that the 21st section of the Jury Act, 1870, should be repealed. The following resolutions were proposed by Mr. R. ROBINSON and seconded by Mr. W. T. WAKEFIELD, and carried unanimously:—

"(1.) That grand juries, both at assizes and quarter sessions, are no longer needed as a safeguard of the liberties of the subject, and are now in practice more likely to impede than to forward the ends of justice, and therefore ought to be abolished.

(2.) That the number of twelve for every jury is unnecessarily large; that especially in ordinary civil cases a number not more than seven would be ample, and would relieve the class of jurors from a considerable portion of the annoyance of protracted attendance at the courts. (3.) That from the experience of the members there has been great uncertainty in the summoning of jurors, and that there is no means available for ascertaining whether the jury list has been exhausted before a juror has a second summons, and that in the opinion of this Chamber the jury lists returned by overseers should have a column showing the last date of service of each person, and that the county jury lists should be printed by the clerk of the peace, and copies sent to every board of guardians; and also be purchasable at a reasonable price by the public.

(4.) That it would be a great relief to jurors generally if the sheriff or other officer would act upon power given in section 41 of the Juries Act, 1870, and divide the jury panel summoned so as to provide relays every second day, instead of compelling the whole to attend from the commencement of the assizes or sessions.

(5.) That jurors ought to be remunerated, but as the Attorney-General has stated his intention to introduce a Bill on the subject, no immediate action is required by this Chamber.

(6.) That the deputations from this Chamber to the Central Chamber on the 7th prox. be instructed to lay these resolutions before the Central Chamber, with the view to their being the subject of discussion at the next meeting."

—There are circumstances connected with the Franco-Russian War which may give an impetus to the CROPPING OF FLAX SEED IN IRELAND—particularly in the north, where it is a staple agricultural production. In 1869 there were 261,191 barrels of Flax seed shipped from Riga, available for sowing in 1870; up to the closing of the navigation this season, only about 159,900 barrels had left Riga, showing a decrease of 101,291 barrels. According to information received last year from the British Ambassador at Paris, the average area devoted each year to the Flax crop in France was about 263,637 statute acres. France imported last year from Riga 34,304 barrels of seed; this year only 2378 have been shipped from Riga to that country. The acreage this year under Flax in France is certain to be very much diminished, and the probability is that special attention will be directed to food-producing crops. These facts, combined with a marked revival

in the linen trade, are encouraging Irish farmers to sow Flax seed upon an extended scale this season, and there is every prospect of their reaping substantial benefit by so doing. The demand for seed is rapidly increasing, and, owing to the requirements of the Continent—reduced though they may be—the present supply is already assuming much smaller proportions.

NOTEWORTHY AGRICULTURISTS.

MR. JOHN FOWLER.

THE portrait recalls, not unpleasantly, the grave and thoughtful face of the late John Fowler. Though it lacks his confident expression—which, however, though sometimes no doubt exuberant, was generally quiet enough—nevertheless one is glad to have a likeness which so nearly satisfies the memory.

We have not the materials for a detailed memoir of the late Mr. Fowler; and there are few readers of the

have been written had it not been made by Mr. Fowler. His sudden death, in December, 1864, just when he had gained the summit of success to which long years of persevering labour had given him such unquestionable claim, excited a deep feeling of sympathy and sorrow in the agricultural world.

THE GARDEN OF THE FARM.—No. II.

ITS SITE, SIZE, AND GENERAL CHARACTERISTICS.

MOST gardens owe much to their site. A rising knoll, sheltered from the north, having a cheery outlook to the south or west, is the best possible situation for the garden. Unfortunately, however, the farmer has seldom much choice in the matter of the site of either farmhouse or garden. Such matters have been settled for him by the rural architects of the olden time. These—of course I do not include the designers of model farms—seemed to have drawn their

inspirations from the horse-pond. This, in many instances, is the centre around which all such useful subdivisions as stables, barns, bullock-sheds, yards, &c., cluster. There is no other solution of the extraordinary form and disposition of many of the farmhouses throughout the country. No man can rise above the genius that inspires him, and it must be admitted that the style and convenience of much that we behold throughout the country is in every way in accordance with its nursery origin. With the horse-pond in our eye as the key of the position, the marvellous groupings or stragglings of farm buildings become more or less intelligible. Discharging, as it still does in many cases, the double functions of drinking fountain and cesspool for every living thing about the farm, ready access to this was the grand desideratum of the ancient architecture. Even the dwelling-houses were often squatted down in close proximity to its foul slimy sides and black and nasty depths.

Doubtless the farmers' wives and daughters of a ruder age thought the prancings of the farm-horses and the gambols of the bullocks, as they came and went to water, a better and a pleasanter sight than is the fairest flower or star that ever shone. As to the foul air arising from putrid water and reeking manure—pooh!—why our immediate progenitors used to believe that a good whiff off a hot muck-heap, or an hour in a fellmonger's yard was an antidote to whooping-cough and other ills that flesh is heir to. Still we have advanced somewhat, since then. But unfortunately the farmhouses remain just where they were. Near the horse-pond in the middle, or by the side of the front door, sometimes opening into the strawyard—how is it possible to form or enjoy a garden under such circumstances? Doubtless it is difficult, but difficulties are made to be mastered. The path of success, the way to happiness, often lies through whole hosts of difficulties, and farmers generally are not made of such yielding stuff as to be easily cowed thereby.

Now, we will take the very worst possible case—a substantial farmhouse, placed down in a strawyard, within a few yards of a horse-pond. We will likewise suppose, which is nearly always the case, that the house is irremovable—it is in good repair, and must be the habitation of several coming generations of farmers, as it has been of many in the past. There is no garden, and it seems impossible to form one in such a position. In front there is the bullock-yard; at one end there is nearly half an acre of mud, manure, and water—the horse-



JOHN FOWLER.

[Born July, 1827; died December, 1864.]

Agricultural Gazette but must already know the great services to English agriculture which he rendered, and to which alone we shall now refer. Very few words, therefore, will suffice. It is now nearly five-and-twenty years since we first knew of his efforts to apply steam-power to tillage work, and it is more than six years since his death. During the 18 years which he devoted to invention, organisation, competition, and influence of all kinds, in connection with the main object of his life, the problem received at length, as we believe, its complete solution. Hardly anything has been added to the work as it was left by him, and it is to his unswerving and courageous resolution, to his power of attracting and attaching fellow-workers, to the confidence which he inspired, and which at length he amply justified, that we owe what we may call the full breadth and depth of the result. As we all know, there have been other independent and successful labourers in the field. Mr. Smith, of Woolston—as original, as confident, even as successful—indeed the first successful steam cultivating farmer—will always have a foremost place in the history of steam culture, but that history would never

or an hour in a fellmonger's yard was an antidote to whooping-cough and other ills that flesh is heir to. Still we have advanced somewhat, since then. But unfortunately the farmhouses remain just where they were. Near the horse-pond in the middle, or by the side of the front door, sometimes opening into the strawyard—how is it possible to form or enjoy a garden under such circumstances? Doubtless it is difficult, but difficulties are made to be mastered. The path of success, the way to happiness, often lies through whole hosts of difficulties, and farmers generally are not made of such yielding stuff as to be easily cowed thereby.

pond; at the back, a waste of road and mud, and grass and water, many yards wide; then a fence, and beyond that the farm fields. The horse-pond, the greatest nuisance, the water is always black, the mud so sticky, strong, and deep, that the horses and bullocks have difficulty in wading through to get their black draught of the filthy stuff, once or twice a-day. Just on the other side of the fence, from the horse-pond, a sparkling stream of pure water comes leaping past. In wet weather the overflows of the horse-pond flow into this stream, and it is stained as with ink for half a mile beyond.

Now I propose to abolish this horse-pond. "What, do away with the horse-pond? Did ever you see a farm without a horse-pond? The thing is impossible." Not at all: all that is needed in this and thousands of other cases is to laugh at impossibilities, and say it shall be done. No farm without a horse-pond! They are the weakest part of the farm management, or mismanagement, of the country. They weaken, kill the most valuable living things, and waste the most useful of dead substances. Could the beasts of the farm be enfranchised, to-morrow their first vote would be a plumper for the filling up of every horse-pond throughout the country. No, not one would be left. In this case nothing can be easier than to make a hard road up to the stream, back the water up into a little pool, and make it leap over a waterfall in front. An iron bar or two would prevent either bullock or horse from tramping in or fouling the water, and thus all could be quiet and the dirt left at a pure stream, and leave it clear for all future comers. A drain deep enough to lay it dry could be carried from the lowest part of the hole to a lower part of the stream. After a few weeks' exposure the black mud might be carted, at the rate of 25 tons an acre, on to a hungry upland. The bottom could then be trenched with spade and pick to a depth of 2 or 3 feet. If the earth is good, which it sometimes is, from the slow deposits of years, nothing more will be needed. Leave the stream as rough as possible, to expose it fully to the frost—God's plough. This subtle and strong implement of husbandry will speedily break it down into mellow sweetness—just such a tith as you would like for Mangel. If the bottom is very sour, rank, and bad, the shortest and best way is to remove it bodily, and replace it with 2 feet of good earth. This would lay the foundation of a good vegetable garden on the site of the horse-pond. Then proceed to enclose, to drain, to ditch, and, in all these steps, to be careful, to back, and prepare the way for enclosing the farmhouse with beauty, at least on one side. These two nuisances might often be abolished, and beauty and utility enjoyed in their stead, even though the bullocks should continue to stare the farmer's wife and family out of countenance through the parlour window.

But even in front something might often be done to mitigate the evils of such close proximity to the beasts. The might be driven a little further back, with benefit to themselves, and an increase of comfort to all concerned. The modern theory of feeding is, that rest and warmth are equivalent to so much food in the art of beef-making. Bullock-yards may be too large. The less feeding stock blunder about the litter-covered yards the better. Stall feeding will hasten the process of fattening. By adopting such methods a garden might often be got out of the strawyard, with positive advantage to the interests of the farm. If a few yards cannot be taken for a garden, a few feet might always be had for a flower-border and a good pathway, and even in cases where no horse-pond can be filled up, no waste place impressed for the cultivation of flowers, and the entire bullock-yard, up to the front door, must be given up to the beasts, something may be done to sweeten farm-houses with more savoury scents than the food, manure, or breath of cattle. The walls of the houses may be converted into a garden, and covered with such plants as Jasmine, Roses, Honeysuckles, Sweetbriars. These will be down to the ground upon all the walls, instead of antiseptic unplesant odours is the sweet perfume of flowers, and such plants as Gloire de Dijon and Marchal Niel Roses, with their feet under the dungyard and their flowing branches and glorious blossoms fringing the farmhouse with beauty, and filling it with fragrance for at least six months in the year, are surely worth the little effort necessary to produce them. Other plants might be added, to open their precious boxes of fragrance when the Roses closed theirs, so that sweet odours might master, or, at least, neutralise foul at all seasons. It must be admitted that the site of the farmhouse often compels the farmer to do his gardening, if at all, under special difficulties. But the worse the position of the house, and the more depressing its surroundings, the more need there is for a garden to enwreath it with beauty or overlap it with fragrance. The best position for the strawyard in front is a garden under the parlour window.

Where any or all of these expedients are impossible, then the garden must be wholly detached from the house; but in such cases half its pleasures and uses are lost. Detached gardens are like husband and wife living under different roofs. However near they may be to each other, full half the joy of connubial bliss flies away between the two doors. We lose the unfruct of them on our side, and the fruit on theirs. Instead of being a joy for ever yield but a sort of fragmentary pleasure. Still, this has its advantages to some. We

have heard of people who have tired of Roses, and got sick of the breath of Sweetbriar and Mignonette. And it is better to have a detached garden than none at all. The mechanics in large towns seem to revel in their gardens, though they have sometimes to walk a mile or more to them. The farmer can generally have his garden within a few yards; though, if it is not within sight of the windows, it is well to get as far from the muckyard and the horse-pond as may be. Though, upon sanitary grounds, it may be highly advantageous to combat foul odours with sweet scents at short ranges, the hygienic principles seem to require that the garden should be waged like an artillery duel at long ranges. A garden is more enjoyable beyond the sight and smell of the savoury side of farm life. It should be a cleanly, sweet, quiet, enjoyable retreat, devoted to the culture and enjoyment of Nature's richest and best gifts. Such a spot will be attractive enough to draw the household towards it, and most of the visitors will return from a detached garden like bees heavily laden with sweets to enrich the home. *D. T. Fish, F.R.H.S.*

OUR LIVE STOCK.

ON Wednesday week a large company of noblemen and gentlemen assembled around a sale ring at Kingscot, to witness the dispersion of a selection of 60 Shorthorns from Colonel Kingscot's well-known herd. Previous to the sale a party of 560 gentlemen were entertained at lunch, over which Lord Fitzhardinge presided. The Marquis of Worcester, Lord Arthur Somerset, M.P., the Earl of Dunmore, Lord Fitzroy Somerset, Lord Chesham, Earl Beauchamp, Lord Faversham, Lord Penrhyn, Sir G. Jenkinson, and numerous gentlemen from the neighbourhood were also present, including Mr. Stratford, who was entrusted with the sale. The following is the list of prices realised:

Name of Animal.	When Calved.	Price.	Purchaser.
<i>Cows and Heifers.</i>		Gs.	
<i>Duchess of Slimbidge</i>	1868	20	Mr. Hayward.
<i>Tracy</i>	1868	25	Capt. De Winton.
<i>Hemphre</i>	1868	30	Lord Suffolk.
<i>Lady Godiva</i>	1859	31	Mr. H. Holbrooke.
<i>Princess Helena</i>	1860	31	Miss Strickland.
<i>Princess Victoria</i>	1862	32	Mr. W. Atterbury.
<i>Laura's Love</i>	1861	33	Miss Strickland.
<i>Sabrina</i>	1862	40	Earl of Cawdor.
<i>Sabrina's calf</i>	1871	20	Mr. Blackwell.
<i>Dorinda</i>	1864	200	Sir John Rolt.
<i>Cary Watton</i>	1864	40	Mr. W. Peacy.
<i>Henrietta 15th</i>	1864	115	Mr. Armstrong.
<i>Henrietta 16th</i>	1864	50	Lord Fitzhardinge.
<i>Cerilo 12th</i>	1865	32	Mr. Barclay.
<i>Henrietta 17th</i>	1865	33	Mr. Hooper.
<i>Henrietta 18th</i>	1865	34	Earl of Devon.
<i>Cerilo 13th</i>	1865	35	Mr. H. Barclay.
<i>Vanilla</i>	1865	36	Lord Faversham.
<i>Henrietta 14th</i>	1865	37	Mr. S. Savidge.
<i>General 3d</i>	1867	30	Mr. Playne.
<i>Cucumber</i>	1867	58	Mr. Jones.
<i>Lady Collingham</i>	1867	59	Mr. Edmunds.
<i>Henrietta 15th</i>	1867	35	Mr. Wilson.
<i>Severn Lady</i>	1867	41	Lord Faversham.
<i>Bull calf of ditto</i>	1871	17	Lord Faversham.
<i>Dorinda</i>	1867	165	Mr. S. Savidge.
<i>Lady Lettice</i>	1868	61	Mr. Hooper.
<i>Saloma</i>	1868	51	Mr. Jones.
<i>Severn Countess</i>	1868	53	Messrs. Turberville.
<i>Urrail 10th</i>	1868	49	Lord Fitzhardinge.
<i>Urrail 11th</i>	1868	50	Earl of Dunmore.
<i>Cerilo 14th</i>	1868	60	Earl of Dunmore.
<i>Henrietta 16th</i>	1868	61	Mr. Edmunds.
<i>Severn Lady</i>	1868	62	Mr. Garlick.
<i>Henrietta 17th</i>	1868	63	Mr. Garlick.
<i>Severn Lady</i>	1868	64	Mr. T. Arkell.
<i>Henrietta 18th</i>	1868	65	Mr. T. Arkell.
<i>Severn Lady</i>	1868	66	Mr. T. Arkell.
<i>Henrietta 19th</i>	1868	67	Mr. T. Arkell.
<i>Severn Lady</i>	1868	68	Mr. T. Arkell.
<i>Henrietta 20th</i>	1868	69	Mr. T. Arkell.
<i>Severn Lady</i>	1868	70	Mr. T. Arkell.
<i>Henrietta 21st</i>	1868	71	Mr. T. Arkell.
<i>Severn Lady</i>	1868	72	Mr. T. Arkell.
<i>Henrietta 22nd</i>	1868	73	Mr. T. Arkell.
<i>Severn Lady</i>	1868	74	Mr. T. Arkell.
<i>Henrietta 23rd</i>	1868	75	Mr. T. Arkell.
<i>Severn Lady</i>	1868	76	Mr. T. Arkell.
<i>Henrietta 24th</i>	1868	77	Mr. T. Arkell.
<i>Severn Lady</i>	1868	78	Mr. T. Arkell.
<i>Henrietta 25th</i>	1868	79	Mr. T. Arkell.
<i>Severn Lady</i>	1868	80	Mr. T. Arkell.
<i>Henrietta 26th</i>	1868	81	Mr. T. Arkell.
<i>Severn Lady</i>	1868	82	Mr. T. Arkell.
<i>Henrietta 27th</i>	1868	83	Mr. T. Arkell.
<i>Severn Lady</i>	1868	84	Mr. T. Arkell.
<i>Henrietta 28th</i>	1868	85	Mr. T. Arkell.
<i>Severn Lady</i>	1868	86	Mr. T. Arkell.
<i>Henrietta 29th</i>	1868	87	Mr. T. Arkell.
<i>Severn Lady</i>	1868	88	Mr. T. Arkell.
<i>Henrietta 30th</i>	1868	89	Mr. T. Arkell.
<i>Severn Lady</i>	1868	90	Mr. T. Arkell.
<i>Henrietta 31st</i>	1868	91	Mr. T. Arkell.
<i>Severn Lady</i>	1868	92	Mr. T. Arkell.
<i>Henrietta 32nd</i>	1868	93	Mr. T. Arkell.
<i>Severn Lady</i>	1868	94	Mr. T. Arkell.
<i>Henrietta 33rd</i>	1868	95	Mr. T. Arkell.
<i>Severn Lady</i>	1868	96	Mr. T. Arkell.
<i>Henrietta 34th</i>	1868	97	Mr. T. Arkell.
<i>Severn Lady</i>	1868	98	Mr. T. Arkell.
<i>Henrietta 35th</i>	1868	99	Mr. T. Arkell.
<i>Severn Lady</i>	1868	100	Mr. T. Arkell.

<i>Bulls.</i>			
<i>2d Earl of WALTON</i>	Mar., 1864	42	Mr. W. J. Edmunds.
<i>10th Earl of WALTON</i>	Mar., 1864	43	Mr. W. J. Edmunds.
<i>11th Earl of WALTON</i>	Mar., 1864	44	Mr. W. J. Edmunds.
<i>12th Earl of WALTON</i>	Mar., 1864	45	Mr. W. J. Edmunds.
<i>13th Earl of WALTON</i>	Mar., 1864	46	Mr. W. J. Edmunds.
<i>14th Earl of WALTON</i>	Mar., 1864	47	Mr. W. J. Edmunds.
<i>15th Earl of WALTON</i>	Mar., 1864	48	Mr. W. J. Edmunds.
<i>16th Earl of WALTON</i>	Mar., 1864	49	Mr. W. J. Edmunds.
<i>17th Earl of WALTON</i>	Mar., 1864	50	Mr. W. J. Edmunds.
<i>18th Earl of WALTON</i>	Mar., 1864	51	Mr. W. J. Edmunds.
<i>19th Earl of WALTON</i>	Mar., 1864	52	Mr. W. J. Edmunds.
<i>20th Earl of WALTON</i>	Mar., 1864	53	Mr. W. J. Edmunds.
<i>21st Earl of WALTON</i>	Mar., 1864	54	Mr. W. J. Edmunds.
<i>22nd Earl of WALTON</i>	Mar., 1864	55	Mr. W. J. Edmunds.
<i>23rd Earl of WALTON</i>	Mar., 1864	56	Mr. W. J. Edmunds.
<i>24th Earl of WALTON</i>	Mar., 1864	57	Mr. W. J. Edmunds.
<i>25th Earl of WALTON</i>	Mar., 1864	58	Mr. W. J. Edmunds.
<i>26th Earl of WALTON</i>	Mar., 1864	59	Mr. W. J. Edmunds.
<i>27th Earl of WALTON</i>	Mar., 1864	60	Mr. W. J. Edmunds.
<i>28th Earl of WALTON</i>	Mar., 1864	61	Mr. W. J. Edmunds.
<i>29th Earl of WALTON</i>	Mar., 1864	62	Mr. W. J. Edmunds.
<i>30th Earl of WALTON</i>	Mar., 1864	63	Mr. W. J. Edmunds.
<i>31st Earl of WALTON</i>	Mar., 1864	64	Mr. W. J. Edmunds.
<i>32nd Earl of WALTON</i>	Mar., 1864	65	Mr. W. J. Edmunds.
<i>33rd Earl of WALTON</i>	Mar., 1864	66	Mr. W. J. Edmunds.
<i>34th Earl of WALTON</i>	Mar., 1864	67	Mr. W. J. Edmunds.
<i>35th Earl of WALTON</i>	Mar., 1864	68	Mr. W. J. Edmunds.
<i>36th Earl of WALTON</i>	Mar., 1864	69	Mr. W. J. Edmunds.
<i>37th Earl of WALTON</i>	Mar., 1864	70	Mr. W. J. Edmunds.
<i>38th Earl of WALTON</i>	Mar., 1864	71	Mr. W. J. Edmunds.
<i>39th Earl of WALTON</i>	Mar., 1864	72	Mr. W. J. Edmunds.
<i>40th Earl of WALTON</i>	Mar., 1864	73	Mr. W. J. Edmunds.
<i>41st Earl of WALTON</i>	Mar., 1864	74	Mr. W. J. Edmunds.
<i>42nd Earl of WALTON</i>	Mar., 1864	75	Mr. W. J. Edmunds.
<i>43rd Earl of WALTON</i>	Mar., 1864	76	Mr. W. J. Edmunds.
<i>44th Earl of WALTON</i>	Mar., 1864	77	Mr. W. J. Edmunds.
<i>45th Earl of WALTON</i>	Mar., 1864	78	Mr. W. J. Edmunds.
<i>46th Earl of WALTON</i>	Mar., 1864	79	Mr. W. J. Edmunds.
<i>47th Earl of WALTON</i>	Mar., 1864	80	Mr. W. J. Edmunds.
<i>48th Earl of WALTON</i>	Mar., 1864	81	Mr. W. J. Edmunds.
<i>49th Earl of WALTON</i>	Mar., 1864	82	Mr. W. J. Edmunds.
<i>50th Earl of WALTON</i>	Mar., 1864	83	Mr. W. J. Edmunds.
<i>51st Earl of WALTON</i>	Mar., 1864	84	Mr. W. J. Edmunds.
<i>52nd Earl of WALTON</i>	Mar., 1864	85	Mr. W. J. Edmunds.
<i>53rd Earl of WALTON</i>	Mar., 1864	86	Mr. W. J. Edmunds.
<i>54th Earl of WALTON</i>	Mar., 1864	87	Mr. W. J. Edmunds.
<i>55th Earl of WALTON</i>	Mar., 1864	88	Mr. W. J. Edmunds.
<i>56th Earl of WALTON</i>	Mar., 1864	89	Mr. W. J. Edmunds.
<i>57th Earl of WALTON</i>	Mar., 1864	90	Mr. W. J. Edmunds.
<i>58th Earl of WALTON</i>	Mar., 1864	91	Mr. W. J. Edmunds.
<i>59th Earl of WALTON</i>	Mar., 1864	92	Mr. W. J. Edmunds.
<i>60th Earl of WALTON</i>	Mar., 1864	93	Mr. W. J. Edmunds.
<i>61st Earl of WALTON</i>	Mar., 1864	94	Mr. W. J. Edmunds.
<i>62nd Earl of WALTON</i>	Mar., 1864	95	Mr. W. J. Edmunds.
<i>63rd Earl of WALTON</i>	Mar., 1864	96	Mr. W. J. Edmunds.
<i>64th Earl of WALTON</i>	Mar., 1864	97	Mr. W. J. Edmunds.
<i>65th Earl of WALTON</i>	Mar., 1864	98	Mr. W. J. Edmunds.
<i>66th Earl of WALTON</i>	Mar., 1864	99	Mr. W. J. Edmunds.
<i>67th Earl of WALTON</i>	Mar., 1864	100	Mr. W. J. Edmunds.

High prices were not the rule; and, with the exception of a few favoured animals, biddings rarely rose above 60 gs. The highest price was given for OXFORD BEAU, scarcely a year old, which became Lord Penrhyn's property at 330 gs. Sir John Rolt secured DUNE OF FUSNISH, a yearling, for 200 gs., 2009, bred by Mr. R. Guiding, got by 2D DUKE OF ATRI (19,600), and of the Darlington tribe, was bought

by the same purchaser for 200 gs., and her daughter, DORLIDE, by 2D DUKE OF WETHERBY, became the property of Mr. S. Sayd, for 165 gs. The average of the 45 cows and heifers, including some very young calves, was nearly 47 gs., showing that although sensation prices were not frequent, the demand was uniform and well sustained. The bulls realised the unusually high average of 68 gs., principally due to the sale of OXFORD BEAU.

— Among forthcoming Shorthorn events are the sales of the Lillingstone Dayrell herd on the 30th inst.; of a large number of Mr. Cheney's herd on April 5; Mr. Wood's excellent herd at Stanwick Park, Darlington, on April 20; Mr. David Neasham's herd at Gainsford, Darlington, on April 21; the Knowlmore herd, the property of Mr. Jonathan Peel, on April 26; J. Mr. Eastwood's small herd at Whitwell, near Clitheroe, on April 26; and 50 head of Mr. R. Jefferson's (Freston Hows) on April 27. We hope on subsequent occasions to give some account of these herds, which, at present, we cannot do more than name.

A piece of good grass land is the desire, if not the envy, of almost every farmer, especially of the owner of valuable stock. We can hardly, however, boast of such pasturage in this country as is furnished by the prairies of southern Canada, described by Viscount Milton and Dr. Cheadle in "The North-west Passage." "The pasture is so nutritious that animals fatten rapidly even in winter—when they have to scratch away the snow to feed—if they find woods to shelter them from the piercing winds. No horses are on the property, and the only stock are the very young calves, whose only food is the grass of the prairies and the Vetches of the copses. The milch cows and draught oxen of Red River and in Minnesota, feeding on grass alone, were generally in nearly as fine condition as the stall-fed cattle of the Baker Street (Islington) show." With such pasture to graze upon, what improvement may we not expect to witness in our exported Shorthorns now finding their way into wilds until recently occupied by the bison alone?

SHEEP.

AT the recent sale of the Fieldhouse flock, bred by Mr. John Simpson for 50 years, many noted breeders were present. Gimmer shewlings in lamb made from 60s. to 71s., and averaged 66s. 6d. per head; selected ewes made an average of 77s. per head. The general flock brought 64s. 6d. per head; gimmer hogs, 50s. per head; tup hogs from 65s. 6d. to 162s. 6d. per head; and wether hogs 46s. 6d. per head. On Wednesday week the well-known Caythorpe flock, associated with Mr. Jordan's name, was disposed of. There was a brisk competition for ewes, the range being from 60s. to 71s., and the average price 64s. 2d. per head. Among the principal buyers were Messrs. Stevenson, Tranner, Hornby, Botterill, Brigham, Cockerill, Usher, Sawdon, Granger, and Robinson, &c. Wether hogs ranged from 47s. to 60s., and averaged 54s. per head, and the gimmer hogs ranged from 42s. 6d. to 51s. per head. The top hogs made an average of 65s., the top figure being 101s. 6d., given by Mr. Stevenson. The chief buyers were Messrs. Marshall, Leppington, Beckett, and Stevenson. The sale was a great success, and one of the most important of the season. Next Tuesday and Wednesday the whole of the stud and cattle at Caythorpe will be sold by Mr. Boulton.

THE LAND TRANSFER ACTS.

[These were the subject of discussion in the House of Commons on Tuesday evening by Mr. G. Gregory, M.P., and Mr. Wren Hoskyns, M.P., whose speeches are abridged below.]

MR. G. GREGORY moved a resolution in favour of increased facilities for the declaration of title from the office of Land Registry. The hon. member traced the course of inquiry and legislation on this subject, and stated that the Act of 1862 giving the Court of Chancery power to declare a title, remained a dead letter, and the other Act of that year, which established a registry of titles, made registry subject to conditions which were fatal to the operation of the Act. Two of these conditions were that a title must be shown to be indefeasible, and that the boundaries of land must be mathematically defined. To make a title indefeasible it must be traced back for 60 years, and must be shown that all charges on the land had been met, and had been duly and legally released. In actual practice minute defects in title were disregarded, the purchaser being unwilling to go to the expense of clearing them up. The second condition of registration was that the boundaries of estates should be clearly defined, and notice of the intention to register was required to be given to all adjoining landowners and to all occupying tenants, a regulation that frequently entailed considerable expense and trouble. By rendering such notice imperative persons were encouraged to make adverse claims, and to revive those which had been long dormant. A third requirement was that all subsequent dealings with a registered estate should be registered. In the case of the sub-division of land for building purposes it was a great hardship upon poor people who bought a plot of land for £20 or £30, and an angry should be compelled to pay an additional sum of £3 or £4 as the expense of registration. The Royal Commission which sat

to consider this subject in 1867 in their report stated that purchasers only required a marketable and not an indefeasible title. He suggested that the operation of the present machinery of the Land Transfer Office, which at present could only be put into motion on condition that an indefeasible title could be shown, should be enlarged, and that certificates should be granted in cases where an ordinary marketable title was shown, which should bear upon their faces certain reservations exhibiting whatever defects in the title might exist. He was certain that in most cases purchasers would be satisfied with such certificates, and if they were not, they would be able to get the defects cleared up at their own expense. If this proposal were adopted the large sums which were now spent in investigating titles would be saved, and the transfer of land would be rendered far easier than it was at present. The member concluded by moving that it is expedient to afford further facilities for the declaration of title through the office of Land Registry.

Mr. WREN HOSKINS felt obliged to the hon. member who had introduced that question, than which one more important could hardly be brought before the House. In the report of the Land Commission which he had just read, the member expressed his opinion that before any successful effort could be completed for the transfer of land there must be a revision of the law of real property altogether. The difficulty which really applied to the transfer of land arose in consequence of the length of title that must be examined into; and so long as the title must be of that length it was almost impossible to place on the register a title which could be made an easy commercial transfer between man and man. Why was it necessary to go back 60 years to get a title? Because so much power was given to landowners to make changes on the land that lasted over a great number of years; and of course there must be a correlative power to look into those changes when they endeavoured to make a title. It was a national misfortune that there were so few owners of land in England. Although we had no proper statistics on the subject, yet he believed there was scarcely a continental country where the ownership of the land was confined to so small a number of persons as was the case here. Such extensive improvements had been made in the land laws of Prussia, Bavaria, Austria, and even Russia, in this century, that we lagged behind almost every other European country in respect to the extension of the advantages, and he might say the blessings, of the ownership of land to the general community.

In England a man might go into an auction-room and bid for a piece of land, and the moment he had done so he found himself pledged to something equivalent to a positive lawsuit, which might extend over six months or two years before he could realise actual proprietorship. It was a disgrace to a civilised State that there should not be a power of acquiring a portion of the land of the country on terms a little easier than was the case here at present. The attempt to register the mere scraps of title to land could only result in the effect of burdening the register and making it more difficult to examine it. What was wanted was that the results should be registered, and that, he feared, could not be accomplished unless they made up their minds to have a greater number of fee-simple titles to land. There now existed so many estates for life, extending to the next generation, before the actual ownership of the land was decided by the fee simple. It had been said that it ought to be as easy to buy a house as to buy a horse; how would it be possible to buy a horse if the ownership of the one-half of it was in one century and that of the other half was in another century, as was the case with land? The real impediment to the transfer of land was the immense period over which the ownership extended. Our middle classes were accustomed to invest their money where they could at once obtain what they purchased—where there were no delays, no unknown costs, and where they could get rid of it and then with their bargain before it was completed; and as to our lower classes, they found the purchase of land to be utterly hopeless. In other countries the acquisition of land was an object attainable by the whole community. All the great political economists said that the accumulation of wealth might make a nation or a part of it rich, but that it was the distribution of wealth which made a nation happy, and defended it from any pauperising crime, and other evils to which society is liable. Let them apply the doctrine of Adam Smith to this matter, and they would find that in regard to land they now almost bade defiance to the principles continually appealed to as those which conducted to the happiness and prosperity of a nation. That subject of the transfer of land was made too much of a lawyer's question. They ought first to make the title itself transferable, and then its transfer would not be so difficult. The common charge against the Code Napoleon was that it subdivided the land to excess, prescribing so much and leaving so little scope to testamentary power, but in this country we almost imitated the mistakes of that code in a still more dangerous degree, though in a different way, because we cut up the ownership of land into so many different, deferred, and complicated interests, breaking down the true interest, such as a great variety of small estates. The hopes built upon Lord Westbury's Act

had been disappointed owing to that state of things. Lord Cairns' admirable intentions in regard to that subject were frustrated by the dissolution of Parliament; and Lord Campbell, Lord Brougham, the present Lord Chancellor, and, indeed, almost all the law lords had, in turn, attempted to give facilities for simplifying that question; but he was sorry to say he believed that none of those efforts would be successful until they first consented to alter the whole subject of the law of real property. That work was begun in Prussia in 1807, and completed in the middle of this century, and it had nearly doubled the value of land in that country, increasing the national happiness in a manner seldom witnessed in any State. The recent successes of the patriot soldiers of Prussia might be accounted for in no small degree by the fact that a large part of the Prussian army went from homes which they owned in fee simple to fight in a foreign country, and had those homes to return to when the war was over. He did not reproach our landed interest in this matter for a state of things of which he believed they were more the victims than the authors. Many men of their class had expressed a most liberal desire to see the transfer of land facilitated in England, and the great sub-division of the interest in land put an end to by fee-simple ownership, the state of public business would permit, he thought, and also in Russia, there was a practice of retaining under the system of entails land which belonged to ancient families who were looked up to with honour by the State; and in those cases exceptional entails were made. He did not see why similar means might not be used in this country for escaping from the great difficulty of any attempt to abolish or interfere with the right and practice of entail.

The ATTORNEY-GENERAL said this subject was under the consideration of the Government, and a Bill had been prepared to deal with it; but it was doubtful whether the state of public business would permit, its introduction during the present session. He had, however, the authority of the Lord Chancellor for saying that if the Bill were not brought forward this session it should be introduced early in the next one, and as on its introduction there must be a discussion, he thought, he might, perhaps, be excused from now going into the subject. He had no doubt the transfer of land could be dealt with, though to what extent he was not certain; but they might go far in the direction of cheapening and simplification. The Act of 1854 had turned out a failure, he might be believed, because it dealt only with indefeasible titles, which were difficult to obtain. The commission had suggested that the existing registry might be utilised, and that by the establishment of an additional registry the transfer of land with an ordinary title might be facilitated. That was the object of the Bill which had been prepared, and was now in the hands of the Lord Chancellor. Having made this statement, he trusted that his hon. and learned friend would not think it necessary to press his abstract resolution. The motion was withdrawn.

USE OF HORSES ON A STEAM CULTIVATED FARM.

YOUR "W. B." tells us that "the steam tackle will this year be in request, and should always be ready for work, not only for ploughing and smashing, but also for the harrow, seed, and manure drill. For all these purposes steam is infinitely better than horses."

Will steam tackle be in request "this year?" It ought to be. Horses are so scarce on the point of view of 53 acres of heavy land Wheat is a good witness. It is a good plant. The seed-bed, by steam and horse work, cost 5s. 11½d. per acre. It is the second crop under steam culture on this land, and the produce may be estimated at near, or quite, 40 bush. per acre. The average of last year's crop was 20 bush. per acre. Under horse culture, on an average of years, the produce did not average over 20 bush. per acre.

Take my 39 acres of heavy land Beans next. The seed-bed, worked to inches deep, cost 6s. 3d. an acre. The Beans were dibbled in by hand in February at cost of 3s. 6d. per acre, after which it was harrowed twice over with horses at a cost of 1s. per acre each time. The total cost of seed-bed and planting was 11s. 9d. per acre. A finer seed-bed could not be made, and the land is as clean as a garden. It is planted for the sixteenth crop under steam.

Now take No. 6, light land, 14 acres, for Barley—the fifth, white-strawed crop in succession. The cost of seed-bed, worked a foot deep, by steam-power, is 6s. 3d. an acre. The land is very clean, and a finer seed-bed never was seen. It will be harrowed down and drilled, and that will be all.

No. 5 light land is in Wheat after Beans. The working of the land a foot deep for Beans left this field in such beautiful condition that it needed only a cultivating with horses once over for this crop of Wheat. The total cost of such bed for Wheat stands at only 2s. per acre.

No. 4, light land, 12 acres, is for roots. The ridging and subsoiling by steam-power cost 6s. 3d. an acre. It is in beautiful condition. The portion for Mangel will be drilled in without anything more being done to it. The portion for Swedes will be scuffed down once, and then drilled upon the flat. My Swedes planted in this way last year were very good.

No. 3, light land, 11 acres, is Clover.

No. 2, light land, 13 acres, is in Wheat after Clover, the Clover lea being ploughed over with horses.

No. 1, light land, 12 acres, after roots is being ploughed by horses for Barley.

This is the summing up of my position on my 166 acres of arable land for my next year's crop, to effect which my steam tackle worked 18½ days. My horses worked over the 13 acres of Clover clean, and completed the Wheat seeding in the autumn. They are now ploughing my land for Barley, after roots. They have harrowed my Beans twice over, and my 53 acres of heavy land Wheat once over; they have clod-crushed my 13 acres of Clover lea Wheat, and they will complete my spring seeding. Excepting the few acres of ploughing, they have now only to plant my Barley and roots.

This 18½ days' work of steam tackle has effected a great saving in the cost of seed-bed, and the gain in produce on my heavy land is very great, yet the work on the 166 acres is done. Those persons who carp at interest of money, &c., must be dumb, for that (of £200 only) never ought to be a stumbling-block in the way of such results; and wear and tear, &c., cannot be a stumbling block, for 18½ days a year cannot wear tackle much. Landlords are doing all they can to keep the farmer from getting up to the steam-hiring system. I will do my best to open both their eyes by giving the plainest possible facts, and steam-tackle will not "be in general request" till their eyes are opened.

Now for the next point. "W. B." says: "and should always be ready for work, not only for ploughing and smashing, but also for the harrow, seed, and manure drill."

What "harrow" my Beans and Wheat by steam-power? Why, "W. B." must be daft, or talking without practice. My Bean harrowing, done twice over with horses, cost me 2s. per acre. The horses did no damage whatever, and the land is now in beautiful condition, and my horses did my 53 acres of Wheat harrowing at 6d. an acre, without damaging the land at all. Now let "W. B.'s" steam-engine go, be it a locomotive or common portable, no matter which kind of engine it is, and it will do the work of both Beans and Wheat, and the cost would be all thrown away; for until harvest carting, &c., is done by steam, horses must be kept. Then it would be wasteful not to let them do these trifles, that they can do better than steam can.

Lord Dunmore tells us that he did his harvest cart last year, but he does not tell us that he did everything without horses, "W. B.'s" harrowing, &c., included. His Lordship is now getting up a company, £50,000 strong, to do everything. My No. 6 light land, 14 acres, is in nice condition for planting with the fifth white-strawed crop in succession; horses can plant it without doing damage, but steam tackle could not. The Scotsman of March 2 can tell you a lot as to what Lord Dunmore can do.

Now, for drilling "seed and manures." I have spent hundreds of pounds in perfecting machinery to effect the sowing of seed, and manures, and in making an efficient working machine, but the work when done is not invaluable, therefore I have abandoned its use; and as to the latter, it would be a piece of wastefulness to attempt it. On Saturday last I received by boat 12 tons of superphosphate, 8 tons of which was taken at once to my 53 acres of heavy land Wheat, and three men sowed it broadcast within the day. Therefore the cost of sowing is not over 14d. per acre. Steam-sowing is more than a hundred times as much as sowing, and the damage it would do.

The results that I get by the use of steam-power can be had only by working the land by that power in the autumn, and using horses (that we shall be obliged to keep to cart the corn) for the light and useful purposes. The £200 for machine standing idle year after year, excepting about 18 days a year, is mere dust against the large lump in the shape of money spent in the purchase of the machine, and in the wear and tear to add to the bit of dust. The contract plan cannot give the work in the autumn, therefore it must in the end break down. Hear a contracting man upon this point. Mr. Isaac Robinson is one who says that a high price to the contractor must be the order of the day, and here are his reasons why:—

"1. Because the wear and tear of machinery is so much heavier; moving from farm to farm and travelling on the road try the engine as much as working."

"2. Because contractors have to pay high wages."

"3. The contractor has special expenses, such as cost of superintendence, horse keeping, horse hire, attending fairs and markets, advertising, expenses in seeking work and collecting debts, besides the interest of capital and the fair profit that every man in business has a right to have."

"4. Because contractors can only work a certain number of days in the year. Besides the inevitable stoppages, repairs, bad weather, &c., there are occasional strikes from work, so that the contractor who can secure from 150 to 200 days' work in the year is a lucky fellow. Contractors lose so much time in moving from farm to farm."

"5. Contractors must often use bad water, or go without water."

"6. Want of work during spring and summer. From April to July this year (1870) although this is a district of summer fallows, and the weather was everything that could be desired, there was very little steam-cultivating going on. A district that can only find work for steam

tackle during August, September, and October, must always pay dear.

Then, according to the evidence of Mr. Robinson the contract plan is a bad one. The contractors as well as the farmers generally like work done twice over. The general charge for such work is from 20s. to 25s. an acre.

Let us compare the cost of contract work with the cost of my own work. I will fix the cost of contract twice over at 20s. per acre, and my own work stands thus:—

53 acres of heavy land, Bean and Pea stubble, for Wheat, sown in 62 days, cost men and horses	£ 5 12 10	
Scuffled once with horses	5 6 0	
65 acres of Wheat and Barley stubble, &c., for Beans 39, Barley 14, and roots 12 acres, ridged and subsoiled in 12 days, cost for men and oil	£ 11 11 0	
The acres have been planted with Beans without any farther operation, and so will the 14 acres for Barley, and so will also the 4 acres for Mangold; the remaining 8 acres for Swedes will be scuffled once at a cost of		
	0 12 0	12 3 0

This shows clearly that the whole seed-bed on my 118 acres of steam-power worked land cost me £23 1s. 10d., exclusive of coal, interest of money, and wear and tear. The sale of my horses, sold off at starting, with their keeping, puts the interest of money question right; and it will be clearly seen that the wear and tear of only 183 days, as the year's work, cannot be much; and the farmer who has his work done on the contract plan, finds coal and water. Then my saving for the year on the 118 acres stands thus:—

Upon the contract plan the 118 acres, done twice over (and that would not have given so good a seed-bed on the whole of my land as I have got would have cost, exclusive of coal and water	£ 18 0 0	
Cost to me, exclusive of coal	23 1 10	

Gain on my side for the year £ 9 18 0

This £9 18s. 2d. saving for the year's work surely is enough to justify me in keeping a set of tackle of my own to work my 166 acres of land; and besides that, the gain in the shape of results that I do get could not be had unless my work was done when it was, in September and October; and farmers, to make sure of having their work done at that time, must keep tackle of their own. Mr. Robinson's evidence is conclusive upon the point. *William Smith, Woolston, Bletchley Station, Bucks, March 7.*

THE PRACTICE OF ARTIFICIAL MANURING.

PROFIT AND LOSS.

We extract the following from Mr. Lawes' recent lecture before the Maidstone Farmers' Club.]

TAKING, however, the Rothamsted experiments as they stand, let us now examine what results they give when brought to the standard of profit and loss? In the Barley field the average annual produce obtained by the annual application of 300 lb. of superphosphate of lime and 25 lb. of soda, or instead 275 lb. of nitrate of soda, has been, as already stated, about 6 qr., or 48 bush. of dressed corn, and 23 cwt. of straw. As the supply of nitrate of soda in the market is much greater than that of the ammonia salts, I will adopt the nitrate as the basis of calculation. We have then the cost of the crop per acre, approximately, as follows:—

275 lb. or, say 2 cwt., nitrate of soda, at 16s.	£ 3 0 0	
24 cwt. superphosphate of lime, at 5s.	0 13 0	
Sowing manure	0 1 6	
Rent, tithes, and rates	1 10 0	
Ploughing	0 10 0	
Scarifying	0 3 0	
Hoing and weeding	0 4 0	
Rolling	0 2 0	
Drilling	0 2 0	
2 bush. seed, at 4s. 3d.	0 12 0	
Hoing and weeding	0 7 0	
Harvesting	0 10 0	
Threshing and dressing, at 2s. per qr.	0 12 0	
	£ 13 10 0	

The above may be considered as a close approximation to what would be the annual cost of growing a crop of Barley for a number of years in succession, at Rothamsted.

On the other side of the account, we have—

6 qr. of dressed Barley, at £1 16s. per qr.	£ 10 0 0	
1 bush. of offal Barley, at 2s. 6d.	0 7 6	
25 cwt. of straw, at 1s.	1 0 0	
	£ 11 7 6	
Cost of the crop	13 10 0	
Profit per acre	£ 1 18 6	

I will next call your attention to a few of the experiments on the continuous growth of Wheat. The first crop of the series was harvested in 1844, and the 28th in successive years is now growing. Omitting the results of the first eight years—1844 to 1851 inclusive—when the manures were not exactly the same as they have been since, we have, as in the case of the Barley, a period of 19 years—1852 to 1870 inclusive—during which the same manures have been applied to the same plots year after year. Plot 5 has received each year a

mixture of salts of potash, soda, and magnesia, and superphosphate of lime; Plot 6 the same mineral manures as Plot 5, with 200 lb. of ammonia salts per acre; Plot 7 the same mineral manures, and 400 lb. of ammonia salts per acre; and Plot 9 the same mineral manures, and 550 lb. of nitrate of soda per acre. The following are the average results over the 19 years:—

Per acre, per annum; 19 years, 1852-1870.		Aver. produce.	
Plot.	Manures.	Dressed Corn.	Straw.
5	Mixed mineral manure, alone	17	15
6	" " " and 200 lb. ammonia salts	27	25
7	" " " and 400 lb. ammonia salts	36	36
9	" " " and 550 lb. nitrate of soda	37	41
14	tons farmyard dung	36	34

Thus the mixed mineral manures alone give, over 19 years, an average annual produce of Wheat, of 17 bush. of corn, and 55 cwt. of straw, per acre. The addition of 200 lb. of ammonia salts per acre to the mineral manures gives an increase of 10 bush. of corn, and 10 cwt. of straw; the addition of 400 lb. of ammonia salts to the mineral manures gives an increase of 19 bush. of corn, and 21 cwt. of straw; and the addition of 550 lb. of nitrate of soda to the mineral manures gives an increase of 20 bush. of corn, and 26 cwt. of straw. The farmyard dung, on the other hand, gives the same amount of corn, but 2 cwt. less straw than the mineral manures, and 400 lb. of ammonia salts; and 1 bush. less corn, and 7 cwt. less straw than the mineral manures and 550 lb. of nitrate of soda.

It is evident from these results, that in the case of moderately heavy land like that of the experimental field at Rothamsted, full crops of Wheat may be grown for many years in succession, by means of the annual application of certain mineral constituents, with ammonia salts, or nitrate of soda, in addition.

Taking, again, the cost and result with nitrate of soda as the basis of calculation, the following will be the money account per acre of the experiment on the continuous growth of Wheat.

200 lb. or, say 2 cwt., nitrate of soda, at 16s.	£ 3 0 0	
24 cwt. superphosphate of lime, at 5s.	0 13 0	
Sowing manure	0 1 6	
Rent, tithes, and rates	1 10 0	
Ploughing	0 10 0	
Scarifying	0 3 0	
Hoing and weeding	0 4 0	
Rolling	0 2 0	
Drilling	0 2 0	
2 bush. seed, at 4s. 3d.	0 12 0	
Hoing and weeding	0 7 0	
Harvesting	0 10 0	
Threshing and dressing, at 2s. per qr.	0 12 0	

On the other side of the account we have—

17 bush. of dressed Wheat, at 6s.	£ 10 0 0	
25 bush. of offal Wheat, at 2s. 6d.	0 7 6	
41 cwt. of straw, at 20s. per load (1296 lb.)	3 10 10	
	£ 13 17 10	
Cost of the crop	13 10 0	
Profit per acre	£ 1 15 4	

There are several reasons why the results with the Wheat are not so satisfactory as those with the Barley in point of profit. The crop is much more costly to keep clean; and, as you will see, I have charged 7s. for hoeing an acre of Barley, but 20s. for hoeing and cleaning an acre of Wheat. Again, for a given weight of corn there is nearly 1½ times as much wheat-straw as barley-straw; and with the winter-sown and stranger straw-crops are enabled, in the average of seasons, to ripen a greater weight of total produce. The result is, that, to obtain a full crop of Wheat we have to employ about twice as much ammonia salts, or nitrate of soda, as is required to yield what may be called a corresponding crop of Barley. Thus, 48 bush. of Barley, and 36 or 37 bush. of Wheat, may be taken as nearly equal money value; but to grow 48 bush. of Barley we have used only 200 lb. of ammonia salts, 275 lb. of nitrate of soda, producing at the same time only 28 cwt. of straw; whereas to get 36 or 37 bush. of Wheat, we used 400 lb. of ammonia salts, or 550 lb. nitrate of soda, and produced about two tons of straw; withdrawing, of course, at the same time, much more mineral matter from the soil.

It is obvious that, in growing Wheat or Barley year after year by the manures above described, and removing both corn and straw from the land, the exhaustion of mineral constituents will show itself sooner in the case of Wheat than in that of Barley. Hence it is that, in the Wheat account given above, there is the heavy charge of 50s. for salts of potash, soda, and magnesia; whilst there is no such charge against the Barley crop. The amount of those salts annually used in the particular experiments quoted was, it is true, considerably more than would be required to compensate for the exhaustion by the annual use of crop plants. It must be distinctly borne in mind, however, that the Rothamsted experiments are not arranged with a view to providing direct examples of profit. At the same

time, the fact is clearly brought out, that more money must be expended on nitrogenous manures to yield a given money value in Wheat grain, than an equal value in Barley grain. Calculations show, indeed, that, of a given amount of the expensive constituent nitrogen supplied in manure, a larger proportion is taken up from the soil by the Barley than by the Wheat crop.

To conclude, in regard to the Wheat experiments, I am sure you will agree with me that the fact of having removed 27 full crops in succession from the same land, is one of the greatest possible interest and importance, as showing what constituents must, and what need not, be applied to the soil for the successful growth of the crop. But, although the growth of Wheat under such circumstances may require the employment, as manure, of expensive constituents, such as potash, it is by no means to be concluded that such manures would be requisite under the very much modified application of the system of more frequent corn growing, which could alone be followed in farming "with a view to profit."

Home Correspondence.

Sewage Manure.—As the season approaches for farmers and others looking out for artificial manures, it is not inopportune to relate an experiment with manure from sewage, and which, in the interest of the producers of such wares, is important to guard them against attaching over much faith to testimonials, which, in many cases, are too conveniently acquired. In June last year serious complaints (for a sample of which see the "Royal Commissioner's Second Report, 1870," p. 32), were made against the A. B. C. Native Guano Company, Limited, for the state of their works at Leamington, by the occupants of the residences in their neighbourhood, the nearest of which was not less than 150 yards, the farthest away 750 to 800 yards from them. The local board were appealed to, who, in fear of further consequences and liabilities, insisted on the works being instantly cleared out. This was no easy matter, for where could they be cleared to? In the extremity, application was made to a farmer in the neighbourhood to place one of his grass fields at their disposal. From a very ill-defined arrangement between the company and the farmer, the latter, on being presented with an account of about £350 for manure supplied, entirely repudiated their construction of the bargain, and would have nothing to do with the stuff. Fortunately for the company, though less so for cultural interests, the manure, after having been spread about for nearly four weeks, was scraped together and returned to the works as saleable native guano—about 97 tons of it. In the interest of agriculture and horticulture, such an experiment was not to be mistaken nor lost sight of, and its importance accounts for the accuracy of the details. As carts could be had, the removal from the works had occupied more or less of eight days. Some days 75 loads were put out, 54 loads another day, 41 another, and as few as 12 on the last day of removal. The field is from 6 to 8 acres. One of the largest drains, which covered 11 to 12 running yards, by 9 to 10 feet in width. The carts averaged 5½ feet long by 3½ feet wide, and were filled 18 to 24 inches deep. There must have been cleared out somewhere about 600 loads of sludge of the best kind in the works, rich-looking black mud, which was so difficult to get into the dry state. By the application of such concentrated material, it would not have been surprising to have seen the field burnt up, and the remainder to have been beyond a little leaviness where the messer stood, there was nothing of the kind, and to-day the field does not look so well as the meadow on the other side of it, nor is it so good as any grass field in sight of it; and, as a comparison which most people must understand, it is not so green in colour as the Warwick Common, where the races are held. The application recommended by the company is about 8 tons [7 cwt.] per acre, but in this instance was a dressing of 20 times that quantity, and a small stream of water was now not a vestige remains to mark the application; even the corner of the field where the stuff was collected to be riddled and served up for market, the place where the heap stood, is hardly discoverable but by the sharpest observation. This is a result from Leamington sewage, which, from the style of its population, must be considered rich. *A. S. C. O. T., March 8.*

The Drying of Hops.—Some time ago my attention was directed to a proposal made by a gentleman who read a paper before the Society of Arts, and who suggested the applicability of the chloride of calcium process to the above operation. It was, however, not adopted by the Society of Arts, and the Hop Hop farm has now its hops, which could not well be re-arranged without considerable expense, the application of the new process in the existing buildings would be attended with much difficulty, and the multiplying of many drying places would be a waste of capital. The author therefore proposed "the concentration of the work, now so divided and scattered, into a central drying house or factory for each district," to be worked on the "dry cold blast" and "chill" system as now being present during the discussion, following the reading of this paper, I thought this rather a sweeping proposal, and as I felt that (granting the

utility of the process?) all parties might not be prepared to entertain it, and a counter proposal, based upon the supposition that all Hop farmers would be ready to economise their fuel in the existing oasts. I suggested (as I have done for the drying of tea) the applicability of the hot-water system of heating, but that portion of my remarks was not published. It might almost be expected that a proposal of this kind would be both made and received with diffidence, for I have no interest or experience in Hop curing, no interest whatever in hot-water apparatus, and nothing even to encourage me to make such a proposal public. Nevertheless I do believe that the heating of the air of a Hop kiln, or a Tea kiln (if I may so call it), may be accomplished with more economy and with more safety by means of hot-water pipes than by means of open fires; and merely for the love of truth I commend the proposal to Hop farmers, Tea planters, and others.

James McPherson.

Co-operative Societies.—Mr. Spooner complains because I have been "pleased to attack a letter" of his attacking these societies, and then attacks me for correcting him, and stating the result I have experienced in the dealings with co-operative societies. I have no doubt your correspondent feels perfectly satisfied he has acted with logic and consistency. Mr. Spooner does not ask the question, "Is the farmer to sacrifice or to remain indifferent to such advantages" (offered by the co-operative societies) "for the sake of the 'trade of Romey', or any other town, and in order that the Government taxes may be paid?" And he "declines to argue the question on such a very narrow basis as that indicated, as to whether I or any single manufacturer can offer better terms and surer to a Member than his co-operative society." Nor does he suggest any foundation for inform Mr. Spooner the only way in which it is possible for him to protect that "trade" about which he appears so nervously anxious, and to render co-operation harmless, is to offer feeding-stuffs and manures on as advantageous terms as these societies, which act precisely in accordance with the principle of the motto, "Live and let live." This reminds me to ask if your correspondent believes those dealers whose proceedings have been frequently alluded to by the Royal Agricultural Society of England by Dr. Voelcker, and to that of the agricultural classes by the *Mork Lane Express*, have taken for their motto "Live and let live," and have acted up to its precepts? I think the owners, whose cattle died from the effects of the poisonous rubbish supplied by those gentlemen, who are so solicitous of giving the farmer "credit," will have had reasons enough to come to a contrary conclusion. These practices of the "traders" are no means cold-blooded, oh no! The farmer only "cold-blooded" because he seeks protection from dishonesty, and goes to the cheapest market. Is this not right, both in "principle and practice?" That "very narrow basis" on which Mr. Spooner "declines to argue the question," indicates no more nor less than the whole of the interest the farmer has in this subject. But that Mr. Spooner is so concerned for the welfare of the farmer that he is not prepared to let the farmer go on his "base" for the farmer's widely expanded mind to consider! Your correspondent asks: "Can a thing which is wrong in principle be right in practice?" I will answer by asking another question. Is it wrong in principle to co-operate, with a good object in view? Your correspondent also asks: "Should a system which, if thoroughly carried out, is destructive to trade, commerce, and industry, be encouraged, on the ground that its operations are likely to benefit a few?" Most decidedly my system should be heartily encouraged and actively supported which would effect the "destruction" of such "trade, commerce, and industry" as have been before alluded to. But while the co-operative society in London will have this effect on the trade of vendors of adulterated feeding stuffs and manures, it will have precisely the contrary effect on the "trade, commerce, and industry" of those who manufacture and sell pure and unadulterated commodities. This society purchases nothing for its members but what is perfectly pure, thereby encouraging honest and fair dealings, and discouraging dishonest and unfair transactions. The farmer, finding he can depend on the society for sending him everything pure, relinquishes the plan he has been driven to adopt by the practices of some of the merchants, of feeding his stock on the grain raised on his farm, and buys more freely of the manure in consequence; and finding also he is in this way supplied at a cheaper rate than he would be direct by the trade, and the profits being larger, he has a larger balance than he otherwise would have to expend in artificials. I say, therefore, though "its operations are limited" only with regard to the quality of the articles with which the members are supplied, the benefit derived is a national one. Mr. Spooner boasts of the "credit" this lucrative "trade" offers to give the agriculturist, but says nothing of the general percentage the "trade" exacts for this "credit." How much better it would be for the agriculturist if, instead of having this "credit" given him, he had retained some of the capital this opulent class of traders have amassed out of the enormous profits of their business? I feel profoundly grateful to Mr. Spooner for conceding that I have "a perfect right"

to make my purchases wherever I please, and I have no doubt other farmers claim a similar right, whether Mr. Spooner wills it or not. With Mr. Spooner's permission, I again subscribe myself, of the Agricultural Co-operative Society, *A Member*.

Prices of Railway Land.—In answer to your correspondent, "P," I may state that, judging from my experience, he should have from 30 to 35 years' purchase on the annual value of the land actually taken by the company, that is, on the assumption that the land is freehold. He should also be allowed compensation for compulsory sale. In this neighbourhood (the north of England) 50 per cent. on the annual value of the land actually taken is usually given; but I understand that in the south 25, and even as little as 10, to the rule, the rule. He should also be compensated for severance (often a very serious injury to an estate), and for any alterations that may be rendered necessary in the cultivation of fields, stubbing up old and forming new fences, &c. He may also claim to be compensated for general depreciation of the value of the whole estate. *Agricola*.

—Permit me to suggest, in reply to your correspondent, "P," in last week's paper, that he should employ a competent surveyor to act on his behalf in agreeing with the railway company for his land, who will probably advise him that other important questions besides the number of years' purchase and the addition for forced sale will have to be taken into consideration. The fee to his valuer will be paid by the company. *William Brown, Tring, March 13.*

The Peruvian Guano Trade.—A few days ago I purchased some Peruvian guano for application to my spring corn, and found on analysis that it contained nitrogen equal to only 9 per cent. of ammonia. On representing this to the agents of the Peruvian Government, I was informed that I might return it. I accordingly did so; as I considered that the increase of corn arising from the use of the guano would not be sufficient to be remunerative. I then requested to be supplied from some other cargo, or to be allowed to have a sample for analysis—both these applications were, however, refused. It is, of course, at the option of the seller to settle upon what terms his goods shall be sold; at the same I feel bound to protest against the adoption of rules in regard to the sale of guano which would inflict great injury upon the farmer purchasing it, and would at the same time run the risk of the seller's communication on this subject, which you were good enough to publish in your journal some weeks ago, I gave the results of the analysis of a number of samples of guano from the Guanape Islands whence the supplies now in the market are obtained. It appeared that the composition of this guano was extremely variable. Thus the amount of ammonia ranged from nearly 19 to under 4 per cent., and that of the phosphate of lime from nearly 40 to under 5 per cent.; and, as a result, being a difference in the estimate value of a ton from over £15 to under £7. Every intelligent farmer is now aware of the special value of manures rich in ammonia for corn and grass crops, and of the special value of phosphatic manures for root crops; but according to the absurd regulation of the Peruvian Government, or of their agents, he is not to be allowed to take advantage of this knowledge. If he buy guano, he must do so in ignorance of its composition and value, and at an uniform price, whatever its composition and value may be. He must, in fact, take the chance whether he is supplied with a manure rich in phosphates and poor in ammonia, for his corn crops, and one rich in ammonia and poor in phosphates for his root crops, or vice versa. To what extent the cargoes of the guano now imported vary in quality, I am not in a position to say. But a sample which I had analysed from another cargo contained nitrogen equal to 12 per cent. of ammonia. By way of illustration, I may mention that, at the present importers' price, the guano containing only 9 per cent. of ammonia, to which the agents confined my choice, would, as a source of ammonia, be equivalent in cost to nitrate of soda at £25 7s. per ton; and in the same way, that containing 12 per cent. of ammonia would be equal to nitrate of soda at £19 per ton. I would therefore suggest that the agricultural community, united, must certainly prove sufficiently powerful to secure reasonable regulations in regard to this matter. It is of the utmost importance to the farmer that he should no longer purchase guano in entire ignorance of its composition, and so without any means of judging of its suitability, or otherwise, for the crop for which he requires it, and also that he should no longer be compelled to pay one uniform price for it irrespectively of its value. *F. B. Lawes, Rothamsted, Feb. 25.*

The Crops of the Farm do not meet with the consideration they ought to receive from the great body of farmers. It is a matter of high importance, and well worthy of the closest attention of every farmer. It is the cultivation of the soil, and the way much toward the abolition of the many abuses and habits of management between landlord and tenant, so that nearly every intelligent tenant has the privilege of arranging his own course of management and cropping. It is the profitable exercise of this liberty to which I desire to direct attention. Every farmer ought to ascertain the natural powers and fertility of the soil under his cultivation, as also the amount of expen-

diture in money and artificial manurial aids he proposes to bestow upon his crops. This may involve some little study of agricultural chemistry, or if not by study information must be obtained as to the adaptability of certain manures to certain soils; but this is readily obtained in the present day from innumerable sources, so that in reality he has only to decide as to the most profitable crops he can produce upon his farm. There is another view to be taken of this question, and it is exceedingly important for the benefit of the general public. It is heavy produce that is now most needed for the public welfare. It is the growth of roots and edibles which is becoming more and more valuable. Grain can be imported into this little kingdom to almost any extent, but meat and vegetables are not of such easy attainment, and must be produced at home to a large extent. Now it is desirable that this order of cropping should be more practical than formerly, in order to increase the production of animal food, which is now, and likely in future to be, the great want of the population of this country. The production of these roots and edibles has been astonishingly promoted by modern appliances and culture. The weight of certain of these crops now grown per acre is almost beyond belief. The writer can vouch for three crops of Mangels, two of which were grown in the past season, *i. e.*, 62 tons, 74 tons, and 89 tons per acre, respectively. Wonderful crops of growth of great weight per acre. Turnips, too, can be produced of surprising weight per acre. Cabbages in all their varieties produce immense crops. Potatoes are worthy of more extended cultivation, and yield large supplies of food both for man and beast. These root and edible crops are now, for the most part, the real products of agricultural chemistry. Artificial manures are fast becoming general in their application, and it is by their use in the main that these wonderful crops are produced. Farmers, then, must consider their position in relation to the requirements of the country. Meat is very dear, and in great demand. Is it, then, most profitable to grow more roots and less corn? should be the inquiry of every farmer; as also, Is the farm in my occupation adapted for root culture, or can I by artificial aids make it so? Many facts are in favour of root culture upon farms and in districts not heretofore considered adapted to the growing of such crops. Modern appliances, and manurial aids have done much upon the better soils, but they will do more for soils of inferior quality and power. *O. F.*

Questions on Steam Cultivation.—I was fortunate enough to get the loan of a neighbour's steam-cultivating apparatus (a Fowler's double set), which broke up and worked across 50 acres of Wheat stubble in the early in September last. Thirty acres of this land had the advantage of two turns of the same tackle in the summer of 1869, being then Clover lea, broken up and fallowed for Wheat. The remaining 20 acres were Wheat in 1870, Beans well manured in 1869, Wheat in 1868, and Clover well manured in 1867. It is now proposed to put 40 acres of the above into Barley, and 10 acres into Mangel. The Mangel drift was mostly manured with good short farmyard manure, and being so manured, the thirty acres of this land has been recently drained by the General Land Drainage and Improvement Company, and is naturally thin land with cold clay subsoil—such, in fact, as no farmer would have thought of planting with Barley before the draining and steam cultivating had been done. The ground has not been touched since the cultivator left it, and now seems in fine tilth and condition. Will some of your experienced correspondents kindly inform me, through your journal, whether this is much risk in adopting the above course of cropping, or if any other system would be preferable. Will it be desirable to horse-cultivate before planting the Barley, and what kind and quantity of manure will be required? Having only recently become a subscriber to the *Agricultural Gazette*, I have not had the advantage of reading any articles on the above subject that have appeared in its columns. *Midland.*

Ploughing Match in the North Riding of Yorkshire.—The Sutton Forest Ploughing Society held their fifth annual ploughing meeting March 7, on the estate of the Hon. Admiral Dundcombe. The soil was a light, sandy loam on clay subsoil. The ploughing, for neat workmanship, greatly surpassed that of any previous year. Liberal prizes were given, which brought together 25 single-plough competitors in three classes, viz., swing-ploughs, wheel-ploughs, and single-furrow ploughs, and 18 boys under 18 years of age. The chief attraction of the day was the trial of three double-furrow ploughs, brought together by Mr. Bushel, of York. A double-plough by John Fowler & Co., Leeds (an improved Pirie's patent), carried off first honours, beating Ramsomes, Sims & Head, Ipswich. A very excellent plough from Messrs. Howard, Bedford, was disqualified, owing to arriving too late in the field. The trial was a most interesting one, and the following dynamometrical tests of the ploughs were as follows:—Fowler's, 354 stones; Ramsomes', 373 stones; Howard's, 313 stones; single wheel plough, 25 stones. The double ploughs in each case were drawn by one pair of horses, which seemed to do their work comparatively as easy as the single-plough horses. The formation of the above Society has greatly improved the agricultural classes in this district, and it ought to

stimulate neighbouring villages to imitate the example of the Sutton Forest Ploughing Society. *W. S. Campbell.*

Sale of Dairy Milk.—I have made inquiry of Lord Rivers' tenants in this parish, of whom there are over 20, whether they would like to sell their milk, and get rid of further trouble. Such as I have seen object on the following grounds:—1, they do not count it slavery; 2, their occupation would be gone; 3, they could keep no pigs; 4, they would not like to send twice a day to the town. They seem to take Sir George Jenkinson's view of the matter. A Londoner lately offered my neighbour, Mr. Hallett, to take all his milk, but he refused, for the above reasons. *W. F. Radcliffe, Oxford Fitz-paine.*

Foreign Correspondence.

PARIS: March 14.—The March, or spring cereals, as they are called, being of immense importance to France this year, M. Pomarel, an agriculturist of the department of the Dordogne, writes to a Paris paper stating that for many years past he has sown autumn Wheat in March and has obtained as abundant crops as when the seed was sown before the winter set in. He has, he says, ceased to make any distinction between spring and autumn Wheat; the only point to which he attaches importance is to sow the seed in well prepared and well manured ground, and under favourable conditions of the atmosphere. He declares that seed sown at the end of February or in March, under good conditions, yield him better crops than seed which is sown under the most favourable conditions in the late autumn. He adds that the same experiment has been made with Rye, and with equal success. The plan of proceeding which he adopts and recommends is, that in order to gain three or four days the seed should be steeped for some hours in water, not too cold, and with the usual dose of sulphate of copper, 100 grammes to the hectolitre (33 oz. to 22 gallons), the seed to be sown broadcast, but rather more thickly than usual, and very carefully harrowed, or, which he thinks better, raked by hand. M. Pomarel's plan cannot be applied to all lands and under all climates.

The accounts from the provinces are very sad: farms without servants, horses or cattle; houses abandoned, fields lying fallow, the plough lying rusting in fields untouched since October, broad plains where the young crops have been trodden under foot by thousands of heavy-booted strangers; villages where the few inhabitants that remained lived miserably in cold and idleness, under roofs where the enemy was master: such are the spectacles which are to be seen in 40 departments, which include some of the most fertile cornfields of France. The neighbourhood of Orleans has suffered very severely; from Beaugency to Tivernon, and in the Sologne, scarcely a hamlet has escaped,—everywhere battles have raged, the land converted into camps and trampled under foot by battalions passing and repassing. With the loss of crops the hope for the future is gone. The countries covered over with ruins, strewn with corpses of man and horse, and almost without labourers? What little Wheat escaped the ravages of the enemy has been almost utterly destroyed by the severity of the winter. The only chance is in the sowing, which is now being effected as fast as possible, fortunately, in propitious weather; but seed is scarce, as well as hands and implements, and all the aid that can possibly be given to supply these deficiencies is urgently required. Much, however, is being done, but the wants are enormous, and every drill and rake, every man and every horse, will be a blessing to the unfortunate farmers. Fearful is the price paid by the provinces for their Imperialist votes; terrible the infliction caused by the other extreme party whose mad clamours caused the farmers to chance anything in the vain hope of order being maintained. The lesson has been a fearful one, and the new *Mars* will be well remembered, who had its proper effect. In the Lot and Garonne, as well as in many other departments, the necessary seed is not to be found; and black Oats, Maize, Sorgho, Peas, Haricots, Tares, Vetches, Lucerne, and Cinquefoil, are much wanted. The agricultural committee of Agen and other centres are doing all they can to supply the deficiency; but every one who can send a few bushels of seed to any of the committees should do so as Christian duty, and that immediately—March will soon run out.

The South has suffered far less than the rest of the country; the spring operations are there proceeding rapidly. Round about Lyons the Wheat looks well, and the meadows assume their emerald dress again, but the trees and plants are in a sad condition; the Vines have suffered much from the severity of the winter, the espaliers have also been more or less injured, while the fruit trees in the open orchards have generally escaped. In other departments and provinces the Vines have not been so seriously injured as was feared. In the Maraisles country the Wheat is reported to be magnificent, finer in many places than it was at the same period last year. The accounts from the Landes, Gers, and the Pyrenées are equally satisfactory; the crops promise to be magnificent. It is pleasant to be able to record one gleam of sunshine amid so much cloud.

If charity begins at home, it is natural that it should

also visit its nearest neighbours first; the condition of Normandy calls for all the aid that can be given. A large portion of the autumn sowing has been killed by the cold of January following the melting of the snow, and the seed now in later still is not much better off—nearly all the fields have to be resown. Fortunately this state of things is not universal; while the Seine-et-Oise is ruined for the moment, in Upper Normandy, the Eure, and the Seine Inférieure the crops are not injured; in Calvados, too, the cereals have escaped, but the Colza crops on the strong and damp lands have been destroyed by the frost; in some parts the Colza is being dug in, and the land sowed with spring Wheat.

The number of cattle killed by the rinderpest was so large, and the number of men and women who were employed in burying the carcasses, and three telegrams for more assistance were sent in one day to the Prefect of Châteaulin: all the sewer-men were sent at once, and 200 Mables. The disease has appeared in La Breuse, where 32 animals perished on one farm alone. M. Chaveau, Professor of the Veterinary School of Lyons, has been commissioned to take the necessary measures. All fairs are interdicted, in consequence, in the department of the Loire the best is allowed to be taken away from any commune where the disease has appeared, nor any killed until carefully examined by competent men.

Unfortunately the disease has made its way to Paris; 100 diseased bullocks were killed immediately on their arrival the other day. The most severe precautions are being taken: not an animal is to be admitted from the provinces where the disease rages, and means are being taken to put the cattle all under cover, instead of allowing them to stand in the open air, as they do now in many of the outskirts of the town. The effect of this visitation has caused a rise in the price of meat, which promises to increase, and there is a talk of fixing the price by law. Such is the latest blow which this horrible war has brought upon us; when will its effects be exhausted? *G. W. Y.*

Farmers' Clubs.

KINGSOTE.

Agricultural Machinery.—The following paper was read by Mr. H. HOLBOROW at the last meeting of this Farmers' Club:—

Considering the vast amount of mechanical and trading interest connected therewith, it seems strange that such a subject should have been allowed to remain comparatively neglected. What would the farmer of the present day do with implements such as existed 40 years ago! Why, you would put back a great part of the agricultural progress of the present day along with them. The landlord would have to take a less rent for his land, the farmer would be more cost in less return, the labourer would be retrograde in intelligence; the whole nation would be an enormous sufferer. Whilst mere discussions on the subject have not yet furthered the matter much, the Royal Agricultural Society, and other kindred societies, have done an incalculable amount of good in this particular; I feel almost disposed to say even more good in the improvement of agricultural appliances than in the improvement of live stock, great as that is. By means of the annual exhibitions, tests, prizes, and so forth, we have been enabled to get to perceive what is required. Mechanical genius has been brought to bear, large establishments have sprung into existence, the requirements have been met, the farmer has got into a better method, the nation has reaped an enormous benefit.

With these few introductory remarks, then, let us pass by for a while the money-making considerations of increase of crops, increase of meat, cheese, butter, &c., or even saving of cost of production, and turn to the more humble subject, viz., the tool by which it is done. We have now the danger of getting for our tools, as we have for our implements, that they are actually required on the farm, and only occupying the room the others should have. I said, "forced upon them;" well, I may say, tempted to purchase also, for we all know what it is to be bored by importunate agents, when we attend a market, to give an order for what we do not actually require, as though they knew better than ourselves; and I dare say most of us know how tempting many of the nicely painted, graceful-looking things are to the eye when visiting a show yard; perhaps we may have been overcome in this way too.

But, to the first point—the "selection" of farm implements—what shall we say? what advice shall we give? Let us suppose a young man to be just entering into a farm where he has everything to buy that may be required; whether he possess abundance of capital, or whether his means be somewhat straightened, we will not stop to consider. We will suppose that he has enough in him to consider the nature of the soil he has to till—whether it be light or heavy, wet or dry,

hilly or level; the system most suitable to the locality, &c.; the articles he will be compelled to supply himself with, and those he can manage to do without for a time. After this he may then be tempted to purchase, where is he almost sure to begin? Why, at the first auction of farming stock within his reach; and there he buys a lot of things, half worn out, at three-fourths of their cost when new, not of the most improved plan, and a carpenter and a blacksmith will have to be set to work very soon to repair them. Thus a great mistake will be made at the outset. We would say, then, don't begin here (although there may be some few exceptions, it is true, such as expensive things to any quite new, which may only be occasionally required, such as waggons for harvest purposes), but go rather to where new things are sold, and of the best quality. It will be wise to attend a large agricultural exhibition—it is well for all of us to do so occasionally—and there see and compare the different articles as turned out by different manufacturers; but always go to the best makers, and give them their price for the best articles, and you shall have by far the best in the market. Don't be hurried into chasing new inventions because they look likely to answer the purpose; let them be tried first, and if they are found to be on correct principles they will be improved on, and made more complete very soon. We have known many very likely looking inventions, and that have been sold freely for a time, which have soon been put aside in the corner of a shed as useless lumber or a perch for the hens. Allusion has been made to agents for selling implements, and they are a very useful class of men in their way, only, don't go to them for advice, exactly, or you will be sure to be recommended to the very article they are most interested in selling, for they cannot be the best judges of practical merit. Never go to small country makers for new waggons and carts, but go to large makers, who keep the best materials, and put them together in the best manner, and be willing to give a best price. There are many improvements on the farm which used to be made chiefly of wood, but now can be had made of iron. Choose the latter in preference to the former; they are far more durable, cost less for repairing, and are always worth something for old iron when the others would be rotten or only fit for the fire. Try to obtain a proof of the practical efficiency of an implement before you buy it, and if it be recommended by a farmer whose soil is different to yours—that is, if it be for working the soil—try it, and get a trial of it. If you have an article of any kind used on the farm which you have not proved, try and get a sight of in actual operation before purchasing—see one of the kind at work, I mean. I went once to the Royal Agricultural Show, and there I saw a horse-hoe for roots, which was to expand and contract at the will of the manager when going along, and it appeared to be such a capital thing, that I ordered one at once. During the day I met an old and experienced farmer, a carpenter, who was an implement, and he at once said, "O yes, I saw it, and ordered one myself; the best new thing in the yard." Well, we both had them sent, and what became of his I do not know; but I know that mine had to be sent to the blacksmith's shop, and there altered into the same simple kind of hoe that he was making at one-third less in cost price, before it could be used at all. Many have been similarly deceived in more costly articles, and have been caused to regret their purchase. I have seen many farmers buying new inventions. Do not buy an implement which is intended to do the work of two; such as drills for general purposes, combined reaping and mowing machines, for if you do you will get double trouble, double expenses, and the work not half so well done; it is better to have them separate. Don't buy any old things, especially old carts and old harness, or you will soon make up the price of new by paying for repairs. Don't buy anything which you do not actually require, or you will actually require it, or it will be as dear as the amount you give for it. Don't buy a thing with the notion so commonly expressed, "that it will pay itself out the first year;" if you doubt this, try it on every year, and see where your profits will get to. Seek to have a good implement of every kind you may require, and no more. Try to find out the best makers; the best plan; give them their price, and you will have the cheapest article you can procure. Competition will always keep things within a reasonable price, and no maker can turn out a good article without a fair profit; cheap, in this respect, always means deception. To point out the best makers, or the most approved articles, is not my object; and it would be a difficult thing to do, if not altogether out of place; but to give a few words of advice and start the discussion.

And now this will lead us to the next point—their "cost and general management." Two things will at once present themselves, viz., protection from the weather and from the rays of the sun. All wood-work exposed to wet will go to pieces in less than half the time of that which is kept in the sun; it will never be in such nice condition for use; will cost double, and more than double, for repairs; and there is nothing which requires more to be attended to than this one thing—especially when it applies to waggons and carts. The rays of the sun will have great effect in contracting, warping, cracking, and otherwise injuring wood-work of all kinds. The man who allows his

property to be carelessly exposed to these influences will require two new sets in 20 years, when that which is well protected will be still in fair working order at the end of the same time. Painting is also a desirable thing; even iron implements will pay for an occasional coat of paint, but especially wood-work; and let the colour be light for everything that is likely to stand out in the sun in the heat of summer, as dark colours attract and absorb the heat so much more than light ones. Iron things exposed to continual action of the weather are also more likely to become crissled, and therefore to snap in two, than they would be if sheltered whenever it could be done. But repairing is a great consideration. You know the old adage that "A stitch in time saves nine," and it is especially true in this case. A little flaw may soon become a wide breach, and the consequence might be costly repairs, without restored efficiency, and great loss of time added thereto. A shaky wheel, a worn ploughshare, a blunted coulter, a twisted harrow, a cracked axle-tree, may cause a sudden break-down in a road or in the field, and thus stop both men and horses; or otherwise cause a slower yet more laborious process, work badly done, and all sorts of hindrances and inconveniences. If, then, you would save risk, expense, loss of time, decay of your property, have your work well done, and all things as they should be, keep your implements in the dry, away from the sun, well painted, in thorough repair, and always in the best working order, remembering the proverb of the wise man, that "the axe be blunt, he must lay to the more strength." The axe does not suffer, but the one that handles it. "A broken tooth," or "a foot out of joint," will teach a similar lesson.

CHESTER-LE-STREET.

Seaside Land Drainage.—At a late meeting of this Farmers' Club Mr. HOPE read a paper on this subject, referring especially to seaside flat lands.

It has often been remarked that all rivers run to the sea; but those living near the river side, within a few miles of the sea, can scarcely subscribe to that at all times, as the waters run from the sea every twelve hours. Such land lying subject to being overflowed by those tides is what we call the sea-marsh, and the possibility of being drained. The oldest inhabitant of the place has seen the tide run up the burns or goats (as these small streams are generally termed), and fill them level with the land ever since he was a boy, and so comes to the same conclusion, that these fields cannot be drained. I have in some of these parts seen ploughmen going with wet feet, and the water following them from one end of the furrow to the other, and even in the seed time "casting their seed upon the waters, expecting to find it after many days." If land such as this was drained it would change the very atmosphere, and the countryside would have a different aspect altogether. This brings us, secondly, to speak of the manner of draining such land. We all know that flat land lying contiguous to the sea-beach looks as if it could not be drained when the tide is flowing out. But when there is a very gentle slope down to the beach, and it is this heavy gradient that we must take advantage of to be able to get this land drained. In seeking an outfall for draining a field, the best guide on the coast is to follow one of these small streams that carries off part of the surface water off the land. After fixing your whereabouts, take your level and go back to the lowest part of the land, and commence to level straight down for the beach, and go on until you reach the sea. If you have a thousand pounds has been thrown away on light shallow draining, and many a hundred pounds is thrown away by allowing men to put drains in that know as much about either the theory or practice of it as they do about preaching. But dear bought experience is considered the best teacher—it will subdue a stubborn, self-willed nature when no other human skill can. We still meet some of the 2-foot and 3-foot system; their idea, to get the top or surface water off, is sufficient for them, and that water lying the depth of 4 feet can do no harm to the land. Now, the surface water is not doing the most harm, it is the water that is lying at the depth of 4 feet. The water rises to the surface by capillary attraction, and prevents the rain water from sinking into the soil. Therefore, unless you cut your drains below the capillary attraction, which is 4 feet, you need not expect to have dry land. It is the water lying below the plants that keeps them unhealthy; take away the water from below, and the surface water will not do any harm. While the water is allowed to remain at the depth of 4 feet the soil upward will retain it like a sponge. When pipes are laid at that depth they carry off the water out of the power of the capillary attraction, which proves that the 4 feet system is undoubtedly the best.

This brings us to the last part of the subject, "Slakes lying within sea mark." Land like this would not be so very difficult to drain, as regards the level of the land, if a proper outfall could be obtained. But making this embankment at the furthest extremity of the slake, next to the sea, it would be impossible to level the land up to the embankment, to drain the land on the inside of it. But the next best thing to adopt would be to drain the higher part of the land,

you can make it secure at any time, until you reach the lowest part where you intend your main drains branching off, and at that point make a cistern for all the mouths of the mains to meet. Put a valve upon the outfall, so as to provide a head of water to flush it, should it ever be required. Then commence cutting the mains along the lowest parts, turning in the branch drains as you go on.

We come now to the branch drains—first, the direction that the drains should lie; and, secondly, the distance apart and depth. I recommend very strongly to lay drains in the direction of the furrows or ridges, up towards the rising ground where there is a better chance of cutting through the strata, which act as small drains feeding into the drain cut. A stratum runs across the rising ground, and not down an incline. Some condemn the system of cutting the drains in the furrows, as water is more apt to stand upon the drains than any other part, but this is nothing to do either with the nature or formation of subsoils. One of the reasons that water stands more upon the drains than any other part is because the drains are generally put into the furrows, where there is more water to stand, by the furrows being lower than the ridges, and this only happens after the first year or two. If the drains were cut on the top of the ridges I think there would be very little chance of the water standing upon the drains. I firmly believe that furrow draining is decidedly the best plan, for the very reason that they keep the furrows dry. It is very common to see water in the furrows when there is none to be seen on any other part of the field, and when there is a drain below, it soon disappears, unless a strong clay has been dug out and filled in again, and got puddled with the working.

We come to speak of the distance apart, and the depth that drains ought to be. Land that is of a strong nature, lying upon a clay subsoil, must be taken into account here, as the land lying along the east coast is generally of a strong, heavy nature, and ought to be drained not more than 18 feet apart. Many a one advocates the method of testing the drawing powers of the subsoil by digging trial-holes in the field to be drained, when they generally fill with water, and then cut a drain a respectable distance from the hole, and then ascertain what distance the drain will draw the water out of the holes, so as to be able to know the drawing powers of the drains on such land. Now this I condemn as being a good test, for this reason—the very cutting of the holes in clay subsoils destroys the capillaries by sealing them up for a time, and therefore defeats the very object of their intentions. I have seen a drain cut very close to holes of this sort, and not draw a single drop of water out, just for the very reason I have assigned, the capillaries or small veins being destroyed. The distance apart that drains ought to be laid is 18 feet, which will, in the end, give most satisfaction. I have seen porous subsoils drained from 21 feet to 30 feet apart. But the last named will not give universal satisfaction, as it becomes, in the end, the most expensive, with having to cut drains in the ground, which makes them to 15 feet, instead of 18 feet. I would strongly recommend strong land draining, 18 feet apart. I have seen it tested over and over again. This brings us to speak of the depth that these drains ought to be cut. There have been more blunders committed in cutting drains too shallow than by laying them too wide apart; they can be rectified by cutting drains in between, but a shallow drain is perfectly useless for answering the purpose it was intended for. What I mean by shallow drains are those that are cut to the depth of 4 feet. Many a thousand pounds has been thrown away on light shallow draining, and many a hundred pounds is thrown away by allowing men to put drains in that know as much about either the theory or practice of it as they do about preaching. But dear bought experience is considered the best teacher—it will subdue a stubborn, self-willed nature when no other human skill can. We still meet some of the 2-foot and 3-foot system; their idea, to get the top or surface water off, is sufficient for them, and that water lying the depth of 4 feet can do no harm to the land. Now, the surface water is not doing the most harm, it is the water that is lying at the depth of 4 feet. The water rises to the surface by capillary attraction, and prevents the rain water from sinking into the soil. Therefore, unless you cut your drains below the capillary attraction, which is 4 feet, you need not expect to have dry land. It is the water lying below the plants that keeps them unhealthy; take away the water from below, and the surface water will not do any harm. While the water is allowed to remain at the depth of 4 feet the soil upward will retain it like a sponge. When pipes are laid at that depth they carry off the water out of the power of the capillary attraction, which proves that the 4 feet system is undoubtedly the best.

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using the sea outfall mentioned in the former part of this paper; but instead of going down the beach on the outside of the embankment, place in the embankment and carry it up the outfall drain until there can be sufficient depth gained to drain all the higher ground 4 feet deep and 18 feet apart. To drain the lower part, or the part lying close in to the embankment, there would have to be at least two very large cisterns built, and pumping-engines provided to raise the drain water over the embankment. The main drains ought to be laid with large pipes, and the branch drains with at least 4-inch pipes in this low part, so that they would be the means of retaining a large amount of water should anything happen to the working of the engines. Road-making would next follow; the building of the farm steadings, with covered courts for cattle, to shelter them from the eastern winds of the sea. When completed such farms would be very profitable to the occupiers for years, as there would be very little expenditure for artificial manures, being a rich alluvial deposit.

Notices of Books.

Suttons' Farmer's Year Book, and Select Lists of Seeds, with Original Articles on Cultivation. Royal Berkshire Seed Establishment, Reading.

Carter's Farmer's Calendar, 1870. J. Carter, Dunnett & Beale, Seed Growers and Nurserymen, 237, High Holborn, London, W.C.

Here are two excellent trade catalogues, illustrated in the completest possible way, with hints and instructions for the cultivation of various farm crops—leaving nothing to be desired. It is impossible to place these two firms in the balance, and say which presents the better book, or offers the better seeds, or suggests the weightier reasons for a preference. Both are able, energetic, competent, proficient, and even excellent as surveyors of good farm seeds and teachers of good farm culture. The excellent varieties which they severally offer are depicted by woodcut, lithography, and even colouring—and nothing can exceed the perfection of form or the style of testimony by which the merits are in every case attested. We shall content ourselves with an extract from each—

On Kohl Rabi Messrs. Sutton say:—

"The cultivation may be described as nearly resembling that of the Swedish turnip—the principal difference being in the earlier sowing time."

"After having cultivated and manured the ground by ribbing up, and dunging the drills a feet apart in the autumn, guano or superphosphate, at the rate of 2 or 3 cwt. per acre, should be spread over in March; early sowing between the drills should be horse-hoed, the ridglets moulded up again by a double mouldboard-plough, and the land will be ready for the seed."

"When drilling is decided on, and we think this by far the better method, 3 or 4 lb. per acre may be sown in the row in April or early May. On the plants becoming large enough, they should be singled out with the hoe (as Swedes) from 15 to 18 inches apart."

"An experienced grower in Huntingdonshire writes us thus on transplanting after early summer crops:—'People do not always do this as they should, but with this root in the way of transplanting; a crop of early Potatoes or Peas may be sent to market, and a crop of Kohl Rabi put in the ground for 8s. per acre capable of growing 20 tons per acre.'

On Kohl Rabi Messrs. Carter say:—

"The best time for sowing is the beginning and middle of April for the main crop. If the sowings are made at the latter end of March, the plants will be ready for transplanting from, when you have a piece of land ready and the weather is suitable. This is one of the great advantages of this crop, that it will stand transplanting better than anything else, and is very useful to fill up gaps in the Mangold Wurzel field, where it was sown in March; early Taro has been taken off, or foul land has been cleaned, get the land fine, and after a shower put all your hands to work, and another crop will be on the ground at less expense than in any other way. It can be done for 8s. per acre, and you will have a crop of 20 tons per acre, and the plants will be of better quality, with less root than when drilled; only you cannot make sure of suitable weather, and with a large breadth to do, it would not be safe to trust to that for only a portion of the crop. On high land, sowing may be made in the middle of May; they will grow longer into the winter, but the earliest sown will always be the best crop. The young plants grow much slower than Turnips in their early stages. The rows may be from 20 to 24 inches apart, and 15 to 18 inches from plant to plant, decreasing the distance as the season advances."

"The early sown will be ready in October, and nothing is so nice for lambs to begin upon. They take to them more readily than any other root. When the tops are eaten off, the bulbs can be cut up and given in troughs."

On Sugar-Beet Messrs. Carter say:—

"Give the land the same treatment as for a Mangold crop, and sow the seed early. The seed should be sown about the middle of April, and the land well worked previously, to permit free growth of the root. Sugar-Beet may be grown much closer in the rows than Mangold, say 18 inches from row to row; in fact, the quality of the root is deteriorated if the crop is sown too much, so the roots then have a rarer character, and the quantity of saccharine is proportionately reduced."

On Sugar-Beet Messrs. Sutton say:—

"The cultivation of Sugar-Beet is engrossing much attention at the present time; and the success which has

attended the efforts of some of the more enterprising agriculturists of the country conclusively proves it to be a very profitable and valuable crop. Excepting only very light lands, the soils and climates of England and Ireland are peculiarly adapted to the cultivation of Sugar-Beet. The Metropolitan Sewage Company grew, in 1870, from seed supplied by us, 47 tons per acre, but it must be reckoned as an exceptional crop, and if from 10 to 30 tons per acre are obtained the result may be considered very satisfactory.

"There are various kinds of Sugar-Beet, but having fully tested the several varieties this season we are of opinion that the Silesian Green-top, the variety used at Lavenham and Buxton, is best, both in point of produce and percentage of sugar."

Thornton's Circular (Eleventh). *A Record of Shorthorn Transactions and Catalogue of Shorthorn Cattle for Private Sale.* Jan., 1871. J. Thornton, 15, Langham Place, London, W.

That this is more than a mere trade circular is plain from the extracts we shall hereafter give from its pages. Besides a list of forthcoming sales, the history of the Shorthorn breed, its progress, every other achievement and particular of interest in the history of the Shorthorn breed finds publication and subscribers are thus informed of all that is necessary to a full record of current Shorthorn transactions. We extract here Mr. Thornton's reference to the 7TH DUKE OF YORK (17,754), whose portrait lately appeared in our columns (see p. 245) :—

"7TH DUKE OF YORK (17,754). One of the most celebrated sires of modern days, and the last pure English blooded bull, was sold to a butcher on December 16. Bred by Capt. Gunter, at Getherby, on January 24, 1869, he was got by 6TH DUKE OF OXFORD (12,765), out of *Duchess 66th*. Mr. Banks Stanhope hired him as a yearling, and he got a number of rich roan-coloured calves, but the poor condition, as many will remember, in which he was shown at the Revue Agricole in 1864 detracted much from his appearance. Messrs. Bowly and Rich then engaged him for a season, and afterwards purchased him outright for 500 gns., including the one year's hire. His stock at the Didmanton sales in 1868 and 1869 were greatly admired, and he was sold from one to five for 100 guineas, and were sold at an average of £79 10s. At Mr. Bowly's sale at Siddington in 1870, 21 of his heifers and bulls averaged £93 4s. Becoming Mr. Bowly's sole property after Mr. Rich had sold his herd, he was sold some time afterwards at Siddington, for 100 guineas, was useful for a year or two, Mr. Banks bought him at a speculative price for Mr. Cheney, at Gaddesby, where he was again useful, and left 16 calves, one of which, from the imported American heifer, *11th Duchess of Geneva*, was recently sold to Mr. Pavin Davis at a high price. He ceased to be useful after August 3, and was finally sold for £16 to a butcher, who exhibited his carcass in Leicester. Although a white in colour, the majority of his offspring were rich roan, full of hair, and generally very good animals. He had a magnificent head and neck, with the finest quality of fur, his shoulders were somewhat strong and upright, ribs, more particularly on the left side, rather flat, his quarters were good, though slightly rough about the setting on of the tail. He had, however, a very majestic look, and standing on short legs, he seemed erect, being a very admirable animal, and one whose loss is not easily replaced."

Farm Memoranda.

WEST SUSSEX: March 11.—Sowing has now begun, and as work is well forward, and the roots are nearly finished, all spring corn will be got in in good time; the land works well, and, for the time of the year, is rather dry; and as we have had but little rain during the winter, and such a dry summer before, we must have a wet summer next, or water will be very scarce, as there has hardly been enough to move the sprigs, and they were very low.

The Wheat is looking very strong, but it is regular, and there is not much fear when that is the case at this time of the year, and we may expect that the heavier lands will do well.

The Pea plant is coming up, and has had a very favourable time for sowing. They have been dearer this winter than for some time past, as there have been very few sent to market, the growers consuming them at home to a much greater extent than usual. And perhaps the day is coming when what is grown on the farm will be used more extensively, and less artificial food be purchased. And though it may be thought that co-operative societies may injure a certain class, they will be more common than they have been, at least till there is more honesty in the food and manure trade, and perhaps smaller profits satisfy; for how can a farmer get a manure good for anything—say for £6—when perhaps an agent may get £2 for selling it; and suppose the merchant gets £2 more, what can the manure be worth? Such a system of manure must be always given, but it is sometimes; and surely it is time that farmers took a little care of themselves—and that they are sure to do more than they have done—and leave taxpaying to take care of itself. It is often said, Deal with a respectable man, and so get a good article, by paying a fair price. Now, we do not grudge a fair price, not even an extra one, could we get a real article; but such is not so common as it should be, and there are so many names for manures that we are puzzled to know what to make of them. For instance, we used to think superphosphate of lime was dissolved bones, but it does not appear to be so: then what is it?

And linseed cake we thought was the seed after the oil was extracted, and nothing else, but it is not so. And why not? Could they not make it pure, and charge us a fair profit upon it? But surely this is the age of deception in all mercantile matters. Now, that is not fair, as we cannot compete in this way; corn shows its value to any notice. And so with cattle; all that we dispose of must be genuine. Why may we not look for the same?

The spring is rather backward, and all kinds of winter food are getting low. Hay is fast disappearing, and we shall have less old straw left than usual. Mangled roots are very scarce, and we shall not have had a little more than we have got. And no doubt there will be much more snow this season. They have kept very well, and we shall now use them in feeding off Rye, Winter Barley, &c. The young Clovers have stood the winter very well, but perhaps the lighter lands do not hold it so well.

Our market has been well supplied with fat stock, and the best mutton has been dear, but the inferior sorts have been dropping all the winter, and that we expected to be scarce has been more plentiful than usual, and is now a very dull sale. But fat pigs are nearly unsaleable, and have not been so low for many years. It is evident that there is not so much pork consumed as used to be. While mutton, on the whole, gets dearer, pork gets lower, and beef maintains a medium price. Our corn market has never been so full as it is now, and there are arrangements made for creating the stores; and we shall soon have a new cattle market opened, which will be very complete, and altogether instead of being scattered over such a length of street as it now occupies, we may expect that Chichester will become a more important market town than it now is; and it has increased very much during the past 10 years—perhaps doubled.

Work is still scarce, and there are a great many of the rougher and inferior hands out of work. Grass has not yet grown much, and will not be of any use to pasture for some time to come. G. S.

Miscellaneous.

MEAT & CORN.—Many of your agricultural readers may feel grieved to read of the writer's article in which he has picked from the *Agricultural Gazette*, signed "G. A. H.," for "the solution of the riddle" which has puzzled many of us for some years past, viz., to make a "high profit" on farming, which he has no doubt done to his own satisfaction, but not to some of your readers. Allowing his figures to be correct, there is one point on which a little further information from him would be exceedingly useful, that is, how (on a farm of 5000 acres) producing the justly-styled "fair crop" he mentions, he manages to keep "rent, local rates, and taxes" within the limits of the exceedingly modest sum of £1000. If we reckon tithe at 7½ per acre (a very common charge), local rates and taxes at 3s. per acre, we shall find the sum of £450 left for rent, or 12s. 2½d. per acre,—not a very "high profit" for the landlord "G. A. H." must admit, especially as the tenant has his roads and fences rent free, and the necessarily extensive buildings for the accommodation of so large a stock, kept in repair, cost free. I could not help contrasting the facts elicited by the correspondence which has taken place on the recent award of farm prizes in this neighbourhood, and would suggest to our respected neighbours at Ashgrove Farm, Winchendon, and Lyneham, that they should get a leaf out of "G. A. H.'s" book, as it is evident they are not near perfection yet. If "G. A. H." had doubled the sum set down as "rent and taxes" he would, in my humble opinion, have been much nearer the mark.

If Mr. Editor, you could obtain the desirable information, you would confer an immense benefit on a numerous class of your readers, and greatly oblige *A Needy Tenant-Farmer* (in the "Oxford Journal").

ONE CAUSE OF CATTLE DISEASE.—A great part of the meat condemned by the inspectors of markets is condemned for no other reason than that the animal has got into a state of disease in the railway truck; and living cattle condemned in the market are mostly, if not all, put down to the same liable and condemnable condition from the same cause alone, whilst diseases thus originated not unfrequently spread where cattle suffering from them are pastured, and thus loss is incurred by farmers and by the country. *Food Journal*.

The Week's Work.

MARCH 11 AND 18: Autumn Wheat.—Top-dress with 1½ cwt. of nitrate of soda per acre, or whatever fertiliser the land may require at this season. The work should be done as soon as spring growth commences, so that in the South the top-dressing should have been applied before now, but in the North, where vegetation has not yet started, the work may be deferred for a week or two; much depends upon the weather.

Barley should now be got into the ground in southern counties. Elevated districts, subject to spring frosts, must be taken as an exception to the rule, although, if the soil is not very cold, and the atmosphere is not very susceptible of frost, both in the early and late stage of life, or during the formation and ripening of the ear. Hence the large percentage of the grain

which does not malt when frosted at the latter period, and empty ears when frosted at the former. This, however, only shows the greater necessity for getting the seed into the land as soon as the season will permit in such districts, so as to avoid the later frosting, which is most liable in late seasons. Seed Barley should always be carefully tested in a flower-pot, so as to determine its vitality. It requires a finely cultivated soil and seed-bed, and should be drilled in as shallow as the seed can be properly covered.

Beans, it is said, "are a very precarious crop in late seasons"; there are, however, exceptions to this old rule. Much depends upon getting a favourable seed-bed, with plenty of available plant food in the land, so as to force forward the crop rapidly and healthily, and thus place it beyond the attacks of fly. The Bean is a deep-rooted plant, and therefore requires deep tillage with a sound bottom. It is a large consumer of lime and potash, elements which indicate the nature of the fertiliser it requires to force it forward early, and without which it always advances slowly to maturity of growth. The Bean occupies a wide range of latitude, maturing its seed, when properly cultivated, at both ends of the island. Like all other cultivated crops, it is affected by the time of sowing—a normal characteristic that requires to be attended to in changing seed.

Peas may yet be sown on early calcareous soils, or on dry land if well limed. The land should be in a high state of cultivation and fertility, taking care not to produce more straw than corn. It is a good farmyard manure, when the land requires it, should be applied in the autumn, and the land at the time of sowing worked with a fine season. If manure has not been applied in autumn, artificial fertilisers are preferable just now. And when the land does not require manure, the greatest attention is requisite in getting the crop into a fine seed-bed, so as to give it a fair start, without which it seldom yields much grain.

Artificial Manures.—Every season has its own peculiar demand upon this class of fertilisers, and the current one will be no exception to the common rule. When properly applied they differ very much in their action from farmyard manure. It has been said, "they require a dripping season" and no doubt there is much art in applying them during this month in dry weather, or, indeed, in any weather, wet or dry, so as to retain a sufficiency of moisture in the soil to render them available. In the case of crops, the rain covers the land by the time the drought of May begins. If this can be done they have a tendency to absorb moisture from the atmosphere in the form of night dews, and thus secure the early filling and ripening of the crop in dry summers, while in growing weather they promote early maturity, with stronger straw and more corn, unless when too much seed is sown, and the crop grows too thick, and so on. From the large quantity of artificial manures used in the market, the practical difficulty is to select what the land, season, and peculiar crop grown require, so as to provide not only for the normal requirements of the crop, but also for the two emergencies of roasting in dry weather and lodging in wet. At one time the grand fertilising panacea for every crop was ammonia, but without the salts of soda, potash and lime in an available form, ammonia often does more harm than good, increasing the requirements of the next season, and the lodging and rotting effects of a wet one. Much of course depends upon what the land and atmosphere supply naturally, but generally speaking experience begins to teach most localities that more attention must be paid to the above earthy fertilisers, such as common salt, muriate of potash, and the phosphates, sulphates, and carbonates of lime, and less to ammonia, however valuable the latter may be in due proportion; for it is only when the several articles of plant food are present in due proportion, and in available form, that the greatest results are produced. As to the actual quantities of each, that is a practical problem not yet solved, but which every farmer ought to solve by experiment.

Spring Vetches sown weekly, as directed last month, for the successive foldings and cuttings of summer. The land requires to be thoroughly cultivated and manured to obtain the maximum of crops. It is an old saying, "When Vetches fail the crop is ruined the land, and when they succeed they enrich it." Three bushels of seed, with about 2 pecks of Oats or Rye to keep up the crop, are sown per acre.

Kohl Rabi sown in seed-beds, for filling up blanks in the general crop or in the Mangels and Swedes. Plants from seed sown at this season are hardier, and transplant better than those from thick places at the time of hoeing. The general crop is now sown as Swedes and Turnips, and thinned with the hand or hoe. Prepare the beds as directed for Cabbages last month.

Hop Gardens.—Whether the weather is wet or dry, give employment in trenching and digging, in collecting and making manure, and in getting ready the poles or other means for training the bines. The use of artificial manures has greatly reduced the home manufacture. Nevertheless, all Hop growers make less or more of the old plan. The Hop delights in a calcareous soil, and where there is a natural deficiency, with a supply of calcareous sand, &c., at command, such may be carted when the teams cannot work in

the field. The annual supply of new poles may also be procured and got ready. In fine weather manure may be carted and dug into the drier class of soils, and the heavier loosened with the fork, to let in the drying air, so as to fit them for manuring and digging.

Hedges in our southern counties should now be finished for the spring season, so as not to interfere with the seeding of the land and the growth of grass in the meadows and pastures. Furze seed sown on mounds for fences, and on low ridges raised by the plough for shelter and sheep-fence northwards as the season advances, up to the middle of April.

Farm Horses require careful management this month, both as to diet and grooming. The diet requires to be nourishing and cooling; consequently, to counteract the heating effects of a full allowance of ground oats and beans mixed in their chaff, the addition of bran, boiled barley, or Carrots cut fine, is necessary; and it is better to mix these latter with every meal than to give them at a separate meal, the latter practice being liable to derange the bowels of many horses. As soon as sewage grass, or the produce of irrigated meadows can be got, it is to be preferred giving a small allowance at first.

Dry in-calf cows should be kept in roomy feeding boxes and not in stalls. Half the difficulties and mishaps experienced at calving arise from springing cows standing on sloping stalls, knocking against the trevies and each other where two cows are housed in a double stall; and nothing can be worse than to shift the cow at the time of calving to an outhouse or feeding-box, to calve and spend a few days with her calf; for a wrong step in shifting, and a few hours restlessness before labour comes on are capable of doing incalculable harm, and it is much better to shift each cow as she goes dry, and not return her back to her stall, if back she must go, until some time after calving, when she is wholly recovered. The day it is hoped, is not far distant when roomy cow-boxes will be the rule all the year over, in which milch cows can move about, no less for their own health than that of their fetal offspring and the quality of their milk.

Flax may now be sown in southern counties, continuing the sowing northwards until the beginning of May. Early sowing in the south is essential so as to get the ground covered before the drought sets in, otherwise the crop will come to much. In Egypt and other warm climates, it is sown before winter, and the fact that it grows more successfully in the Netherlands and in Ireland than in Egypt, Italy, and the South of France, and that it also grows wild in our fields, proves that the climate of this country is natural to the crop. There is, however, a considerable diversity in our climate that requires to be attended to.

The land should be well fallowed and manured in autumn, and smashed up at this season, so as to keep the winter-mould mould on the surface, such forming a favourable seed-bed for Flax. By such means it may be grown on heavier soils than are generally considered adapted for the crop. It requires a rich soil, but the manure in the land should not be in a crude or half decomposed form, consequently when the land requires manuring, and when the manure could not be applied in autumn, artificial manures may be applied at the time of sowing, or after three weeks or a month beforehand. On some soils the crop is liable to grow too rank—often unequal when sown after root crops that have been heavily manured with farmyard manure. In such cases a corn crop should intervene. Thus, in Ireland, Wheat follows Potatoes, and Flax Wheat, the Flax being followed with grass seeds. It is doubtful, however, if this is the best place in the rotation for the drier counties of England. For fine Flax 3 bush. seed are sown per acre, and chain-harrowed in. Flax seed is very liable to be infested with Dodder, and therefore the greatest possible care is requisite in its selection.

Sainfoin sown on calcareous and sandy soils that are naturally adapted for it. It is sown successfully both in the richer class of such soils, when they become Clover-sick, and on the poorer where none of the other grasses will grow. It requires a clean seed-bed, and about 4 or 5 bush. of the rough unshelled seed per acre, drilled after Oats or Barley after a fallow, or after a corn crop; or it may be drilled across winter or spring Wheat or Rye, after fallow, 8 or 9 inches between the drills; and in place of the common sort the French and giant varieties may be sown. When Sainfoin is laid down for a period of years, the corn crop should be sown thin, the object of the corn being to nurse the young Sainfoin plants until they are established in the soil.

Course sown in our southern counties, and on to April northwards. The plant grows naturally on a great variety of poor, ferruginous, gravelly, and hilly soils, where Sainfoin, Lucerne, Clover, and the cultivated grasses will not grow. It is essential that the crop is up and covers the ground, so as to be fairly established before the drought of summer commences. It is grown for soiling, sheep pasture and shelter, and for fences.

When grown for soiling, if the land cannot be ploughed, as often the case, it may be roughly dug with the spade, and the surface reduced to a fine mould for the seed—about 10 lb. per acre when sown broadcast, rather less when drilled. When grown for shelter on exposed sheepwalks, narrow strips are either ploughed

or dug about a yard wide, and from 50 to 100 yards asunder, so laid out as to afford shelter whichever way the wind blows. This should have been done in the early part of the winter, so as to get the sod broken by the frost. The seed is then sown at this season and onwards to the North, and harrowed in with a single harrow. Sheep crop it greedily in the winter time, often when everything else is covered with snow, and they do better on Grass than on Turnips. Ground on mounds it forms a hedge. Some sown in three rows—one on the top, and one on each side—others one row on the top and the sides broadcast, and not a few the whole broadcast, carefully raked in, or dibbled in at over, 8 or 10 inches between the holes, the dibble in one hand and the seed in the other. It is common to calculate 1 lb. of seed to 100 yards of fence, the seed being fresh and sound.

Young Crows clear of every obstruction to the mowing-machine. When necessary, top-dress. Cypripis is a good top-dressing for Clover when the land is naturally deficient of lime. Sown with a broadcast distributor at the rate of 6 to 8 cwt. per acre in moist weather, whenever the Clover begins to grow rapidly.

Dungfills for Potatoes, Mangel Wurtzel, Kohl Rabi, Carrots, &c., turn. The land for these crops should be manured in the autumn, but in many cases this cannot be done; and for application in spring the manure should be well manured, finely broken in the autumn, and covered in with the sap. It is only when manure is made in the summer time by soiling that it can be economically used in autumn, for winter-made manure applied in the spring yields a crop before autumn, so that few considerate farmers would care to sacrifice the time lost by keeping on winter-made manure to next year's crop. Some salt the manure in the strawyard, others prefer applying a sprinkling when turning the dungfill, from a half to 1 cwt. per cubic yard, as different crops and fields require different quantities. It promotes the healthy decomposition of the manure, and it is destructive to insect life and the seeds of weeds.

Manure light land for Turnips, so as to get the manure in with a sufficiency of sap to induce its rotting and incorporation in time. If this is done, the absorbent and retentive powers of the soil, to abstract moisture from the atmosphere and retain sap to start a healthy blaird rapidly into rough leaf, are greatly increased; whereas, when farmyard manure is applied to such soils at the time of sowing in May and June, the land scorches, and the manure dries and freights, often doing more harm than good in seasons of drought. Such soils work freely at this season both in smashing, harrowing, and getting in the manure.

The Lambing Season is now general in breeding districts of England. March weather is often trying for both ewes and lambs, and also for ewes that have not lambed. The latter often suffer more than the former, when the bad consequences are taken into account at the time of lambing. In stormy weather the flock is apt to be driven before the wind. Shepherds should attend to this in time by keeping their ewes and lambs under the shelter of the fences, and if there is nothing for them there, they should be placed under hurdle pens or hovels, if permanent buildings are not provided, which is seldom the case, hovel room being only provided for ewes taken in to lamb overnight. Not the least of the labours of the shepherd is to see that the lambs have plenty of milk, and that the milk is of a healthy quality, both at the time of lambing and afterwards. W. E.

Markets.

HAY.—Per Load of 36 Trusses.

SMITHFIELD, Thursday, March 16.		
Prime Meadow Hay, 130s. 10/17s.	Clover, old ..	135s. 142s.
Inf. do. 100 .. 110	Inf. do.	120 130
New Hay	Prime 2d cut do. ..	130 135
Inf. do.	Inf. do.	110 120
Straw .. ..	.. ..	36 45

CUMBERLAND MARKET, Thursday, March 16.		
Sup. Meadow Hay 134s. 10/14s.	Inf. do.	126s. 10/12s.
Inf. do. 110 126	Prime 2d cut do. ..	.. ..
New do.	New do. .. ..	.. ..
Superior Clover .. 138 147	.. ..	JOSUA BAKER.

METROPOLITAN CATTLE MARKET.

MONDAY, March 13.

The number of English Beasts on offer is about the same as last Monday, but of foreign is much smaller; altogether the supply is very short and low in quality. Choice kinds are readily disposed of, at higher prices. The supply of Sheep is also smaller, the deficiency being principally in foreign; prices are higher on the average, and a good clearance is effected. Choice Calves continue to be sold dear. Our foreign supply consists of 590 Beasts, 700 Sheep, and 60 Calves; from Scotland there are 90 Beasts; from Ireland, 200; from Norfolk and Suffolk, 1200; and 415 from the Midland and Home Counties.

Best Cows, Here-fords, &c.			Best Long-wools		
5	5	80s 0	0	0	80s 0
Best Short-horns ..	5	6—8	Ewes & ad quality	4	4—5
Best Down	3	4—8	Do. Shorn .. ..	..	..
Best Downs and Half-breeds ..	6	4—6	Lambs .. ..	..	..
Do. Shorn .. ..	..	..	Calves .. ..	..	..
Beasts, 2495; Sheep and Lambs, 14,720; Calves, 65; Pigs, 45.					

THURSDAY, March 16.

We have a larger supply of Beasts than on Thursday last; there is, however, a demand for them, and prices are not much altered from Monday. The number of Sheep rather exceeds that of last week; the trade is active, and nearly all are readily disposed of, at fully Monday's quotations. There is a demand for some choice Lambs, at from 7s. to 8s. per lb. Although the season can scarcely be said to have commenced. Trade is not quite so good for Calves. Our foreign supply consists of 475 Beasts, 600 Sheep, 105 Calves, and 5 Pigs.

Best Cows, Here-fords, &c.			Best Long-wools		
5	5	80s 0	0	0	80s 0
Best Short-horns ..	5	6—8	Ewes & ad quality	4	4—5
2d quality Beasts ..	3	4—8	Do. Shorn .. ..	..	..
Best Down .. ..	..	..	..	..	..
Half-breeds	6	4—6	Calves .. ..	..	..
Do. Shorn .. ..	..	..	..	..	..
Beasts, 1010; Sheep and Lambs, 3880; Calves, 145; Pigs, 70.					

MARK LANE.

MONDAY, March 13.

The small supply of English Wheat to this morning's market was sold at the prices of this day's night. There was a fair attendance, and foreign Wheat met a retail demand at last week's rates. Barley was rather dearer. Beans and Peas unchanged in value. The Oats trade was quiet, and in some instances rather less money was accepted. Flour was steady.

PRICE PER IMPERIAL QUARTER.			.. ..	
WHEAT, Essex, Kent, Suffolk, White 47—55	Red	52—56	.. ..	.. ..	.. ..
— fine selected runs .. ..	.. ..	52—57	.. ..	.. ..	.. ..
— Talavera .. ..	.. ..	52—61	.. ..	.. ..	.. ..
— Norfolk .. ..	.. ..	.. ..	.. ..	.. ..	.. ..
— Foreign .. ..	.. ..	45—64	.. ..	.. ..	.. ..
Barley, grind & dist. 30s to 34s ..	Chew	43—46	Malt	36—41	.. ..
— Foreign .. ..	.. ..	37—43	Malt	35—43	.. ..
OATS, Essex and Suffolk .. ..	.. ..	25—28	.. ..	.. ..	.. ..
— Scotch and Lincolnshire ..	Potato	28—30	Feed .. ..	.. ..	.. ..
— Irish .. ..	.. ..	27—29	Feed	25—28	.. ..
— Foreign .. ..	.. ..	27—29	Feed	21—26	.. ..
RYE .. ..	.. ..	32—36	Foreign	33—36	.. ..
RYE-MEAL, Foreign .. ..	.. ..	.. ..	.. ..	.. ..	.. ..
BEANS, Maragan	43s to 47s	.. ..	Harrow	49—50	.. ..
— Foreign .. ..	.. ..	45—64	Longpod	49—50	.. ..
— Small	Small 45—47	.. ..	Egyptian	42—44	.. ..
PEAS, White, Essex, and Kent ..	Bollers	38—40	Sulfol	40—42	.. ..
— Maple, got to .. ..	.. ..	36—40	Foreign	36—40	.. ..
MAIZE .. ..	.. ..	.. ..	Foreign	32—35	.. ..
FLOUR, best marks, delivered ..	per sack	42—50	Country	36—49	.. ..
— Irish .. ..	.. ..	36—42	Per sack	38—60	.. ..
— Foreign	per barrel 28—30	.. ..	.. ..	.. ..	.. ..

WEDNESDAY, March 15.

The grain trade to-day was characterised by quietness. The business transacted was small, and prices were with difficulty supported. There was a limited show of English Wheat on sale, the portion of which was tolerably good. The inquiry was dull, but prices were unchanged. The arrivals of foreign Wheat were only moderate. The demand was inactive, and prices had a slight downward tendency. There was a small supply of Barley, which sold to a moderate extent, at previous quotations. Malt changed hands slowly on former terms. Oats, although in limited supply, experienced a quiet sale, at Monday's currencies. Beans and Peas were unaltered in value. Flour was dull, and American barrels were exceedingly weak.

ARRIVALS OF GRAIN, &c., INTO LONDON BY WATER CARRIAGE.

	Wheat.	Barley.	Oats.	Flour.
English & Qrs.	Qrs.	Qrs.	Sacks.	
Scottish .. 710	.. ..	.. ..	.. ..	.. ..
Foreign .. 7070	.. ..	.. ..	.. ..	4310 bbls.
.. .. 7780	30 ..	.. ..	.. ..	.. ..

LIVERPOOL, March 14.—There was a rather better tone, arising from a more general country inquiry for Wheat; but the amount of transactions was limited—holders refusing to concede more than 1d. per cent on last Tuesday's rates, to which extent quotations are altered. Flour little or nothing done, and prices a shade easier. Barley, Beans, and Peas maintained about late rates. Oats and Oatmeal scarce, and held for full prices. Indian Corn in limited request, and holders conceded 3d. to 6d. per qr.

AVERAGES.

	Wheat.	Barley.	Oats.
Feb. 4	52s 0d	35s 4d	22s 11d
.. .. 11 ..	53 7	35 8	23 9
.. .. 18 ..	53 11	35 8	23 7
.. .. 25 ..	53 11	35 8	23 7
March 4	53 2	35 5	24 7
.. .. 11 ..	53 8	36 0	24 10
Average ..	53 5	35 7	24 0

METROPOLITAN MEAT MARKET, March 16.

Best Fresh Butter 10s. per dozen lb.
Second do. 15s. ..
Small Pork, 4s. 8d. to 5s. 0d.; Large Pork, 3s. 8d. to 4s. 4d. per 8 lb.

ENGLISH WOOL.

The demand during the last week has continued with unabated spirit, and prices, though slowly, are gradually hardening, with every prospect of a steady further rise.

SEED MARKET.

The seed trade has during the past week been characterised by great activity, large parcels having been sold both for home and foreign consumption. The heavy French demand for nearly all kinds of seeds has continued without any abatement, and values have in consequence

tended upwards. There is but little American red Clover now in London; it must be quoted 1s. to 2s. per cwt. dearer since our last report. Alsike white Clover and Trefoil seed are all firm. Grass seeds are in brisk request. Rape and Mustard seed are both dearer. No fresh arrivals of spring Tares have yet come to hand. For Linseed there is a steady trade. Bird seeds are without change.

JOHN SHAW & SONS, Seed Merchants,
16, Water Lane, London, E.C.

COALS.—March 15.

Hastings Hartley, 15s. 6d.; West Hartley, 15s. 6d.; Walls End Harton, 15s. 3d.; Walls End Hetton, 17s. 6d.; Walls End Hetton Lyons, 15s. 3d.; Walls End Kelloe, 16s.; Walls End East Hartlepool, 16s. 9d.; Walls End Original Hartlepool, 17s. 6d.; Walls End South Kelloe, 16s. 3d.; Walls End, 17s. —Ships at market, 31; sold, 23; unsold, 8; at sea, 35.

Notices to Correspondents.

IMPORTS FOR TWELVE MONTHS: A.

Articles.	Imports.	
	1869.	1870.
Animals, living—Oxen, Bulls, and Cows No.	190,674	170,647
Calves	50,516	31,225
Sheep	601,472	651,139
Lambs	18,371	15,767
Pigs and Hogs	6,049	95,624
Bones burnt or not, or as Animal Charcoal tons	95,980	94,923
Corn—Wheat—From Russia .. cwt.	9,128,131	10,269,108
Denmark	549,811	327,019
Prussia	4,615,111	2,650,990
Schleswig, Holstein, and Lauenburg ..	67,454	31,275
Mecklenburg	66,147	457,205
Hanse Towns	73,134	257,682
France	468,274	253,444
Illyria, Croatia, and Dalmatia ..	1,020,393	60,472
Turkey and Wallachia and Moldavia ..	2,354,047	436,848
Egypt	1,004,479	104,950
United States	13,815,597	19,372,175
Chili	567,107	509,337
British North America	2,723,053	2,876,539
Other countries	5,930,820	996,046
Barley	8,053,660	7,243,781
Oats	7,910,870	10,860,955
Pee	1,054,387	1,729,375
Beans	1,897,220	1,512,176
Indian Corn, or Maize	17,644,111	10,764,297
Wheat meal and Flour—Hanse Towns ..	647,430	674,020
France	148,051	648,181
United States	1,711,000	2,154,751
British North America	538,766	451,473
Other countries	1,456,989	892,403
Indian Corn Meal	6,039	5,741
Flax and Tow or Cordilla of Flax—		
Russia	1,085,841	1,610,609
Holland	118,591	107,575
Belgium	167,790	212,145
Other countries	167,795	370,009
Cotton—West Coast of Africa tons	3,320	2,480
United States	457	568
Peru	100,122	244,534
India	1,612	955
British West India Islands	2,292	—
Other countries	3,397	32,374
Hemp and Tow or Cordilla of Hemp—		
Russia	563,615	612,808
Venetia	225,054	218,551
Illyria, Croatia, and Dalmatia ..	41,271	162,214
French India	47,844	12,721
Philippine Islands	92,641	120,345
Other countries	68,348	88,213
China Grass	—	31
Jute and substances of the nature of Hemp	2,496,968	2,493,550
Hides—Untanned Dry—From British India	267,256	384,510
Other countries	73,193	141,779
Wet—From Argentine Confederation and Uruguay	206,430	306,610
Brazil	104,381	158,667
Australia	41,756	27,148
Other countries	179,117	179,596
Hides, tanned, tawed, curried, or dressed (except Russia Hides) .. lb.	9,847,757	11,424,692
Oil	323,515	227,013
Oil Seed Cakes	159,016	158,211
Paper for printing or writing	160,274	173,106
Of other kinds, except paper hangings ..	244,200	238,366
Potash, muriate of	298,948	208,535
Potatoes	1,660,189	772,003
Provisions—Butter	1,259,080	1,599,481
Cheese	979,320	1,041,531
Eggs	442,772,740	430,842,240
Fish, cured or salted	481,714	572,380
Meat	255,641	17,673
Meat, fresh or slightly salted—Beef ..	14,608	12,035
Pork	20,730	36,481
Meat, salted—Bacon and Hams ..	77,619	57,154
Beef, salted	714,955	203,773
Pork	165,044	220,523
Meat, not otherwise described	82,401	114,937
Salt	278,820	208,538
Cubic Nitre	906,604	1,123,472
Seeds—Cotton	105,147	120,295
Clover	231,427	155,723
Flaxseed and Linseed	91,327,666	1,490,695
Rape	260,212	551,107
Tallow, from Russia	399,818	219,541
Australia	244,186	489,751
South America	431,772	174,185
Other countries	259,319	329,541
Tallow	26,728	43,843
Wool, Sheep and Lambs—From Europe	25,349,401	23,686,039
British Possessions in South Africa ..	34,307,882	33,785,971
British India	28,796,590	11,143,148
Australia	158,477,060	17,581,427
Other countries	16,776,521	16,666,098
Alpaca and the Llama tribe	3,300,345	3,888,536
Woolen rags, torn up to be used as wool	41,943,068	21,291,648
Woolen manufactures not made up of Shawls, scarfs, and handkerchiefs .. lb.	2,445,299	3,256,323
Woolen and worsted yarn	10,000,820	10,900,000
Yeast, dried	120,012	128,641

WHEELERS' GRASS SEEDS

FOR PERMANENT PASTURE ON THE

OLD RED SANDSTONE.

30s. per acre.

Carriage Free. Five per cent. discount for cash.

WHEELERS' GRASS SEEDS

FOR PERMANENT PASTURE ON

THE LIMESTONE.

30s. per acre.

Carriage Free. Five per cent. discount for cash.

WHEELERS' GRASS SEEDS

FOR PERMANENT PASTURE ON

CLAY SOIL.

29s. to 33s. per acre.

Carriage Free. Five per cent. discount for cash.

WHEELERS' GRASS SEEDS

FOR PERMANENT PASTURE ON

THE LIAS.

29s. to 32s. per acre.

Carriage Free. Five per cent. discount for cash.

WHEELERS' GRASS SEEDS

FOR PERMANENT PASTURE ON

THE OOLITE.

28s. to 30s. per acre.

Carriage Free. Five per cent. discount for cash.

WHEELERS' GRASS SEEDS

FOR PERMANENT PASTURE ON THE

NEW RED SANDSTONE AND MARL.

29s. to 32s. per acre.

Carriage Free. Five per cent. discount for cash.

WHEELERS' GRASS SEEDS

FOR PERMANENT PASTURE ON

THE COAL MEASURES.

28s. to 32s. per acre.

Carriage Free. Five per cent. discount for cash.

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SEED GROWERS, 59, MARK LANE, LONDON.
Seedsmen to the Gloucestershire Agricultural Society, Gloucester.

LOAM.—Three or Four Hundred Loads of very first-

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SILVER SAND, PEAT, and LOAM for SALE, by

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SILVER SAND and PEAT, in any quantity.—

This Sand is acknowledged by Florists to be the best yet

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By Royal Letters Patent.

THE SIDNEY SEED SOWER, for all sorts and

sizes of Vegetable and Flower Seeds, at 6d. each.

By using this Hand Sower, after throwing out, may be avoided, as

all kinds of seeds can be sown in any quantity required by regulating

the slide, either for drills, broadcast, or in pots.

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THE SILICATE ZOPISSA COMPOSITION.

A PERFECT CURE FOR DAMP WALLS.

For particulars apply only to

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New Verbena Peg.

His NEW PEG may well measure in stating that his

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Birmingham Edton and Sons Manchester J. Shaw

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GREEN'S PATENT SILENS MESSORS,

OR

NOISELESS LAWN MOWING, ROLLING, AND COLLECTING MACHINES, FOR 1871.

THOMAS GREEN AND SON, in introducing their PATENT LAWN MOWERS to the Public for the present season, take the opportunity of acknowledging the unprecedented patronage that has been accorded to them in former years, and can assure their future Patrons that nothing will be wanting on their part to maintain the CONFIDENCE so long given to them.

Every Lawn Mower that is sent out by them is warranted to give entire satisfaction, otherwise it can be returned at once, free of cost to the purchaser. Our Machines have been submitted to numerous practical tests in Public Competition, and have in all cases carried off every Prize that has been given.

The following are their advantages over all others:—

- 1st. **Simplicity of Construction, every part being free of access and easily managed.**
- 2d. **They are worked with far greater ease than any other Lawn Mower.**
- 3d. **They are the least liable to get out of order.**
- 4th. **They make little or no noise in working, as is the case with Cog-wheel Machines.**
- 5th. **They perform their work in a neat and smooth manner, and leave no notches or scores.**

PATRONIZED BY

HER MOST GRACIOUS MAJESTY

THE QUEEN,

ON 45 DIFFERENT OCCASIONS;

H.R.H. THE PRINCE OF WALES;

THE KING OF THE BELGIANS;



THE EMPEROR OF THE FRENCH;

THE EMPEROR OF RUSSIA;

AND MOST OF THE

NOBILITY, CLERGY, AND GENTRY

OF THE UNITED KINGDOM.

PRIZE MEDALS AWARDED TO GREEN'S PATENT NOISELESS LAWN MOWERS.

International Exhibition, London, 1862.

International Exhibition, Dublin, 1863.

Agricultural and Horticultural Society, Brussels, 1862.

Agricultural and Horticultural Society, Brussels, 1863.

Agricultural and Horticultural Society, Hamburg, 1863.

Agricultural and Horticultural Society, Liege, 1861.

Agricultural and Horticultural Society, Namur, 1862.

Agricultural and Horticultural Society, Laeken, 1862.

Agricultural and Horticultural Society, Gand, 1862.

Agricultural and Horticultural Society, Linnece, 1862.

Agricultural and Horticultural Society, Linnece, 1863.

The following are a few of the principal places where Green's Patent Lawn Mowers are the only Machines in constant use, and have been for a number of years giving entire satisfaction:—

THE ROYAL GARDENS, WINDSOR.
BUCKINGHAM PALACE GARDENS.
MARLBOROUGH HOUSE GARDENS.
SANDRINGHAM HALL GARDENS.
CHISWICK HOUSE GARDENS.
ROYAL HORTICULTURAL SOCIETY'S GARDENS,
SOUTH KENSINGTON.
ST. JAMES'S PARK.
KENNINGTON and BATTERSEA PARKS.

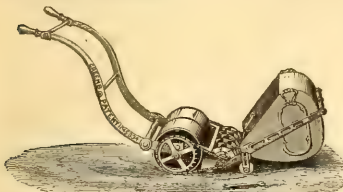
ROYAL BOTANICAL GARDENS.
ROYAL HORTICULTURAL GARDENS.
KENSINGTON PALACE GARDENS.
TEMPLE GARDENS.
ZOOLOGICAL GARDENS.
CRYSTAL PALACE GARDENS.
SOUTH KENSINGTON MUSEUM.
BERKELEY SQUARE GARDENS.
RUSSELL SQUARE GARDENS.
GORDON SQUARE GARDENS.
PARLIAMENT SQUARE GARDENS.

BRUNSWICK SQUARE GARDENS.
ROYAL HOSPITAL, CHELSEA.
ROYAL NAVAL SCHOOLS.
HYDE PARK GARDENS.
LIVERPOOL PARK.
BIRKENHEAD PARK.
PRESTON PARK.
SUNDERLAND PARK.
HALIFAX PARK.
BRADFORD PARK.
LEEDS ROYAL PARK.

NOTICE OF REDUCTION IN PRICES.

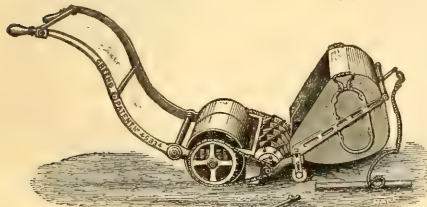
With the increased advantages and facilities we possess for the Manufacture of Lawn Mowers, we are enabled to Sell them at a greatly reduced rate on former years, as will be seen from the following Scale of Prices:—

SINGLE-HANDED LAWN MOWER.



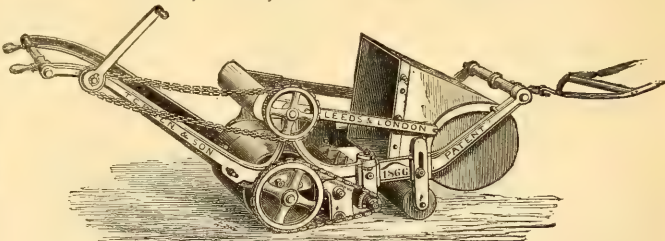
To cut 8 inches	..	..	..	..	Price	£2	10	0
" 10 "	..	..	..	..	"	3	0	0
" 12 "	..	..	..	..	"	4	0	0
" 14 "	..	..	..	..	"	5	0	0

DOUBLE-HANDED LAWN MOWER.



To cut 16 inches	Price	£6	0	0	This can be worked by one Man on an even lawn. By Man and Boy.
" 18 "	"	7	0	0	
" 20 "	"	7	10	0	
" 22 "	"	8	0	0	
" 24 "	"	8	10	0	"

HORSE, PONY, AND DONKEY MACHINE.



Prices of Horse, Pony, and Donkey Machines, including Patent Self or Side Delivery Box, Cross Stay complete; suitable for attaching to ordinary Chaise Traces or Gig Harness.

DONKEY AND PONY MACHINES.

To cut 26 inches	..	..	£13	0	0
" 28 "	..	..	15	0	0
" 30 "	..	..	17	0	0
Leather Boots for Donkey	..	..	0	18	0
Ditto for Pony	..	..	1	2	0

HORSE MACHINES.

To cut 30 inches	..	..	£21	0	0
" 36 "	..	..	24	0	0
" 42 "	..	..	27	0	0
" 48 "	..	..	30	0	0
Leather Boots for Horse	..	..	1	6	0

The 26 and 28 inches can easily be worked by a Donkey, the 30 inches by a Pony, and the larger sizes by a Horse; and as the Machines make little noise in working, the most spirited animal can be employed without fear of its running away, or in any way damaging the Machine.

SPECIAL NOTICE.

Both the Horse, Pony, Donkey, and Hand Machines possess (over all other makers) the advantage of self-sharpening; the cutters being steel on each side, when they become dull or blunt by running one way round, the cylinder can be reversed again and again, bringing the bottom edge of the cutters against the bottom blade, when the Machine will cut equal to new. Arrangements are made that the cylinder can be reversed by any inexperienced person in two or three minutes.

The Handles of the Machines can be altered to suit the person using them, by either raising or lowering them.

Delivered Carriage Free to all the principal Railway Stations and Shipping Ports in England, Ireland, and Scotland.

N.B.—With the large number of all sizes of Machines we have in Stock at our Leeds and London Establishments, we are in a position to execute all Orders on the day they are received. REPAIRS are done with efficiency and despatch both at Leeds and London.

THOMAS GREEN AND SON, SMITHFIELD IRON WORKS, LEEDS; and
54 and 55, BLACKFRIARS ROAD, LONDON, S.E.

The Great Western and the Great Eastern Railway Companies have liberally promised to convey over their lines, *en route* to Plaistow Wharf, any donations in kind bearing the label of the French Peasant-Farmers' Seed Fund, which will be supplied upon application to the Honorary Secretaries, whilst a certain amount of tonnage will be carried free to a port in France by the South-Eastern, London, Chatham, and Dover and London and South-Western, Railway Companies.

Under Royal Patronage.



PHILLIPS' ROYAL POTTERY, WESTON-SUPER-MARE.
ESTABLISHED 1856.

JOHN MATTHEWS, late PHILLIPS, Manufacturer
of STATUARY POT VASES, FLORAL ARBORETUM
POTS, EDGING TILES, &c. Plain and Ornamental GARDEN
POTS. PUTS, with movable bottoms, made to order.
Book of Drawings and Price List on application.

JOHN MATTHEWS, Royal Pottery, Weston-super-Mare, Somerset.

Roshers' Garden Edging Tiles.



THE above and many other PATTERNS are made in
materials of great durability. The planter is especially
suited for KITCHEN GAR-
DEN, as they harbour no
Slugs or Insects, take up little
room, and, once put down,
incur no further labour or ex-
pense, as do "grown" Edging
tiles, consequently being much
cheaper.

GARDEN VASES, FOUNTAINS, &c., in Artificial Stone, very
durable and of superior finish, and in great variety of design.
F. AND G. ROSHER, Manufacturers, Upper Ground Street, Black
friars, S.E.; Queen's Road West, Chelsea, S.W.; Kingsland Road, E.
Agents for LOOKER'S PATENT "ACME FRAMES," PLANT
COVERS and PROPAGATING HOUSES; also for TOWNLEY'S
PATENT BEADED GARDEN WALL BRICKS.

Illustrated Price Lists free by post. The Trade supplied.

ORNAMENTAL PAVING TILES for Conservatories,
Halls, Corridors, Balconies, &c., from 12 per square yard
upwards. Pattern Sheets of plain or more elaborate designs, with
prices, sent for selection.

WHITE GLAZED TILES, for Lining Walls of Dinies, Larders,
Kitchen Ranges, Baths, &c. Grooved and other Stable Paving of great
durability, Wall Copings, Drain Pipes and Tiles of all kinds, Roofing
Tiles in great variety, Slates, Concretes, &c.

F. AND G. ROSHER, Brick and Tile Merchants—See address, above.

SILVER SAND, fine or coarse grain as desired.

Price 12s. Coarse 12s. per 100 lbs. In Truck Loads 12s. per 100 lbs.
Delivery by Cart within three miles, or to any London Railway or
Wharf, 2s. per 100 extra. Samples of Sand free by post.
FLINTS and BRICK BURS for Rockeries or Ferneries. KENT
PEAT or LOAM supplied at lowest rates in any quantities.

F. AND G. ROSHER—Address see above.
N.B. Orders promptly executed by Rail or to Wharves.
A liberal discount to the Trade.

WINDOW GLASS, SHEET LEAD, PAINTS, &c.

THOMAS MILLINGTON & Co.,

IMPORTERS AND MANUFACTURERS.

NEW LIST of PRICES for MAY, transmitted or furnished on application.

87, BISHOPSGATE STREET WITHOUT, LONDON, E.C.

HENRY DOULTON & Co.,

HIGH STREET, LAMBETH, LONDON, S.E.;
100, SOHO STREET, LIVERPOOL; and GRANVILLE WHARF, BIRMINGHAM;

MANUFACTURERS OF

IMPERISHABLE GARDEN EDGING, VASES, FLOWER POTS,
AND EVERY KIND OF
TERRA COTTA GARDEN ORNAMENT.



The Tiles will be found far preferable to Box and
other edgings, as they require no attention when once
fixed, take up less room, and do not harbour Slugs, &c.
They may be had also in Vitrified Stoneware.

Price Lists on application as above.

JOHN WARNER & SONS, HYDRAULIC ENGINEERS,

Bell and Brass Founders to Her Majesty, Manufacturers of Hydraulic Machinery
of every description, Wind Engines, Water Wheels, Water Rams, Deep Well Pumps and
Frames for Horse or Hand Power, Garden Engines, Swing Barrows, &c., &c. Branch Pipes
for Rubber Hose, with Jet and Spreader, or with Haswell's Patent Director, from 3s. 6d.
Syringes from 5s., or, fitted with Haswell's Director, 12s. 6d. Lists sent on application.

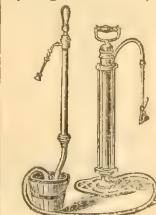
8, CRESCENT, CRIPPLEGATE,
LONDON, E.C.



FOUNTAIN JETS.
In great variety, from 3s. 6d.



No. 517A.
GARDEN ENGINE.
12 Gallons .. £3 0 0
26 3 16 0
24 5 1 0
30 5 13 0



WARNER'S
AQUAJECT.
Useful for every variety of at-
tachment—in watering or washing
Flowers or Trees in Gardens,
Conservatories, &c.; also for
washing Carriages or Windows,
laying Dust, &c.
Price complete £1 8 0
Small size for the
hand, as an ordi-
nary Syringe .. 0 15 0



THE CRYSTAL PALACE
GARDEN or FIRE ENGINE.



No. 35.
CAST-IRON
PUMPS.

2½ inches	.. £1 9 0
3 .. ..	.. 1 18 0
3½ .. ..	.. 2 7 0
4 .. ..	.. 2 15 6



No. 42.
PORTABLE PUMP.
With improved Valves for Liquid
Manure, &c. for 6d. Two-inch
Flexible Rubber Suction Pipe,
10, 12, and 15 feet lengths,
per foot 2s. 5d.



No. 43. SWING
WATER BARROW.
Galls. Galls.
20 £2 2 0 38 £3 18 0
6, 30 2 14 0 50 5 14 0



THE "ARCHIMEDEAN" AMERICAN LAWN MOWER.

The only Lawn Mower that Cuts Wet or Long Grass
(as well as dry) without Clogging,

Leaving the Cuttings in small particles, evenly scattered, never looking untidy, serving as a Mulch to Protect the Roots
from Heat and Drought, and Fertilising the Sod, which cannot fail to invigorate and beautify the Lawn. Perfectly adapted to
SLOPES, UNUNDULATING LAWNS, RIDGES and VALLEYS; and for the CROQUET GROUND is invaluable.

NOTICE.—GREAT REDUCTION in PRICES for 1871.—We have great pleasure in stating that owing
to the unprecedented success our "Archimedeon" Lawn Mower met with last year, we have increased our facilities for
manufacturing, and notwithstanding that several important improvements have been made in the machine, yet we have made a
large Reduction in Prices for 1871.

"Far superior to any of ours."—*Vide The Field.*

"We feel bound to recommend it to our readers as one of the best Mowers we have as yet made
acquaintance with."—*Vide Floral World.*

"Remarkably easy to work."—*Vide Gardeners' Magazine.*

"The quickest, most simple, and most efficient Mower ever used."—*Vide Gardeners' Chronicle.*

Numerous Testimonials from the highest authorities in horticulture have been received

ILLUSTRATED CATALOGUES and TESTIMONIALS Post Free on application.

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WILLIAMS AND CO., 1, CITY ROAD, FINSBURY SQUARE, E.C.

Wholesale Agent—JOHN G. ROLLINS, American Merchant, Old Swan Wharf, London, E.C.

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AND

SATURDAY, MARCH 25.

Registered at the General Post Office as a Newspaper. Price 5d. POST FREE, 5½d.

VINES FOR PLANTING,

Canes, 6 to 7 feet, 5s. each.

Muscat Grapes.		Muscadine and Sweetwater Grapes.	
BOWDOY MUSCAT	MRS. PINCE'S BLACK, extra strong	CHASSERAS NOIR	REEVE'S MUSCADINE
MUSCAT OF ALEXANDRIA		FOSTER'S WHITE SEEDLING	PROLIFIC SWEETWATER
White Frontignan Grapes.		Purple Grapes.	
CHASSERAS MUSQUE	EARLY SMYRNA	BLACK HAMBURG	GROS COLMAN, the largest
DE GRAY'S SILVER	ENGELIN	BLACK TOKAY or	Grape known
EARLY AUYERNE	PRIMAVERA	DITH'S ALCANTARA	MEDOC
" GOLDEN	SAVANA	INGRAM'S PROLIFIC	ROYAL ASCOT
" SAUMUR	TOKAY		TRENTHAM BLACK
" SILVER	TROVEREN / WHITE	White Grapes.	
GRIZZLY FRONTIGNAN	MEURTHE FRONTIGNAN	CALABRIAN RAISIN	MADELINE ROYALE
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			WHITE CORSAIC.

Carriage Paid to London.

THOS. RIVERS AND SON, NURSERIES, SAWBRIDGEWORTH.

NEW GRAPES.

EXTRA STRONG

GOLDEN CHAMPION, WHITE LADY DOWNE'S, MUSCAT CHAMPION.

OLDER VARIETIES—

BLACK HAMBURG, DUCHESS OF BUCCELUCH.

Strong and in Quantities.

PRICES ON APPLICATION.

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PAUL & SON'S NEW ENGLISH ROSES FOR 1871.

PAUL AND SON, THE "OLD NURSERIES," CHESHUNT, N.

HAVE THE PLEASURE TO ANNOUNCE THE FOLLOWING

NEW ENGLISH HYBRID PERPETUAL ROSES.

PRINCESS LOUISE (LAXTON).—First-class Certificate Crystal Palace Rose Show. A seedling from Madame Vidot, fertilised by Vigneron; a white, sometimes bluish white, large, full globular form, the growth resembling that of Madame Rivers; strong, vigorous growth.

PRINCE OF WALES (LAXTON).—First-class Certificate Birmingham Rose Show. A seedling from Lælia, fertilised by Victor Verdier; deep silvery pink, of enormous size, fine globular full form. In our opinion, one of the finest Roses ever sent out. The above, 10s. 6d. each, in June.

CLIMBING VICTOR VERDIER (PAUL & SON).—First-class Certificate Royal Botanic Society. A new variety, with the bright cherry-red flowers of Victor Verdier, but with vigorous zigzag climbing habit, and half-pendulous shoots and flowers. A sport selected three years ago, and thoroughly proved as a good Pillar or Climbing Red Rose. 7s. 6d. each.

THE NEW FRENCH ROSES, 36s. per dozen, strong plants, ready in April with

HYBRID PERPETUAL.

HENRI PAGES

TEA-SCENTED.

CAPITAINE LAMONT

MADAME AZELIE IMBERT
BERARD
GAILLARD
VICTOR PULLIAT

BELLE MACONAISE
COQUETTE DE LYON
FRERES SOUPET ET NOTTING
HORTENSEA

PRICED DESCRIPTIVE LISTS now in the Press.

E. G. HENDERSON & SON,

WELLINGTON NURSERY, ST. JOHN'S WOOD, N.W.

Respectfully announce that on and after April 1 they will send out the following first-class Bedding Plant—

PANSY, QUEEN OF SCOTS.

This very effective variety has been grown by the raiser for several seasons, and proved to be of first-class merit, by the great profusion of bloom which it carries throughout the early spring and summer months, thus being specially adapted for the first general display in the spring flower garden, as well as for the succession bloom required in the green leaf tint, and maintaining a continuance of growth and bloom throughout the season. The flower is a rich purplish blue, with a central orange-coloured eye, being nearly two sizes larger than Imperial Blue Perfection, of a good outline and substance, finely expanded, and yielding a very delicate and grateful odour. The constitution of this variety is as hardy as the common wild Violet, maintaining its growth, verdure, bloom, colour, and effect, in dry seasons, superior to any other yet offered. For extensive decoration in lines, borders, or belts, it forms a rich and beautiful contrast with parallel circles or lines of the white and golden-yellow kinds, and will be found a valuable acquisition to the flower garden, not less by its unequalled profusion of bloom than for its adaptation to all ordinary soils.

Each 2s.; Six Plants, 10s. 6d.; Twelve Plants, 15s.; 50 Plants, 42s.

DOUBLE-FLOWED TUBEROSE.

The tubers of this delightfully fragrant flower are generally known to differ much in their value for producing bloom. The smallness of the French and Italian tubers, especially the former, produce but small stems and few flowers, and many fail in the latter. The finest roots now offered (and they are magnificent tubers) are of American growth, and certain to produce fine long flower-scapes.

6s. per dozen; Second size, 4s. per dozen.

For LIST of New, Novel, and Beautiful SUMMER PLANTS by Seeds, see the previous insertion of March 11, p. 163.

Full DESCRIPTIVE LISTS of the above and other NOVELTIES may be had, Post Free on application.

Beautiful New Hardy Fruit, the Fairy Apple.

JOHN JENNINGS is now settling out this desirable acquisition to the Dessert. In season from December to April. DRIFTY MAIDEN TREES, 7s. 6d. each.
"Worthy to take its place among the worthiest of its kind."
Dr. Hogg in "Flora and Fomestica," March, 1870.
Nurseries, Shipdon-on-Saun.

Choice Hardy Scarlet and other Rhododendrons.

JOHN WATERER AND SONS have the pleasure of announcing that their CATALOGUE of the above plants, as exhibited at the Royal Botanic Gardens, Regent's Park, is published, and will be forwarded to order. It faithfully describes the colours of the Rhododendrons, and also contains selections of the most improved CAMELLEAS, with heights and prices, as well as the leading EVERGREENS and ROSES.
The American Nursery.

Verbenas—Verbena—8s. per 100; 50s. per 1000.

WILLIAM BADMAN offers well rooted cuttings of VERBENAS—Purple, White, Scarlet, Crimson, Rose, &c., of 100, 250, 500, 1000, &c. per 100.
LABELLA SPECIOSA (true), strong plants on cuttings, 3s. 6d. per 100, 250, 500, 1000.
FUCHSIAS.—Orchard market sorts, from stores, 6s. per 100.
GERANIUMS.—Yessival, Lord Derby, Madame Lemonie, Wilhelm Pflüger, 2s. 6d. per dozen, 10s. per 100; Crystal Palace Gem, finest yellow leaf, 2s. per dozen, 12s. per 100. Scarlet Geraniums, from store pots, 8s. per 100. Package included. Terms, cash.
Croydon Nursery, Croydon.

ONE HUNDRED THOUSAND PANSIES, of

English and fancy sorts, named, hardy and strong, ready for immediate planting; 1 price per dozen, my selection, 1s. 6d. per set per 100.
Mixed PANSIES, for borders, splendid little tufts, 1 inches through, and filled with buds; almost equal to the named varieties, 2s. per dozen, or 1s. 6d. per set per 100.
Clarendon Blue and Yellow PANSIES, fine strong hardy plants, 2s. per dozen, or 1s. 6d. per set per 100.
PANSY SEED, from the finest show and fancy varieties, 1s. 6d. and 2s. 6d. per packet.
CATALOGUE of the above on application to
THOMAS MILNER, Nurseryman, Bradford, Yorkshire.

NEW H. P. ROSE MARQUISE DE

CASTELLANE.—First-class Cordon Rouge Rose, Keating's See "Gardeners' Magazine" for March 18. A splendid stock of this magnificent Rose. The 12 best Roses of 1870; also a selection of the best of
HENRY BENNETT, Manor Farm Nursery, Stapleford, Salisbury.

NEW Seeds for 1871.

ARCHER HENDERSON begs to announce that his descriptive and priced LIST of KITCHEN GARDEN AGRICULTURAL SEEDS; also a select LIST of GLADIOLUS for strong planting, with cultural remarks on all the most important Seeds, Roots, &c., is now ready. The best celebrated English and Continental growers.
GRAPE VINES in pots, an unrivalled collection.
Address, Sion Nursery, Thornton Heath, and at the East Surrey Seed Warehouse, North End, Croydon.

Russell's Pyramid Primula.

GEORGE CLARKE has this season secured a quantity of every variety of this beautiful flower, which he recommends, feeling assured that no other possesses such a robust character, with really splendid flowers. Mixed, Red and white, 2s. 6d. per pkt. Instructions for raising and prices sent if required.
Nurseries: Streatham Place, Brixton Hill, London, S.W.; and Mottisham, Kent.

BEAUTIFUL SPRING FLOWERS.

	Per doz.—s. d.	Per doz.—s. d.
Violets: The Queen, The King, large Double Red, Neapolitan, The Cray, Devonshire, very fragrant	4 0	3 0
Do, Madonna pendula, the new Weeping Violet of 1870	6 0	4 0
Do, Obliqua striata, striped Auricular, finest alpine	4 0	3 0
Do, Hepatica, double red	4 0	3 0
Do, single white	4 0	3 0
Do, double white, the best strain	4 0	3 0
Daisies, six named varieties	4 0	3 0
Do, Aucubifolia, golden Blotched	4 0	3 0
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Do, Primula, choice named	4 0	3 0
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Do, Helianthemum, or Dwarf	4 0	3 0
Do, Helianthemum, named	4 0	3 0
Do, Phlox, Pentstemon, &c., to name	4 0	3 0

A choice collection of ROCK and HERBACEOUS PLANTS, to name, 4s. per doz. 25s. per 100.
A Descriptive CATALOGUE of all the above, with LISTS of ROSES, FRUIT TREES, and GENERAL NURSERY STOCK, sent free.
LEWIS WOODTHORPE, Munro Nursery, Sible Hedingham, Essex.

TYNNAN'S UNIQUE COLLECTIONS of ASTERS, STOCKS, &c.

10 vars. Truffaut's ASTER, 2s. 6d.; 5 vars. Dwarf Chrysanthemum 4s.; Victoria do, 1s. 8d.; 8 vars. Crown do, 1s. 4d.
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10 vars. Ten-week STOCK, 2s.; 10 vars. large flowering do, 1s. 8d.
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10 vars. Double WALLFLOWER, 2s. 6d.
All Finest Imported German Seeds.
Post free on receipt of stamps. CATALOGUES on application.
Seed Warehouse, 68, Great George Street, Liverpool.

SUPERIOR VEGETABLE and FLOWER SEEDS.

	Free by Post.	Per packet.—s. d.
BET, Dell's New Black	..	0 6
BROCCOLI, Melville's Variegated	..	0 6
BROCCOLI, Snow's Winter White, true	..	1 0
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BRUSSELS SPROUTS, Scrymgeour's Improved	..	0 6
Do, Melville's, Worcester's, &c., mixed	..	1 0
CALIFLOWER, true Erfurt	..	1 0
CELERY, Sandringham White	..	1 0
Do, Melville's, Small Green, &c., named	..	1 0
LETTUCE, Worcester's White Coss	..	1 0
Do, Worcester Cabbage	..	1 0
Do, Paris White Coss	..	1 0
MELON, Cox's Golden Gem, true	..	0 6
ONION, Nuecham Park	..	1 0
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AMARANTHUS ELEGANTISSIMUS 1 0
CALICULARIA, splendid mixed 1 0
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Do, CANDIDA 1 0
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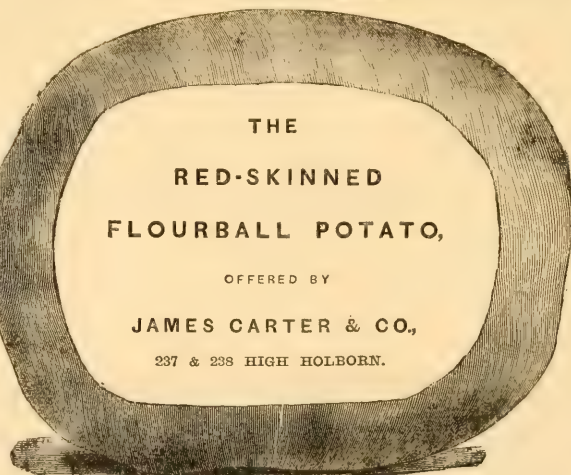
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 2,000 Green HOLLY, 2 to 3 feet, very bushy.
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 1,000 American ARBORVITAE, 5 to 6 feet, very bushy.
 4,000 Able, Lombard, Italian, and Balsam POPLAR, 5 to 8 feet.
 4,000 Yew OAK, 6 to 8 feet.
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 2,000 English YEW, 2 to 4 feet, very bushy.
 1,000 Irish YEW, 2 to 4 feet, very bushy.
 4,000 Variegated and Evergreen BOX, 2 to 3 feet, very bushy.
 2,000 White BROOM, 2 to 3 feet, very bushy.
 10,000 PERIBERIS LUCIFUGA, 1 to 1 1/2 feet, very bushy.
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 1,000 American ARBORVITAE, 3 to 4 feet, very bushy.
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 4,000 Able, Lombard, Italian, and Balsam POPLAR, 5 to 8 feet.
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 CALENDAR for 1871, sent gratis and post free.
 JAMES CARTER AND CO., The Royal Seedsmen, 237 and 238, High Holborn, London, W.C.

Vegetable and Flower Seeds.
 1871. (SEED POTATOS, GARDEN IMPLEMENTS, &c.) 1871.

OUR PRICED DESCRIPTIVE CATALOGUE of the above, with Cultural Directions, also ILLUSTRATED SHEETS of new and improved SEEDS, FRUIT, and FLOWERS, IMPLEMENTS, &c., are now ready, and will be forwarded post free on application.

James Dickson & Sons.
 (Old Established Nursery and Seed Business),
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To Market Gardeners and Others.
SUTTON AND SONS can supply the following, at very moderate prices:
 Daniel O'Rourke Pea Kentish Invieta Pea.
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 Sutton's Improved Broad Windsor Beans
 Apply, stating quantity required, to
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LOAM.—Three or Four Hundred Loads of very first-class Loam, to be SOLD, at Ealing.
 ADAMSON'S, 102, New Road, Ealing, W.

SILVER SAND AND PEAT, in any quantity.—This Sand is acknowledged by Mr. Thomas Arnold, Builder, 29, Clarendon Square, S. Faversham, N.W. Small orders executed at the Wharf, Maiden Lane, North-Western Railway Depot.

EPPE'S SELECTED PEAT for Choice to Plants, Ericas, Azaleas, Ferns, &c., superior to anything of its kind yet sold. It is for immediate use, lightly packed in new bags each (inclusive), 8d. per load. Station orders sent free. Small orders are ordered. Specially selected for Orchids, 1s. extra.
 Testimonials to J. W. JAS. EPPE, Horticultural Depot and Seed Store, Levensham, Lancashire.

A Boon for Grape Growers.
MEREDITH'S VINE, PINE, PEACH AND PLANT MANURE, to be had in sealed bags of 5 cwt., net, 1s. 3d. each; and of 1 cwt., net, 1s. 3d. each. For particulars, see Descriptive Circulars, to be had post free on application.
 J. W. JAS. EPPE, Horticultural Depot and Seed Store, Levensham, Lancashire.

THE LONDON MANURE COMPANY
 (ESTABLISHED 1840), have now ready for delivery, in dry condition—
 PURE DISSOLVED BONES.
 CONCENTRATED AMMONIACAL MANURE, for Top-Dressing.
 PURE BONE MANURE.
 SUPERPHOSPHATE OF LIME.
 NITROPHOSPHATE.
 MANGEL, POTATO AND MANURE. Also
 PERUVIAN GUANO (as imported by Messrs. Thomson, Bonar & Co., NITRATED GUANO, &c., in bulk, at Docks 1 to 10, Fenchurch Street, E.C. EDWARD PURSER, Secretary.

LAWES'S MANURES for GRASS LAND should be applied during the months of February and March. LITRE of SOLE AGENTS, 22, Abchurch Lane, London, Liverpool, and other ports, at lowest market prices.

JOHN BENNET LAWES.
 Branch Offices: Market Street, 22, Abchurch Quay, Dublin; Womansy Street, Cardiff; Sheriff Road, Leith, and 34, Market Street, Aberdeen.
LAWES'S PATENT TURNIP MANURE.
LAWES'S DISSOLVED BONES.
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LAWES'S WHEAT, BARLEY, GRASS, and MANGEL MANURE.
 These Manures can be obtained at any of the above addresses, or through any of the appointed Agents throughout the United Kingdom.
 JOHN BENNET LAWES, 22, Abchurch Lane, LONDON, E.C. 4.
 AMERICAN and other Cakes at market prices.

SUTTONS' GRASS SEEDS FOR ALL SOILS,

CARRIAGE FREE.

SPECIAL ESTIMATES GIVEN FOR LARGE QUANTITIES.



SUTTONS' PERMANENT PASTURE MIXTURES.

PREPARED FOR EVERY DESCRIPTION OF SOIL.

COMPLETE INSTRUCTIONS ON SOWING AND AFTER-MANAGEMENT SENT WITH THE SEEDS.

Suttons' Best Mixtures, 28s. to 32s. per acre, Carriage Free. | Suttons' Cheaper Mixtures, 20s. to 26s. per acre, Carriage Free.

Prices and full particulars of all other Grass Seeds may be had Gratis and Post Free on application.

THE HEAVIEST CROPPING AND BEST COOKING LATE POTATO.

From Mr. B. BARRAM, Gardener to the Right Hon. Lord Ormanthwaite, Warfield Park.

"The Red-skinned Flourball Potato you sent me is a most extraordinary kind, producing tubers varying from 1½ to 2 lb weight. Certainly the largest Potato I have ever seen."

From the Rev. A. G. BODOLF, Mells, near Frome.

"The Red-skinned Flourball Potatoes you sent to me were remarkably large when dug. They both boiled and roasted well, and have been entirely free from disease."

From T. CHAMBERLAIN, Esq., Clifton.

"I have forwarded to your address a small basket, containing a sample grown from the peck of Red-skinned Flourball Potatoes you invoiced to me on January 11 last. I do not know whether you will consider the Potatoes of extraordinary growth, or only what is commonly produced from this particular kind of seed. My gardener informs me one of the samples sent weighs 2 lb. good weight and that the average of the lot sent to you is nearly one pound and a half. The product he considers an exceptionally fine one."



From the Rev. H. H. DOMBRIN, Watwell Vicarage, Ashford.

"I have found your Red-skinned Flourball an admirable Potato, prolific, and unequalled for baking."

From Colonel J. LE COLLEUR, Belle Vue, Jersey.

"Oct. 28.—Half-a-peck of Red-skinned Flourball Potatoes produced 89½ lbs. weight; they are a fine size, excellent and mealy; floury; no sign of disease."

From JOHN F. STANLEY, Esq., Uppington, Wiltshire, Salisbury.

"Nov. 2.—I consider your Flourball Potato the best I have ever grown, both as to quality and quantity; they are quite free from disease, and remarkably uniform in size, with a shallow eye and fine clear skin."

From Mr. W. F. BENNETT, Steward to Lord Norbury, Faversham, Wiltshire.

"Oct. 26.—The Flourball Potato is of first-class quality, a great cropper, and quite free from disease."

From Mr. JOHN HALCOM, Eton.

"July 22.—I never had seeds that gave me had the satisfaction. I gained first prize with your Red-skinned Flourball Potato. Thirty competed."

From Major CLARKE, Wilton Park, Wiltshire.

"Oct. 26.—The Red-skinned Flourball Potato is very prolific, quite free from disease, very handsome, and beautifully white."

SUTTONS' RED-SKIN FLOURBALL.

FIRST INTRODUCED by SUTTON AND SONS in 1869-70. Lowest price per bushel, sack, and ton on application. The above Engraving is from a Drawing made by Messrs. SUTTONS' own Artist in the autumn of 1869, and first appeared in SUTTONS' "AMATEURS' GUIDE OF 1870."

SUTTONS' PRIZE FARM SEEDS, SAVED FROM SELECTED BULBS.

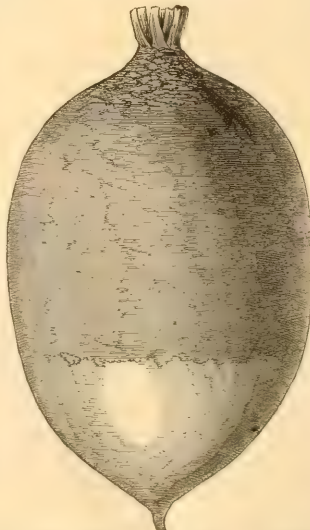


SUTTONS' CHAMPION SWEDE,

The best Swede in cultivation.

Price 1s. per lb.; cheaper by the bushel.

Other kinds, 9d. to 1s. per lb.



SUTTONS' NEW YELLOW INTERMEDIATE MANGEL,

a splendid variety, 1s. per lb.; cheaper by the cwt.



SUTTONS' IMPROVED LARGE GREEN KOHL RABI,

The heaviest cropping and finest quality variety.

Price 3s. per lb.; much cheaper by the cwt.

Ordinary varieties, 2s. 6d. per lb.

For further particulars of FARM SEEDS, see SUTTONS' FARM SEED LIST for 1871, Gratis and Post Free.

SUTTON AND SONS, SEEDSMEN TO THE QUEEN, READING, BERKS.

CHOICE VEGETABLE AND FLOWER SEEDS.



JAMES VEITCH & SONS,
ROYAL EXOTIC NURSERY,
KING'S ROAD, CHELSEA, S.W.

VEGETABLE SEEDS.

BEEF—Dell's Crimson	per oz.	1 6
BROCCOLE—Veitch's Dwarf Late Curled, per pkt.		1 0
BROCCOLI—Snow's Winter White		1 6
Veitch's fine Spring		1 6
Cooling's Matchless Late White		1 6
BRUSSELS SPROUTS—Scrymger's Giant, p. oz.		1 0
CABBAGE—Veitch's Improved Matchless, per pkt.		1 0
CARLIFLOWER—Veitch's Autumn Giant		2 6
CELERY—Veitch's Silver White		1 0
Sandringham Dwarf White		1 0
CUCUMBER—Sooty Qua, a new Chinese variety, growing 5 to 6 feet long, and from 12 to 16 inches in circumference	per seed	3 6
Telegraph (Rollison's Variety)	per pkt.	1 0
Cos's Volunteer		1 6
Dale's Conqueror, fine for exhibition		1 6
LETTUCE—Hicks' Hardy White Cos	per oz.	1 6
MELON—Colston Bassett Seedling	per pkt.	2 6
Queen Emma		1 6
PEAS—Eastes' Kentish Invicta	per quart	2 6
Laxton's Quantity		5 0
Quality		5 0
TOMATO—Hepper's Goliath, very superior, p. pkt. Awarded a First-class Certificate, R.H.S., Oct. 5, 1870.		1 6
TURNIP—Veitch's Red Globe	per oz.	0 6

CHOICE FLORIST FLOWERS.

PRIMULA SINENSIS FIMBRIATA ALBA	2 6
.. .. RUBRA	2 6
.. .. choicest mixed	2 6
The above Primulas are saved from the best fringed and most perfectly formed flowers, and cannot be surpassed in quality.	
Our PRIMULAS were awarded a Special Certificate, R.H.S., Feb. 19, 1871, for superior quality.	
CALCEOLARIA—James' choice strain	2 6
(Received direct from Mr. James.)	
From the Dalkeith collection	15. 6d. and 2 6
CINERARIA—Saved from a first-class collection,	15. 6d. and 2 6
CYCLAMEN PERSICUM—Prize strain,	15. 6d. and 2 6
Awarded a Special Certificate, R.H.S., Feb. 15, 1871.	
BALSAM—Camellia-flowered, mixed	6d. and 1 0
Double, rose-flowered, finest mixed	6d. and 1 0
POLYANTHUS—Very choice, saved from finest gold-laced flowers only	1 0
CARNATION—Mixed, from a prize collection,	15. 6d. and 2 6
PICOTEE—First quality, choice mixed	15. 6d. and 2 6
PINK—Choice lace varieties, from a prize collection	15. 6d. and 2 6
ANTIRRHINUM—Saved from the newest and finest varieties	6d. and 1 0
GLOXINIA—From our own collections of drooping and erect flowering varieties	1 0
HOLLYHOCK—Choicest flowers only	6d. and 1 0
LOBELIA SPECIOSA—Our own saving	6d. and 1 0
PANSY—Choicest mixed, from English show vars.	1 0
PETUNIA HYBRIDA—Choice varieties, in mixture	6d. and 1 0
STOCKS—East Lothian, per collection of three colours (scarlet, purple, and white)	2 6
SWEET WILLIAM—Bragg's Improved, mixed	1 0
VERBENA HYBRIDA—From finest varieties	0 6

NOVELTIES.

ASTER—New Victoria Homecomb,	per pkt.	2 6
New German Emperor, per collection of four colours, separate		
CENTAUREA CLEMENTEI	15. 6d.	2 6
MYOSOTIS DISSITIFLORA	2 6	2 6
MIGNONETTE—Parsons' New White	2 6	2 6
New Large Red-flowered		
TROPEOLUM COMPACTUM LUTEUM	1 0	1 0
VIOLA LUTEA GRANDIFLORA, vars.	1 6	1 6
WALLFLOWER—Belvoir Castle, dwarf yellow,	1 0	1 0

POTATOS.

VEITCH'S IMPROVED EARLY ASHLEAF KIDNEY	per peck	5 0
This splendid variety is quite distinct from every other, and may be fairly described as the best Ashleaf Kidney in cultivation, being a very heavy cropper, of excellent quality, and a first-rate forcer.		
RED-SKINNED FLOURBALL,	per bushel	18 0

All other NOVELTIES at advertised prices.

COLLECTIONS OF VEGETABLE SEEDS,
at 21s., 31s. 6d., 42s., 63s., and 105s. each,
Carriage Paid.

In all respects similar to those advertised by other firms.

PRICED CATALOGUES Free on application.

CARTER'S GRASS SEEDS

FOR ALL SOILS, NOW READY,

CARRIAGE FREE.

FOR PERMANENT PASTURES.

For ORDINARY SOILS, 20s. to 25s. per acre.
For HEAVY SOILS, 20s. to 31s. 6d. per acre.
Reduced rates for quantities of more than ten acres.

Carter's Grass Seeds at Aldershot Camp.

Col. LUTYAN, Commanding the Royal Engineers, reports as follows,
under date Feb. 4, 1871:—Col. Luffian, R.E., presents his compli-
ments to Messrs. Carter, and begs to inform them that all the Grass
and Clover seeds supplied by them to the War Office for use at
Aldershot last year and the year before have succeeded admirably.
Last year a very fair crop of excellent Hay was produced on what
had previously been a barren sand.

CARTER'S GENUINE FARM SEEDS

HARVESTED ON THEIR OWN SEED FARMS, from CHOICE PRIZE STOCKS. PRESENT PRICES:—	Per lb., s. d.
YELLOW GLOBE MANGEL	0 7
CARTER'S IMPROVED MAMMOTH PRIZE LONG RED	1 4
MANGEL	1 4
CARTER'S IMPROVED PRIZE YELLOW GLOBE MANGEL	1 4
CARTER'S NEW CHAMPION INTERMEDIATE MANGEL	1 0
Ordinary stocks at reduced rates.	
LIVERPOOL SWEDS	0 8
CARTER'S IMPERIAL HARVED SWEDS	0 10
CARTER'S LONDON SWEDS	0 10
SKIRVING IMPROVED PURPLE TOP SWEDS	0 10
CARTER'S CHAMPION GREEN and PURPLE TOP	0 10
HYBRID TURNIP	1 0
IMPROVED PURPLE TOP MAMMOTH TURNIP	1 0
Ordinary stocks at reduced rates. Much cheaper by the bushel or cut.	

"COMPARISON" "INVITED."
"THE ROYAL SEEDSMEN"

CARTER'S
PRIZE MEDALS
PARIS, 1867. LONDON, 1862.
HAMBURG, 1868. WISLA, 1870.
BLACKPOOL, 1870, 81, &c.

GENUINE SEEDS.

DESCRIPTIVE LISTS
GRATIS, POST FREE
5 PER CENT. DISCOUNT
FOR CASH.

CARRIAGE FREE
237, & 238, High Holborn,
LONDON.

CARTER'S
IMPROVED
MAMMOTH
PRIZE
MANGEL.

CARTER'S
IMPROVED
MAMMOTH
PRIZE
MANGEL.

In large or small quantities, 15. 6d. per lb.
For the best practical information, see CARTER'S ILLUSTRATED
FARMER'S CALENDAR for 1871, Gratis and Post Free.

JAMES CARTER AND CO.,
SEED FARMERS,
237 and 238, HIGH HOLBORN, LONDON, W.C.

THE GARDENERS' ROYAL BENEVOLENT
INSTITUTION.—Notice is hereby given that an ADDITION
to the LIST of PENSIONERS will be made in JULY NEXT. All
persons desirous of recommending Candidates are required to send in
their Applications and Testimonials to the Committee on or before
SATURDAY, April 22, after which day they will not be received. By
order of the Committee, E. R. CUTLER, Secretary.
14, Tavistock Row, W.C., March 14.
P.S. Printed Forms of Application can be obtained of the Secretary.

The Gardeners' Chronicle

SATURDAY, MARCH 25, 1871.

THE interesting question of what may be
called the POSTHUMOUS GROWTH of FIR
STUMPS has been reopened on its merits by one
of our able contributors, Dr. W. R. MCNAE (see
p. 307); but, while we have gladly opened our
columns to the expression of his views, we feel
bound to say that we do not share them. We
find nothing in his paper to shake our confidence
in the explanation and facts given by Professor
GEPPERT, of Breslau, in his well-known paper on
the subject in the "Annales des Sciences,"
for 1843.

Professor GEPPERT states that in every in-
stance in which the posthumous growth was
observed, and the requisite examination made,
it was found that the roots of the felled tree were
naturally grafted or inarched upon those of a
neighbouring tree which had not been felled, and
that the growth in question was thus not the
result of a posthumous vitality, but of a supply
of sap derived indirectly from another tree in
which the ordinary functions were in full opera-
tion. We presume that both Dr. MCNAE and
Mr. WEBSTER, the forester, whose prize essay on
the subject has drawn forth the remarks of the
former, have overlooked this paper of Professor
GEPPERT's, as they make no allusion to it.
Had Mr. WEBSTER been aware of it, at
least we might have expected that he would have
examined the roots, and reported as to the fact
concerning them: and perhaps if he sees these
lines he may do so still; but we have consider-
able doubt whether the examples which he cites
are really specimens of posthumous growth or
not. We are led to this distrust by more than
one trifling indication. For instance, he tells us
that "by referring to my wood book for dates, I
was enabled to discover that the greater number
of the trees whose stumps have continued to
keep in a state of vitality had been felled in the
month of April. Following up the information
thus gained, I selected two Larch trees, and had
them cut down on April 20, 1869; at the same
time I cut off a slab of about 1 inch in thickness
from the butt end of each tree, and had them
properly marked and stowed away, so that I
might be enabled to compare them at a future
period with slabs cut from the original stumps,
should they happen to grow, and I am glad to
say that my labour in this has been crowned
with great success, both stumps having not only
kept in a state of vitality, but also made excel-
lent growths, so that I am now in a position to
finally settle this difficult and intricate question
by actual experiment."

We rather infer from this that Mr. WEBSTER
does not know the character of the phenomenon
of which he is speaking. He obviously expects
to find, indeed he tells us that he has actually
obtained, additional growth, and that must be
one year's annual ring for the one year which
has elapsed since he cut down the trees; but that
is not the way in which this phenomenon usually
shows itself. The new growth is not seen for
several years. It does not reach the surface at
first. GEPPERT says—"Immediately after a
trunk has been cut the new woody layer begins
to organise itself in all the circumference of the
roots, and the base of the stump; but a more or
less considerable time elapses, depending on the
height of the stump, before the phenomenon
manifests itself at the surface by the appearance
of a small excrescence between the old bark and
the old wood." One of his figures shows 23
layers below the cut surface, indicating the lapse
of 23 years before the new growth reached it.
It is, in fact, just an analogous growth to that
by which, in dicotyledonous trees, amputation
or injuries are covered over by fresh bark and
wood, and all that is to be seen of growth on the
actual stump is the gradual encroachment
and growing over of the bark towards the
centre of the stump, which it sometimes suc-
ceeds in completely covering, making a large
excrescence such as we see upon Elms. But
if we have not misunderstood Mr. WEBSTER,

this is not what he expects to see or has seen; for without any allusion to slicing, he tells us, with regard to a root of Scotch Fir which he thinks is producing this posthumous growth, that he "was enabled to count 18 layers of new wood, all of which are contained in the diameter of one half inch." If he counted these on the exposed stump without taking off a slice, then we can assure him that they have nothing to do with the phenomenon. Had they belonged to it he could not have seen them, for they would have been covered and concealed by the bark. Moreover his statement is defective, in that he gives us no reason or proof why these 18 layers should be posthumous more than the others.

Another element of distrust in Mr. WEBSTER'S observations is that he states that he has observed this posthumous growth going on in a good many Larch stumps, in one Scotch Fir stump, and in one Spruce Fir stump. Now the fact is that, so far as observed hitherto, it has been almost entirely confined to the Silver and Spruce—most rarely to the Scotch Fir, and never at all recorded of the Larch. Of course this in itself is no argument against Mr. WEBSTER'S accuracy; he may have found what no one else has, but it diminishes one's confidence in his observations to find so many points passed over without comment that suggested and required notice, were it for nothing but an assurance that he was alive to the peculiarities of the subject he had undertaken to elucidate.

His scientific explanation of the cause of the phenomenon does nothing to redeem his judgment from the imperfection of his observations. It is this:—"From the well known antiseptic properties of peat, which principally arise from the presence of humic, ulmic, and other similar acids, I am led to believe that this is the principal cause of this strange phenomenon." We do not like to be hard on a man when he makes a slip—we all of us talk nonsense now and then—*dulce in loco disperse est*—but really a prize essay is not just the place where we should expect a sensible man to select for doing so.

At a meeting of the Committee of the FRENCH HORTICULTURISTS' RELIEF FUND, held on Wednesday, March 22, at the rooms of the Royal Horticultural Society, G. F. WILSON, Esq., F.R.S., in the chair, it was announced that the subscriptions amounted to over £500, exclusive of donations in kind. Great credit is due to the nurserymen, seedsmen, and gardeners of this country for the way in which they have come forward on this occasion. Their contributions do great credit to them. The stupid and wicked deeds of certain sections of the Paris "roughs" should not be allowed to warp our judgment, or pervert our sympathies. The class whom the French Horticulturists' Relief Fund specially designs to assist, consists of a class of hardworking, right-minded, peaceable men, as little to be compared with the malcontents of Montmartre and Belleville as the roughs of Whitechapel with our own blue aprons. The educated French are the most logical of people, and as to them, indeed, we may conduct near if we allow the follies of the few to influence us in our sympathies for those who, on all accounts, merit our heartiest commiseration. The disasters of the war have as usual pressed most heavily on those who have least to do with its provocation, and who are the least able to bear its consequences.

British Conservatives and Republicans alike congratulate themselves that we have a settled Government. But even we do not twine a wreath every day; and hence the description of the *BOUQUET* presented by Mr. CHARLES TURNER, of Slough, to H.R.H. Princess LOUISE, on the occasion of her marriage with the Marquis of ORENE, may interest our readers. Without pretending to be as familiar with the doings of Royalty as James and the *Count Circulaire*, we are yet in a position to name the following flowers as having entered into the composition of the Princess's bouquet:—Orange Blossom (of course), *Phalænopsis grandiflora*, *Cymbidium eburneum*, *Odontoglossum Alexandræ*, *O. pulchellum*, *Lycaste Skinneri* alba, *Calanthe vestita* alba, *Gardenias*, *Rhododendron jasmineum*, *White Roses*, *Bouvardia longiflora*, *Adiantum cuneatum*, *Gleichenia flabellata*, *Mylia*, &c. HER MAJESTY'S bouquet, not being so restricted in point of colour, was even more effective. *Phalænopsis Schilleriana*, *Dendrobium nobile*, *Calanthe vestita*, Pink Roses, *Gardenias*, and other flowers lent their charms; and though botanists may possibly object, poets will certainly class these flowers under *Thalamifloræ*.

Messrs. CUTBUSH & SON opened their annual exhibition of HYACINTHS and other SPRING FLOWERS at the Crystal Palace on Saturday last, and it will be open for inspection until this day week (April 1). A better exhibition on the whole than the one now on view in the central transept, Messrs. CUTBUSH have never had. The Hyacinths, which have hitherto always been shown here well, both in quality and in

numbers, are this year rather deficient in the latter respect, but this is more than compensated for by the excellence of the plants staged with them. As we have before intimated, the exhibition will be open for another week, and all who have the chance should certainly pay it a visit of inspection.

We have received from the patentee a specimen of the SYDNEY SEED SOWER, a little implement of simple construction, with which to sow all or any kind of seed, either broadcast, in drills, or in pots. The implement before us has undergone a slight modification from the original form, by having a large regulation slide, which obviates any block with large-seeded seeds.

We gather from a private letter the following brief particulars of the illness and last days of the lamented Dr. MIQUEL:—

"Though he never had a very strong constitution, he was always able to perform his duties until about a year since, when he suffered from repeated attacks of difficulty in breathing. In the course of last summer, being recommended to try the effect of change of air, he spent several weeks in the mountainous districts of Thuringen, with apparently satisfactory results. On his return to Utrecht with his family in September the old symptoms reappeared, and in an aggravated degree, he never since discharged his duties till the end of October, and though becoming weaker every day, he continued to write and work in his study. Three days before his death his physicians discovered that he was suffering from an abscess in the liver which necessitated the lungs. His generally weakened constitution was unable to bear up against the consequent suffering, which, as our readers are already aware, terminated fatally in January last. He had himself for some time been aware that recovery was impossible."

It is not an easy matter to say whether the singular GUNNERA SCABRA is most valuable as an ornamental or an useful plant. We should scarcely expect to find it, even were it more common, amongst beautiful foliage plants in a nurseryman's catalogue; nor should we look for it in the economic list. It is, however, said to be valuable to the inhabitants of Concepcion, where it grows luxuriantly. They not only prepare from it a cooling drink which they consider beneficial in fevers, but the root has a certain repute for tanning leather, and the stems are used for tarts, for which purpose they are said to be little inferior to Rhubarb, and, above all, they are eaten raw after dinner with cheese and wine.

About two months ago a GARDENERS' and AMATEURS' MUTUAL IMPROVEMENT SOCIETY was established at Westerham, Kent, which promises to be a great success. At the fourth meeting, held on April 1, the interest was kept up by having a capital display of fruits, vegetables, flowers, and plants. Papers were read by the chairman, Mr. CHURCHFIELD, and Mr. EVANS; the former being "On the History of the Fuchsia, its Introduction, Development, and Improvement, with Hints as to its Culture;" the latter, "On the Verbena, with some reasons why neglected, and Practical Hints on its Propagation and Cultivation." Both papers were very interesting, and were listened to with much attention. The next meeting is fixed for April 8, on which occasion Mr. GODBOLD will read a paper on the "Cultivation of the Camellia," and the members are requested to furnish their experiences of the damage sustained by the severe frosts of the last three months.

At the meeting of the Entomological Society, on the 6th inst., Mr. F. SMITH exhibited two small branches of an Ash from which a HORNET had been observed in the act of removing the BARK. As this seems to be a somewhat unusual occurrence, we may put on record a case in which, in a nursery near London, considerable damage was done a few summers since to the plantations of Ash in consequence of this propensity of the hornets. The trees attacked were about 10 or 12 years of age, and the injury was done in the nursery quarter, and were very nearly barked at the height of 6 or 8 feet from the ground. A perfect ring of bark, varying in depth from 1 to 4 or 5 inches, was removed, and our impression, while watching the insects at work, was that it was for food rather than for material for nests that the injury was done. We were not so careful as we might have been, *ne crabrone irritare*, nor suffered any inconvenience in our investigations, not even when we made prisoners of some of the marauders. We do not find this habit referred to in Dr. ORMEROD'S delightful "Natural History of Wasps."

The Journal of the Scottish Meteorological Society for January, 1871, contains a peculiarly interesting paper, by Mr. BUCHAN, on the TEMPERATURE of the BRITISH ISLANDS, showing the mean temperature for every month in the year. Unfortunately general data of this kind are only partially available for cultural purposes, owing to the variety of disturbing conditions, local circumstances, and variable plant constitution. The mean temperature for March, as given in the chart affixed to this Table, varies from 38° at Blackheath to 47° at the City of London, and in Scotland and the north-east coast, in general terms, have a mean temperature of 40° F.; southern Scotland and northern England, of 41°; northern Ireland, north-western, central, and eastern England,

of 42°; central Ireland, Wales, western England, and the Thames Valley, mean, of 43°; the isotherm of 44° F. traverses southern Ireland and Devonshire; that of 45° passes the extreme south of Ireland, the Cornish peninsula, and the Channel Isles. The Land's End has a mean temperature of 47° F. The observations on which these Tables and charts are constructed extend over 13 years, and are deduced from the arithmetical means of the daily maxima and minima at 76 stations in Scotland, 67 stations in England, 12 in Ireland, and 15 places in countries adjoining. Similar Tables, showing the minimum night temperatures for the spring months, and the average diurnal duration of frosts at that season at the various stations mentioned in the report, would be specially valuable for cultural purposes, and, will we hope, attract the attention of our meteorologists.

The following statement of the history of the now defunct GARDENERS' COMPANY is extracted from the "City Directory":—"This company was incorporated by the 3d JAMES I., September 18, 1605; re-incorporated by the 14th JAMES I., November 9, 1616. The bye-laws for their good government were confirmed by the Lord Chancellor, Lord Treasurer, and Chief Justices of the King's Bench, July 1, 1606. Arms: The field a landscape, the base irrigated with flowers, a man proper vested in the joints, with linen argent, digging with a spade, all of the first. Crest: On a wreath a basket of fruit, all proper. Supporters: Two emblematical female figures with cornucopie, representing 'Plenty.' Motto: 'In the sweat of thy brow shalt thou eat bread.' Fees payable, upon taking up the freedom: by patrimony or servitude, £1 10s.; and by purchase, £1 17s. 6d."

In the *American Naturalist* for the present month is a paper on the POLARITY of the COMPASS PLANT (*Silphium laciniatum*), by Mr. W. F. WHITNEY. The author, following up a suggestion of Dr. ASA GRAY'S, that the cause of the direction in question was to be sought in the fact that both sides of the leaf are equally sensitive to light, examined the joints of the leaves of the leaf of the plant and of certain allied species. From this examination it appears that the number of stomata or breathing pores is the same on both surfaces in the Compass plant, while in three other nearly allied species the number is, as is usually the case, greater on the lower surface. As there are many plants whose leaves, or whose phyllodes, have an equal number of stomata on both surfaces, it becomes advisable to ascertain whether leaves, having such a structure, point in definite directions.

The seeds of the WILD LIQUORICE (*Abrus precatorius*), says the *Food Journal*, were originally brought from the West Indies. It is a twining plant, now common in India and other eastern countries, and belongs to the papilionaceous order, and is allied to the Leguminosæ. The English call it wild Liquorice, and the French *Liane à riglette*. There are several varieties, and three differently coloured kinds of seeds are well known—black, white, and scarlet. The last mentioned have a jet black spot at one end, and as they are very hard, glossy, and brilliant, they are a good deal in request as beads for necklaces and other ornaments among the Hindoos. They are called retti-weights in India, and are used by jewellers and druggists, and seedling papers supposed to be equivalent to one grain. But Dr. MASON states that he has weighed many of them, and found them to vary from one to two grains. The native goldsmiths are said to make an adhesive compound from them, which is employed in the finer work of jewellery. Some parts of the plant are applied to medicinal purposes. The root is used as a substitute for liquorice, and LUNAN says that a decoction of the leaves is drunk in the West Indies instead of tea. According to LINNEUS, the seeds are poisonous, as are also the Egyptian, used them for food, they can hardly be so injurious as the great botanist has led us to suppose. As a plant, the *Abrus precatorius* does not possess much beauty, and its pale purple flowers are neither gay nor striking. Mr. GOSSE says that it is a common hedge climber in Jamaica, and it is doubtless equally plentiful in other islands of the West Indies. The derivation of the generic name is from an allusion to the resemblance of the beauty of the little seeds; and LOUDON says that the specific designation, *precatorius*, is due to the fact of their being used as beads for rosaries.

The MAXIMUM TEMPERATURES of the air in England, during the week ending March 18, ranged from 59° 4' at the two southern stations, Portsmouth and Blackheath, to 54° at Blackheath, and for all stations of 56° 4', and in Scotland, from 56° at Perth to 50° at Greenock, with a mean for the several stations of 53°. The MINIMUM TEMPERATURES in England ranged from 19° 9' at Salford to 31° at Liverpool, with a mean for all stations of 26° 6', which is 0° 8' above the mean for the several stations in Scotland, where the extremes were 21° 5' (at Paisley) and 32° (at Edinburgh). The MEAN TEMPERATURES at England, as deduced from the observations taken at the different stations, was 1° 2' above the mean for Scotland, the values being 40° 3' and 39° 1' respectively. In the southern country the highest mean temperature at any station was 43° 6' (at Portsmouth), and the lowest was 37° 7' (at Salford); and in

the northern was $41^{\circ}.3$ (at Edinburgh), at $37^{\circ}.6$ (at Glasgow). RAINFALL.—Throughout the two countries the rainfall was pretty fairly distributed, there being no great difference between the fall at one station and that at another, for 3.30 inches at Greenock is so exceptionally large, as to make it appear doubtful whether some mistake has not been made. The mean fall for England was 0.52 inch, and for Scotland (omitting the fall at Greenock) was 0.57 inch. (See Mr. GLAISHER'S Tables in our present issue.)

THE JARDIN DES PLANTES.

No garden has grander traditions than the Jardin des Plantes at Paris. Others may excel it in extent and in the magnitude and interest of its contents. The services it has rendered to commerce and the arts are less than in the case of others. To beauty it makes modest pretensions, and though to some extent free to the public, it is not intended as a place of popular resort. It is a garden

established for scientific purposes almost exclusively, and its history, to a large extent, is inseparably blended with the history of botany in France for the last 250 years. As public attention has of late been prominently called to this historic garden, owing to the disasters which have befallen its collections in consequence of the siege of Paris, it may not be uninteresting to allude to certain points in its history. The condition of the garden before the siege is described by Mr. Robinson in his "Parks and Promenades of Paris," and was alluded to in our columns in June last, only a short time before the siege.

The reader desirous of fuller details than we can give, will find them scattered through several successive volumes of the "Annales du Muséum d'Histoire Naturelle," beginning with that published in 1802. The history there given is compiled by no less prominent a writer than Antoine Laurent de Jussieu, and deals not only with botany and horticulture, but also with natural history, chemistry, and other sciences, the study of which is promoted in the Muséum by means of collections, laboratories, herbaria, lectures, &c. Naturally we must confine ourselves in this notice to plants and horticulture, though the names of Buffon, of Cuvier, and others are sufficient to attest the fame of the establishment in more than the one or two departments of which we have to take special cognisance.

We find records of a royal garden as early as 1608, in which year Vallet published an account of "Le jardin du Roy tres chrestien Henri IV.," with plates and portrait of the author and Jean Robin the gardener; but the starting point of the Jardin des Plantes dates from 1626, when Hérouard, first physician to Louis XIII., at the instigation of Gui de La Brosse, physician in ordinary to the monarch, obtained from his Majesty letters patent, authorising the establishment of a botanic garden, of which the first physician and his successors were appointed superintendents, and power granted to them to select a director (*intendant*) charged with the general management of the garden. Hérouard became superintendent *ex officio*, and La Brosse (Brosses)* the first director. Little or no progress was made before the death of Hérouard put a temporary check to the carrying out the plan, but after a time La Brosse secured the co-operation of the new physician, Bouvard (in whose honour Bouvardia was named), and obtained possession of a plot of ground for the sum of 67,000 livres on February 21, 1633.

And now comes the record of an unseemly squabble, in which etiquette and professional *esprit de corps*

showed themselves as obstacles to progress. The Faculty of Medicine of Paris looked on La Brosse as a quack. His crime was that he was not a member of their body. They denounced him accordingly as an *empirique drôleur*, and endeavoured to prevent him from teaching botany in the royal garden. Thus a delay was caused, but in 1635 La Brosse managed to triumph over his adversaries. By the help of Bouvard he obtained a royal decree ordaining that in order to supply certain deficiencies in the education of pupils three doctors of medicine, to be chosen by Bouvard from the faculty of Paris, should be selected, with the aid of a sub-demonstrator, to demonstrate to the students the interior of plants and the nature of drugs. Bouvard, in consideration of the assiduity, &c., with which "he attends our person for the preservation of our health," was not only appointed the first superintendent, but the reversion to the office of director after the death of La Brosse was made over to Michel Bouvard the younger. A museum of drugs and curiosities, the

in Paris as being, for good reasons, forbidden and censured by Parliament! This, however, is accounted for by the prejudice then prevalent against the use of chemical substances, and particularly antimony, as drugs. The opposition was futile. La Brosse took possession of the garden. It was stocked by Robin from his private sources, to such an extent that in 1636 a description "du jardin royal des plantes medicinales estably par le roy Louis le juste," was published, together with a catalogue containing the names of 1800 species and varieties. In 1640, on the occasion of the "ouverture du jardin royal," a new list was published, comprising 2360 plants. Drawings were made of others which were likely to be lost. Thus La Brosse succeeded in his enterprise. Things went badly after his death, in 1641. Bouvard resigned his post as physician, but retained that of superintendent of the garden. The new physician, Vautier (Vauthiera), upheld his right to fill both offices. Bouvard was deposed, Vautier succeeded, but died in 1652, and was followed

by Vallot (Vallotta), of whom it is recorded that he was a bad administrator, but that, desirous of emulating the success of the garden formed at Blois by Gaston d'Orléans, he secured the assistance of Juncquet and of Fagon (Fagonia). The latter was grand-nephew of La Brosse, and was born and bred in the Jardin des Plantes, for which he had an innate love. He worked hard to improve the condition of the gardens, and at the death of Vallot he became superintendent, and occupied the chair of botany and chemistry. Colbert, who was the Robert Lowe of his day, scrutinised the finances of the garden, and criticised their administration. The result was, that the establishment was placed under Government supervision. Fagon became physician to the Dauphin and to the Queen, and was soon too much occupied in medical practice to attend to his professorship. Ultimately, in the words of De Jussieu, he conferred the greatest of the many benefits he had bestowed on the garden by resigning his chair of botany in favour of Tournefort, still, however, retaining his office as superintendent.

Tournefort (Tournefortia) travelled largely in Spain, Portugal, England, the Levant, and elsewhere, to collect plants for the garden. In some of his journeys he was accompanied by the artist Aubriet (Aubrietia). In 1700 Tournefort published his "Institutiones Rei Herbariæ," and established a classification of plants, which, for its simplicity and beauty, was a great boon at the time. His main subdivisions were based on the form of the corolla. During Tournefort's absence on his travels, Morin (Morina) officiated for him as professor. Under Tournefort's *régime* Vaillant (Vaillantia) became superintendent of culture and sub-demonstrator, and persuaded Fagon in 1714 to erect two hothouses heated by hot-ir pipes, according to a then novel method introduced from Holland. Tournefort died in 1708, and was succeeded by Jussieu (Jussieuia) who died soon after his appointment. Fagon had again to look for a botanist to fill Tournefort's place. His choice fell on Antoine de Jussieu, who had been a pupil of Magnol (Magnolia) at Montpellier. The faculty once more raised objections, but they were overcome on this occasion by the admission of De Jussieu as a member of that body. Antoine de Jussieu (Jussieuia), accompanied by his brother Bernard, followed Tournefort's example, and travelled far and wide in the interests of science in general, and of the garden in particular. The introduction of the Coffee shrub into the West Indies is attributed to Antoine de Jussieu, who sent the plant in 1719 to the Chevalier Desclieux. Fagon, who rendered such excellent service to the garden in his capacity as



M. DECAISNE.

origin of the present noble establishment was established, and Vespasian Robin (Robinia) "our arboriste," appointed as sub-demonstrator to aid La Brosse. The superintendent was to have a salary of 3000 livres; the three demonstrators, 1500 livres; La Brosse and his successors were to have 6000 livres; the sub-demonstrator, 1200 livres. For the wages of the workmen and the maintenance of the garden 4400 livres were set aside. For the purchase of drugs for the pupils 400 livres were allotted, and after use had been made of them for instructing the pupils, they were to be handed over to the poor! Altogether it appears that a sum equal to more than 50,000 francs of the present value, was set apart for the annual expenses of the garden.

Once more the doctors raised obstacles. They accused La Brosse of ignorance and incapacity. They complained that though he was physician to the King, he yet held no medical degree. A similar objection was raised to Bouvard the younger. And then comes a protest which, now-a-days, strikes us with wonder and astonishment, and seems to justify the fun and sarcasm which Molière hurled at the immediate successors of the physicians of that period. The faculty formally opposed the teaching of chemistry

* It is worthy of note that botanists have not been ungrateful to their predecessors and benefactors, as appears from the number of genera named after them.

ORCHIDÆ (*Præcipui generis*).

Acriopsis	Galeottia	Warrea
Banatea	Gubinea	Stells
Broughtonia	Hundleya	Physophon
Colax	Ionopsis	Masdevallia
Cyathoglossis	Pontueva	Ocoteum
Fovinea	Physurus	Pedilum
Galeandra	Ornithoglossus	Diothonea
Govenia	Saccolabium	Ponera
Grobia	Schaphoglossa	Barkeria
	Spathium	

CANNELL'S REGISTERED BOILER.

THIS new economising Hot-water Boiler, or Hot-water Circulator (fig. 77), is the result of 20 years' careful study of what a boiler should be to answer all the purposes required of it. It marks an immense stride, and is totally different from all others, embracing all the qualities that have been set forth as necessary in a boiler. I will proceed to explain its most prominent features.

The boiler consists of nine or more separate hollow castings, placed one upon another. Upon brickwork is placed the basement or No. 1 casting, consisting of a hollow rectangular frame, into which are fixed eight (more or less, according to the size of boiler) circular hollow fire-bars, placed at such a distance from one another as to allow sufficient space for draught. At the back or further end of this casting are the return pipes, and in the front the discharge pipe for cleansing the interior of the boiler at any time. The ash-pit is formed by the brickwork supporting the first or basement casting, and is enclosed by a door hung on a solid cast-iron frame built into the brickwork or otherwise. The furnace-door is to be hung in the same way.

Upon the first casting are placed four other separate hollow castings, of which Nos. 2 and 3, forming the sides of the furnace, are fluted and placed parallel with the hollow fire-bars, and are of such a length that the two remaining castings, Nos. 4 and 5, which form respectively the back and front of the apparatus, may be flush with the ends of the first casting. The back, or No. 4 casting, is large enough to cover the whole or part of the end of the apparatus, and is connected at the bottom by pipes with castings Nos. 2 and 3 respectively, and at the top on each side with casting No. 11, which will be afterwards described. The front casting, No. 5, must be of such a height that the top will be level with the top of No. 6, forming the top of the furnace. The front is built up with brickwork, with three sliding soot doors to allow the flues to be properly cleaned out. This front, or No. 5 casting, is connected at the bottom by pipes with castings Nos. 2 and 3, and at the top on each side with casting No. 6. Upon the top of castings Nos. 2 and 3 is placed a sixth further and separate hollow fluted casting, forming the top of the furnace, having a space left at the back opening upwards, to allow a free passage for the fire to pass out of the furnace under a separate and hollow casting (No. 7), which when fixed forms two flues communicating, by means of other flues formed by similar castings, and terminating in a rectangular opening at the top for regulating the draught, and for the passage of the smoke into the chimney.

The circulation of the water from and into every separate hollow casting is effected by means of four sets of pipes affixed externally to the castings, two sets being placed on each side of the apparatus. If desired the crown or top casting with the flow-pipe can be placed upon No. 2 or 3 casting, and worked without the flues until required. The flame or hot air from the fire placed on the hollow bars will pass between castings Nos. 2 and 3, and it is, at the opening, described to be left at the back of casting No. 6, where it will divide, and pass upwards towards the front through the two flues formed by casting No. 7. It will then return towards the back through the two flues formed by casting No. 8, again uniting and passing upwards into the flues formed by castings Nos. 9 and 10, the heat thus continuing to travel through the castings Nos. 9, 10, and 11 in the same way, so that the hot air will pass six times through the internal length of the apparatus before escaping into the chimney.

It will therefore be seen that this boiler is so constructed that all the calorific which the fuel contains is extracted and conveyed to the water, only just sufficient to take away the smoke being allowed to escape. Any length of flue can be added, or the boiler can be worked without any flue at all; and as the glass houses or buildings are extended so can heating power be added. It requires no brickwork beyond its foundation to form the ash-pit, and a wall

round, as in almost all stoveholes, to form a frontage; the latter can, however, be dispensed with. There are no dead-boilers, solid bars, or bricks in this, as in most other boilers, to burn and crack, thereby admitting a quantity of cold air, which tends to cool the water instead of heating it.

It often happens that during long cold nights, saddle boilers are banked full up, to last the required time, and often by boys, who neither know nor care whether or not they have stopped the draught—which indeed often occurs, causing disastrous results. The same thing often takes place in upright tubulars, from the coke refusing to slip down. Neither of these misfortunes can ever occur with this boiler, as the interior arrangements will show at a glance.

In order that there may be confidence in a boiler, there must be uniform strength in the castings. It is well known that the more complicated the castings the more difficult is it to procure an equal thickness, while inequality causes unequal expansion and contraction, and occasions fractures and leakages. But in my boiler all the parts are in square sections, and easily cast; consequently a regular thickness can be guaranteed. The object which I had in view was to make the boiler as solid and durable as the old cast-iron saddle-back (which I can point to as having been worked for 25 years), by having it cast in sections. The manner in which these are connected is really the secret of having a perfect and economical boiler. The fatal mistake of nearly all the new boilers of late years consists in endeavouring to cast them all in one piece, or in having the parts very complicated, consequently they are neither durable nor are they perfect in shape. It is a well-known fact amongst practical gardeners

fire, so that the heat may be completely shut in between the iron, and made to give up its heat to the water. If the damper is carefully worked, it will keep up an intense heat, and the small amount of fuel required will be almost incredible, yet it will be found capable of driving a very large quantity of piping in sharp weather with less waste of heat than any other.

A small boiler will shortly be driving upwards of 1000 feet of piping at the Nursery, Woolwich, when any one having a wish to inspect it can have our demonstration of its capabilities. *Henry Cannell, Woolwich.*

TABLE PLANTS.

Saxifraga pyramidalis.—The beauty and value of this plant for table or indoor decoration, so far as I can ascertain, is but very little known. However, it is very interesting, and well worthy of being mentioned. It is a plant frequently found growing in the open borders and on rockwork. Throughout the greater part of the year it has the appearance of a good-sized rosette of green leaves; but in early summer, when it throws up bold spikes of beautiful small white flowers, it is much admired. For house decoration it is far better than most plants, as it continues a long time in flower. Grown in 6-inch pots, under ordinary care in a cold frame, it comes in very useful.

Camellia, in young plants about a foot high and 9 inches across, are very fine and highly ornamental. We had some plants of this character, in the middle of December, of alba plena and imbricata, with four and five nice flowers on a plant, and these being apparently set on their clear green foliage gave them a very pleasing effect. In forcing them they require to be very carefully dealt with, or they will lose their buds. An intermediate temperature suits them best.

Cyrtus alternifolius variegatus.—This, with its white, striped stems, and spreading heads of umbellate green and white leaves, is a fine plant for table decoration. It is quite of a different type from ordinary plants, which makes it all the more valuable and interesting. Not unlike the Papyrus of the ancients, to which it is allied, it gives a good idea of that plant in its native habitat, the swamps of the Nile. It is a stove plant, and to keep its variegation well, it requires to be grown in a soil made up mostly of fibry peat and sand.

Thyracanthus rufus.—This old, and almost forgotten, stove plant is one of the best for table work, and it is most useful for other decorative purposes, such as for furnishing cut flowers in winter.

Lately we had a splendid plant about 20 inches high, bearing numerous drooping wreaths of its bright tubular flowers, which extended several inches lower than the pot. These we raised, and brought out elegantly on curved wires, which at a little distance could hardly be seen, and you can imagine how well it looked on the table. It is a plant easily managed, requiring only ordinary stove temperature. I intend to grow it largely for next year, and have already got a fine batch of it struck under a hand-lit in the stove where there is a little bottom-heat.

Young *Rhododendrons*, say two years grafted, are most useful plants for the table, and for vases generally indoors, especially when the richly-coloured varieties are chosen, such as Blandyanum, Brayanum, &c. We have had a nice lot in 6-inch pots, with three or four fine trusses on a plant, and these, like the Camellias, contrast beautifully with the leaves.

Dielytra spectabilis.—This is altogether one of the best and one of the easiest grown decorative plants for spring. Few look better on the table, no matter in what place indoors, and few are more useful for conservatory work. There is a beautiful harmony in its curved inflorescence, delicate leaves, and almost transparent stem. It can be taken up from the open borders, and be forced, a few at a time, in a gentle heat all through the spring, beginning in December.

Young *Fancy Pelargoniums*, in 4-inch pots, will prove very useful plants for small vases on table. We have at present a nice lot just opening. *Robt. Mackellar.*

PORTRAITS OF GARDEN PLANTS.

ACHIMENES (EUCODONIA) NAGELIOIDES NANA MULTIFLORA, Flore des Serres, t. 1895-6.

A remarkably handsome dwarf Gesneraceous stove perennial, of sturdy habit, growing from 6 to 8 inches high, furnished with broad velvety brown-tinted leaves, and bearing numerous spikes of showy flowers, the tube of which is rosy above, yellow beneath, the limb being marked with unequal crimson spots in lines. It is one of

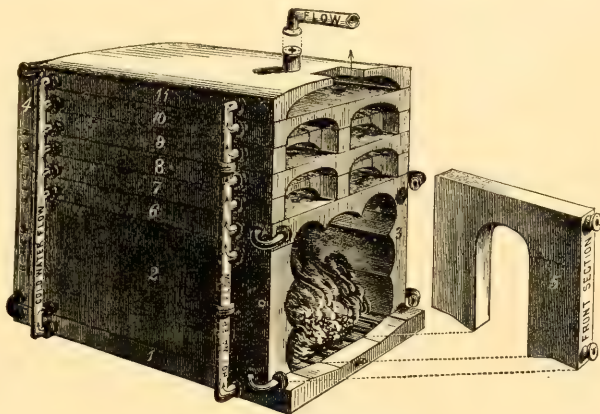


FIG. 77.—CANNELL'S REGISTERED BOILER.

that a large boiler, or rather one that contains a great quantity of hot water, is indispensable for success in the growth of plants and in early forcing, so that a regular uniform temperature may be kept up; this is the only boiler which thoroughly meets this want. Then there are no connections exposed to the action of the fire, which has proved so destructive in many other cases. Moreover, the apparatus can easily be removed and got through any ordinary doorway, and requires for the stovehole but little more depth than the saddle-back. It can easily be cleared either of sediment from the inside, or of soot from the flues, this being the work of a few minutes only. Any of the compartments can be renewed or replaced, without destroying the remaining parts, as the boiler is made in sections, and is put together with patent joints. All that is necessary is a small spanner, and with this two or three ordinary labourers can dismantle and replace it in a few hours. These joints do away with all fear of fracture from expansion or contraction.

The fire, which can be made to travel any number of feet before it can escape, is completely surrounded by iron backed with water. In fact, the boiler presents more heating surface directly to the fire, without any possible means of escape, until the heat becomes exhausted, than any other yet offered. The damper is so constructed that all heat is entirely confined within the boiler; and it is provided with an indicator, so that a person can feel in the dark the exact draught that is left on.

This boiler will heat more water with the same amount of fuel, and will keep up the heat without attention for a longer time than any other. It is provided with a large fire-space, for several well-known practical reasons, which do not apply to others of a different shape; but with this peculiar x-shape it is impossible for the heat to get away without first imparting its full effect to the iron and water. Consequently it can be made what is termed a slow combustion boiler, with sufficient chamber space above the

the many fine garden hybrids for which we are indebted to M. Van Houtte.

Achimenes (ECCOGONIA) SAGITTIFOLIA, DIAMANTINA.

Another charming stove perennial, the large cordate ovate leaves of which are hairy, and the Gloxinia-like flowers of a pleasing rosy-purple colour marked down the lower side of the tube with a yellow band. A garden hybrid, raised in M. Van Houtte's nursery.

ALTERNANTHERA AMABILIS BENTLEY.

L'Hist. Hort. ser. 3, t. 20.

This genus of *Amaranthaceae* has become highly popular for carpet bedding, and we have in the present plant an addition which promises to be an acquisition for that purpose. It is dwarf but erect and much branched in habit, and is clothed with broadly ovate, glabrous leaves, which are dark green at the edge, and have a centre of vivid rose, traversed by purple veins, in an irregular band of orange-yellow intervening between the centre and margin. It has been introduced to the establishment of M. Linden, from Brazil.

ASIMINA TRILOBA, *Bat. Mag. t. 584.*

A deciduous Annonaceous shrub, with oblong-lanceolate leaves, and six-petaled dull-brown flowers, introduced in 1736, and perhaps lingering in a few old gardens. It is a North American plant, the fruit being a hard bearing in autumn oblong, yellow, fragrant flesh, of eatable fruits, which, though widely different from the true Custard Apple and Papaw, yet bear both these names in the United States.

CALLISYPHE ACRASTICA, *Refug. Bot. t. 167.*

An *Amaryllidaceae* bulb, requiring a warm greenhouse. It throws up a single stem, with the so many small, conspicuously-veined, stalked leaves 6 inches long, and an erect scape, which is nearly 2 feet high, and bears an umbel of several spreading, deep golden-yellow flowers, which are much flattened sideways, and have green stamens, which are smaller than the leaf of the perianth. It was obtained by Mr. Wilson Saunders, from M. Linden, who received it from South America, but the exact locality does not appear to have been stated.

CALLISYPHE MIRABILIS, *Refug. Bot. t. 168.*

A most remarkable *Amaryllid*, from Peru. It is a warm greenhouse bulb, and produces about two oblong-spathulate green leaves, a foot long, and a scape 3 feet high, bearing an umbel of small, pale to so many small, pale greenish-yellow flowers, with stamens three times as long as the perianth, and spreading out on all sides, so that the general contour of the flower-head may be compared to that of an expanded parasol. This very peculiar plant is more curious than beautiful, was also received by Mr. Saunders from M. Linden.

DEUTZIA CRENATA ALBO-PLENA, *Flore des Serres*,

t. 6.

A fine dwarf, hardy, deciduous shrub, which, like its allies, is valuable for forcing. It resembles the ordinary double *Deutzia crenata*, but the flowers instead of being pinkish are pure white, both in the bud state and when expanded. The same plant appears to have also received the name of *candissima*. It is a Continental garden variety.

DORSTENIA ARGENTATA, *Bat. Mag. t. 5795.*

A pretty variegated-leaved stove herb, having an erect dull purple stem, which bears numerous oblong-lanceolate leaves, each from 3 to 5 inches long, deep green at the margin, with a broad, feathered, central, silvery band. The receptacles of the flowers are orbicular. It was imported from South Brazil by W. Wilson Saunders, Esq.

GODWINIA GIGAS, *Seemann's Journ. Bot. 1869, 313.*

The largest Aroid known, whence the name *gigas*. It has a tuberous rootstock upwards of 2 feet in circumference, a single leaf, with a thick aculeolate petiole, which is yellow, beautifully barred and striped with purple, to feet high, and terminates in a broad trichotomous division, the lobes of which are linear, and 4 feet long, the ultimate divisions of which are confluent pinnatifid. The inflorescence succeeds the leaf, and consists of an erect, convolute, leathery, dark-coloured spathe about 2 feet long, bluish-brown outside, brownish-red within, supported on a peduncle 3 feet long. Found by Dr. Seemann in the mountains of Nicaragua, whence living roots were sent to Mr. Bull.

HYACINTHUS CANDICANS, *Refug. Bot. t. 174.*

This magnificent Liliaceous bulb, which requires greenhouse treatment, is so totally dissimilar in aspect from the ordinary *Hyacinth* as to raise some doubt whether it really belongs to the same genus. However this may be, it is a grand plant, with large round bulbs, from which proceed several alternate-lanceolate, sub-erect leaves 2 feet long, recurved in the upper part. The flower scape is erect, glaucous, 4 to 4½ feet long, including the raceme, which is a foot long, and consists of from 15 to 20 large drooping, funnel-bell-shaped, pure white flowers. It is a native of South Africa, whence it was introduced by Mr. Cooper to the collection of W. Wilson Saunders, Esq., who observes:—"This very free-flowering bulb is of great beauty, and very valuable as an ornamental plant, its large nodding white flowers, produced in an elongated spike, giving it a peculiar and graceful appearance."

HYACINTHUS PRINCEPS, *Refug. Bot. t. 175.*

A very fine greenhouse bulb, with the general habit and foliage of *H. candicans*, and closely related thereto, but less ornamental, having broader and shorter racemes, and smaller greenish-white flowers, the segments of which are spreading; the flowers are nodding, but the capsules being erect. It is a South African species, and has been introduced to and flowered at Kew. Mr. Baker remarks of this and the preceding:—"These are two magnificent additions to our list of cultivated Liliaceae. Although so different in habit from the previously known species of *Hyacinthus*, the principal technical difference is in the much more numerous and angular seeds. As we have

characterised it, *Hyacinthus* includes *Bellevalia*, *Peribaea*, and *Strangweia*. The extremes differ from one another a good deal in the shape of the capsule and the number of seeds, and in the insertion and shape of the filaments, but we do not see that any line distinct enough to separate genera can be drawn."

TRADE MEMORANDUM.

To S. L.—We do not know of any nursery establishment at 6A, Russia Lane, Victoria Park.

Home Correspondence.

Saponaria ocyroides and Silene Schafta.—

These should not be classed with *Silene pendula*, a hardy annual of a somewhat weedy nature, though well adapted for spring gardening. They are more strictly hardy herbaceous plants, and are excellent subjects for a rockery. They are increased either by cuttings or by seeds. When by the former method, the young slips or branchlets, properly prepared, should be dibbled under hand-lights into a sandy soil, on a cool shady aspect, where they root readily. The stronger of the two when well grown, *S. ocyroides*, seldom attains to more than a foot in height; hence both should be encouraged to make as much growth as possible, as whatever growth is made during the season ultimately becomes masses of dense bright rosy-pink flowers, which have an exceedingly pretty effect. They may be cutted firmly into an open admixture of rich fibrous loam and leaf-mould, and be kept cool and regularly and uniformly moist at the roots; in which case they form very neat objects either for the decoration of the cool greenhouse, the boudoir, or the dinner table. *William Earley, Valentines, near Rford, E.*

Planting-out Heliotropes.—About 12 months ago, Mr. Tillery, Welbeck, contributed to your columns a short but practical lecture on the desirability of planting-out the *Heliotrope*. Profiting by the hint, I last May planted the back wall of a Peach-house, 80 feet long, with it. The plants during the summer grew vigorously, but produced very few flowers. The Peach-house was started in the middle of January last, and I have now plants 6 feet high covered with a perfect sheet of their sweet-scented blossoms, and which are the admiration of all who see them. I would advise every gentleman who has a small place to grow the gem of plants. If we look at it in a business point of view, I am sure the flowers would command more money than the crop of Peaches. I may add that, when the Peaches were in bloom, the sight was such a one as must be seen to be appreciated. *R. Gilbert, Burghley, March 17.*

The Cool Treatment of Orchids.—During the last 18 months Orchid growers have been treated to some largely written letters by your correspondent, "G. H.," who has endeavoured to condemn the "cool treatment" of Orchids. To accomplish this, he brings forward examples of his own cultivation, supported by extracts from works upon tropical climates. As I have charge of a large collection of Orchids, I naturally feel great interest in reading anything that bears upon their cultivation; consequently I have read most of the letters from "G. H.," and I must honestly confess that I cannot understand what he wishes us to believe upon these points, and that I cannot agree with him upon either. At p. 204 (Feb. 18, 1871) he says:—"Our experience of Orchid growing is, that of all plants they are the easiest to grow," and I can but heartily congratulate "G. H." upon his extraordinary success; but the sentence concludes with an assertion that appears to me rather strange, viz., "as they only need one treatment the year round." Now, if that statement is correct, Orchid growing must be a very simple affair indeed, but is it so? I think not, and I think no one can grow Orchids on "G. H."'s hints, or refer to in support of my belief; for at p. 1113, 1869, he says, "Nature has provided two distinct seasons, the growing season and the resting season, and we must provide two distinct treatments." Is it, therefore, possible that "G. H." has gained so much information in 16 months that he is reliably enabled to publicly alter his opinion upon such a vital point in Orchid cultivation? This is one of the points upon which I do not understand him. Again, when writing of the temperature in which he grows *Odontoglossums*, at p. 76 (1871), he says, "I do not know in thermometer figures what cool treatment is, and I do not consider that mine is cool treatment, say a mean of 70°, the highest 80°, the lowest 60°." Then, at p. 310 (1871), he writes, in answer to "Scrutator," "But I may as well point out that terms are relative, and though he may not think that my plan of growing *Odontoglossums* comes under the head of cool treatment, I do; and I am prepared to maintain that it is so." I must leave it to "G. H." to reconcile these two statements if he can. I maintain, however, that a mean of 70° during the winter months is not cool treatment, and further, that to keep *Odontoglossums* at that temperature in the winter months is not only unnecessary, but will assuredly injure many of the plants if persevered in—I mean the genus *Odontoglossum* generally, not *O. Alexandrie* exclusively. My idea of cool treatment is this:

"A minimum of 45° for the winter, and a maximum of 85° for the summer, let the day be as bright and as hot as it may." (This is not only my idea but my practice, not with a few plants either, but with hundreds of them, comprising nearly all of the best kinds and some of the worst. The house containing them has been built six years, and by growing the plants in the temperature above mentioned I have been successful enough to receive six First-class and four Special Certificates from the Floral Committee of the Royal Horticultural Society for various species of *Odontoglossum*, as well as three First-class Certificates for other Orchids grown in the same house. This statement will, I hope, convince even "G. H." that cool treatment is not to be driven out of the field as easily as he imagines. *Ex-Cantab.*

Soft-water Tank.—I have a tank with a 4-inch pipe passing through it, which is perfectly water-tight and has for some time after building the tank I had considerable trouble with it, the pipe goes about three parts through the tank, and then leaves at right angles, and extends for 100 feet. The end of the pipe furthest from the tank being a fixture, the expansion of the pipe when hot forced the other end a little way into the tank, breaking the cement and letting the water out. I altered the pipe so as to allow it to extend the other way, and have had no further trouble with it. *C. Fairington, 4, Elm Tree Road, St. John's Wood, N.W.*

The Nottingham Exhibition.—Does not Mr. Ayres make a mistake when he speaks of this exhibition as a "four days' show?" The Society's schedule says that "June 27 to July 1 inclusive," which, as I have already said, means six days; and as the majority of exhibitors would have closed their fruit and flower show, it may be called seven days. I hope Mr. Ayres' suggestion for alaying the dust will be adopted; but, with every precaution, the destruction of fruit, even in a four-days' show, will be great. Mr. Ayres deserves our thanks for the arrangements he has provided in the way of lodgings, &c. Should I be there, I shall probably avail myself of his forethought. *An Exhibitor.*

Forcing Asparagus.—Mr. Bennett, when at Osberton, had a method of forcing this vegetable which was almost identical with that in operation at Nynedeb Court, as mentioned by Mr. Foote at p. 308, the only real difference lying in the heat conductors. At Osberton the heat was conveyed into the beds by means of pigeon-hole brickwork, but this, by reason of the ramification of the roots and the action of worms, is very liable to become speedily stopped up; not so, however, with the 9-inch drain tiles (which I conclude are there), for they admit of being readily cleaned out, thereby affording a free channel of communication from either side of the beds. Of the two principles then, I incline to the drain tiles, and since Mr. Foote has let us into this secret (for which I heartily thank him) it may be expected that it will lead to the more general adoption of this comparatively inexpensive method of supplying this vegetable luxury. *Thos. Simpson, Broomfield.*

Upright Tubular Boilers.—I have had 12 years' experience with these boilers, and I have never had one which failed, though some of them were nearly 20 years old. From this I imagine they have been treated properly. It always occurred to me that they fracture from unequal expansion or contraction; this may happen in two ways, the first, and the most common, is due, firstly, to using hard water, causing the inside of the boiler to become thickly coated with incrustation; or, secondly, to using muddy water, by which the bottom of the boiler becomes filled with sediment, and the bottom ring of the boiler, being exposed to the direct action of the fire, becomes red-hot. This will cause the incrustation to shell off or set the sediment in motion, and, in either case, when the water comes in contact with the pipes, the boiler will fracture. I have immediately taken place, and the water immediately rushes out, and with it a great portion of the finest sediment, so that on taking down the broken boiler there may not be sufficient quantity of sediment left inside to account for the failure. Another great source of mischief is bad attention. The fire should be allowed to burn down below the bottom ring at least once during the day, and then a good clearing out of ashes and clinkers should take place. Many growers will not attend to this, and in consequence the back of the furnace becomes quite choked up with ashes, &c., so that the whole of the fire is at the front of the furnace; consequently, the boiler is very unequally heated, the front being heated while the back is comparatively cold. I think the Duplex pattern is an effectual remedy for this last kind of fracture. The first may be guarded against by getting all the water in the boiler and pipes into rapid circulation once during the summer, then drawing out the water, letting out all the water as quickly as possible, and if it is thought necessary pouring a few more careful through. After it has all run out, refill, being always careful to use soft water. By attention to these points, I think they will generally last 20 years if they stand the first trial, and I am so well satisfied with the action of those which I have had under my care in different parts of the country, that I should not hesitate to have half-a-dozen of the old pattern fixed next week if I required their

NAMES OF STATIONS.	TEMPERATURE OF THE AIR.								F. OF RAIN.
	Highest.	Lowest.	Range of Week.	Mean of all Highest.	Mean of all Lowest.	Mean Daily Range.	Mean.		
Portsmouth	46.0	26.0	20.0	33.0	16.0	17.0	26.0	1.6	
Blackheath	59.0	28.0	31.0	50.1	29.0	24.2	41.7	0.5	
Birmingham	55.0	29.0	26.0	40.5	25.0	15.4	37.7	0.6	
Wetherhampton	55.5	27.4	28.1	47.0	34.0	13.0	40.5	0.4	
Nottingham	55.5	32.0	23.5	43.1	34.0	9.1	38.5	0.4	
Norwich	55.0	38.5	16.5	46.0	35.5	11.1	40.8	0.2	
Sheffield	55.0	35.0	20.0	45.0	34.0	11.0	39.5	0.4	
Liverpool	50.0	27.0	23.0	38.5	18.2	20.3	28.4	0.5	
London	55.1	31.0	24.1	47.6	30.0	17.6	41.1	0.9	
Leeds	57.5	19.0	38.5	47.1	19.0	28.0	33.0	0.6	
Sheff.	55.0	28.0	27.0	47.0	35.7	11.0	40.8	0.4	
Southampton	54.0	21.0	33.0	37.6	24.0	13.6	30.8	0.4	
Newcastle	55.0	24.0	31.0	41.5	33.0	8.5	37.3	0.5	
Edinburgh	50.7	32.0	18.7	...	...	...	41.3	0.8
Glasgow	51.5	24.7	26.8	...	...	...	38.0	0.6
Cardiff	50.0	25.0	25.0	...	...	...	37.5	0.6
Aberdeen	54.4	25.3	29.1	...	...	...	39.8	0.21
Leith	47.5	25.5	22.0	...	...	...	36.5	0.3
Greenock	50.0	24.0	26.0	...	...	...	37.0	0.39
Ferry	55.0	25.2	29.8	...	...	...	39.0	0.47
Porth	50.0	26.0	24.0	...	...	...	38.0	0.01
Dublin	62.0	30.0	32.0	...	...	...	44.0	...

THE WEATHER.

STATE OF THE WEATHER AT BLACKBATH, LONDON,
FOR THE WEEK ENDING WEDNESDAY, MARCH 22, 1871.

1871. MONTH AND DAY.		At 9 A.M.		Hygrometrical Deduction from Glaisher's Tables, 5th edition.	
		Reading of			
March.		Barometer reduced to 32° Fahr.	Dry Ther- mometer.	Wet Ther- mometer.	Weight of Vapour in a Cubic Foot of Air.
		Ins.	Deg.	Deg.	Gr.
16. Thurs.	40.0	30.0	35.0	30.0	100
17. Friday.	39.4	36.0	34.0	30.0	82
18. Satur.	39.4	36.0	34.0	30.0	2.1
19. Sunday.	39.0	36.0	34.0	30.0	2.2
20. Monday	39.0	36.0	34.0	30.0	2.2
21. Tues.	39.0	36.0	34.0	30.0	2.2
22. Wednes.	39.0	36.0	34.0	30.0	2.2

1871. MONTH AND DAY.		TEMPERATURE OF THE AIR.		WIND.		RAIN.	
		Highest.	Lowest.	Range in Day.	Mean.	Direction. Average of 59 years.	Height. in inches.
March.		Deg.	Deg.	Deg.	Deg.	Miles per hour.	
16. Thurs.	40.0	35.0	9.5	35.7	18	W.S.W.	0.32
17. Friday.	41.7	30.0	14.0	38.2	18	W.S.W.	0.32
18. Satur.	39.4	36.0	23.4	45.8	37	W.S.W.	120
19. Sunday.	35.0	40.0	15.0	46.8	37	variable	0.00
20. Monday	35.0	35.0	35.0	46.8	37	variable	0.00
21. Tues.	39.0	39.0	39.0	46.8	37	W.S.W.	200
22. Wednes.	39.0	39.0	39.0	46.8	37	W.S.W.	0.00

March 16.—Heavy snow fell during the early morning hours, and then rain occasionally in the day. Generally cloudy till night.
17.—Generally cloudy, but foggy. Overcast afterwards.
18.—Generally cloudy, but variable at times.
19.—Cloudy till 7 p.m.; cloudless after that time.
20.—Cloudy till 4 p.m.; calm and after 3 p.m. Light clouds prevalent at other times.
21.—Small amounts of cloud prevalent during the day, but very fine. Cloudless at night.
22.—Generally cloudy. A very fine day.

JAMES GLAISHER.

Garden Operations.

(FOR THE ENSUING WEEK.)

PLANT TUBES.

Gemmas of the tuberous-rooted type, and such like plants as *Plectropomus*, *Negligias*, *Eucodopsis*, &c., will now in many instances have finished flowering, and will, according to a too general custom, be tossed aside into any out-of-the-way corner. Considerate cultivators know full well, that according to the manner in which these are treated for a month or two after flowering, so will be the strength and excellence of the tubers for the production of flowers in the ensuing season. It is, therefore, of importance that the old plants should be encouraged in every possible manner to perfect the development of the young tubers before the drying-off process—a needful adjunct to a thorough ripening—is attempted. As these very showy decorative plants may be had in bloom by a little systematic and careful treatment during the greater part of the year, it might be advisable for those who possess tubers which are dormant, having had a season of rest, to place some at once into fresh soil and heat. By these means fine large plants—often with beautifully coloured leaves—will be obtained, and these will commence blooming early in the autumn, and will continue far into the winter months. Plants of *Nepenthes* may now be potted where larger shifts are likely to prove advantageous. They thrive best, however, in small pots, in a compost of chopped sphagnum and the crude fibre from peat soil, with potsherds. Then, if stood with the base of the pots just under the water, and the plants are frequently syringed, a sufficient amount of nourishment will be afforded. Proceed with the general potting operations in connection with all hard-wooded plants, so that they may have ample time to make fresh roots before the maximum of summer heat is attained, in which case they will be well prepared for making a robust growth, and which will have time to become sufficiently for the subsequent production of flower-buds. Prune back judiciously all *Heaths* (*Ericas*) and *Eparis* which have ceased blooming, and, by keeping them moderately dry, induce young shoots to push freely. Young plants of *Fuchsias* which have moderately filled their pots with fresh roots should now receive a somewhat liberal shift. Pinch back any shoot which may push in to the irregular way, and, by giving them early to lay the foundation for the production of dwarf symmetrical plants. Those who have proper convenience should afford them a stove temperature with its attendant humidity. Give the final shift to the latest batch of *Cinerarias*, subsequently keeping them as cool as possible. *Cape Pelargoniums*, which have been recently pinched back, must, as soon as they commence to break forth again, receive every encouragement to make a robust growth, by giving them more abundant supply of root moisture. Syringe them freely through a fine spray nozzle, and throw water freely on the walks, &c., of the house, to induce a nice moist atmosphere. Proceed with the careful tying of such as need it, and afford to these, and others which have their pots tolerably well filled with roots, alternate applications of wholesome liquid manure.

FORCING HOUSES.

Persist in stopping back all lateral, or sub-lateral shoots upon *Vines* which are on the eve of flowering, as by these means the plant will be better able to reserve its resources for the whole benefit of the berries which will subsequently form quickly. As there are many so-called *Early Vineries* now in this stage, I would suggest that some means be devised for affording a very slight amount of air constantly, both by night as well as day, at the very apex of each structure, of whatever form it may be. I particularly suggest as little only as will secure the exit of any excess of humidity, and this, let it be understood, without in any way advising that a lesser quantity of humidity be diffused, but rather with a view to neutralise and to lessen, in fact, any excess of condensation, which otherwise would assuredly take place, to the questionable benefit of the plants. Whether through the system followed, or through bad practice, we sometimes hear it asserted, that this or that house is verily liable to contract mildew, or become subject to red spider. In all such cases I would strongly advise that finely sifted flowers of sulphur be distributed by the usual means into and amongst the bunches of flowers, and upon the whole of the foliage just at this juncture, when the whole plants are free from actual moisture for a short period. These simple means frequently prevent attacks of the kind referred to. When fermenting materials were placed upon outdoor *Vine borders* at an early date to protect the roots against the inclemency of the weather, it will be well now, when the heat has declined, to remove the mass from the borders, placing in lieu thereof a slight layer of straw, or litter, which will not entirely prevent the sun from affording a little natural warmth, and will at the same time ward off the effects of a cold night. *Pines* in the fruiting stage, and advancing to maturity, whether actually colouring or nearly attained to their full size in the growing stage, should be watered very judiciously and with judgment. *Montezuma* (*Pinus* Black), or the *St. Vincent*, are equally liable to injury in the matter of flavour, if indeed not in keeping qualities (as is the *Cayenne*) through an excess of root moisture at this particular season. Very little injury may be anticipated at this time through their being kept somewhat dry, provided the necessary amount of atmospheric humidity is maintained. Keep up now an average mean temperature of from 63° by night to 71° by day, by means of a low fire, with an increase by night warmth of 6° or 7°. Increase the humidity of the atmosphere materially at this time, and this, the more so, following such periods when air has been afforded the most freely. In giving air during windy weather, even though the sun is pretty strong, take every requisite precaution not to permit the cold air to blow down freely on to or amongst the plants. *Peach* and *Nectarine Trees* must have a good soaking just before they commence stoning. The soil is naturally dry, carrying them over somewhat trying period. It is an excellent plan to place a good thickness of rough, undecomposed manure over the surfaces of the borders before this watering is given, so that the water in passing through it may wash much of its nutritious qualities down to the roots.

HARDY FRUIT GARDEN.

Where newly planted *Fruit Trees* have not already been well surface mulched and firmly staked, this should now be done without further delay. When the summer's verdant garment of leaves and young shoots is assumed, the wind will have much power over them, and the sun will dry the shallow and few roots that occur somewhat harshly during the hot dry intervals which may be anticipated.

HARDY FLOWER GARDEN.

No better period could be chosen than the present to make a full sowing of *Hardy Annuals*, such as *Nemophilas*, of which there are several striking varieties—*Collinsias*, *Clarkias*, &c. A successful sowing of *Sweet Peas* should also be made, by which means a constant supply of cut blooms is assured. Immediately such seedling plants of *Tender Annuals*, as, for instance, *Lobelias*, are sufficiently large to handle, let them be transplanted, leaving the line along and plant these pieces, three in a place, at angles with each other, and about 5 inches apart, letting these stools be about 21 inches asunder, and each row of trios-plants about 2 feet apart. This may seem somewhat close to some cultivators' minds, but is by far the more profitable way. In dibbling the pieces in mix them—those with and those without actual crowns in each triple planting. So dibble them in that a good pressure be

KITCHEN GARDEN.

Where the formation of new plantations of *Sorbeles* has been delayed, let them be made at the earliest possible moment, as by delaying the operation much of the inherent strength of the crowns, or young plants, will be exhausted. It may be as well to mention, for the benefit of the uninitiated, that the crowns and roots of old stools, taken up, if cut neatly into pieces, from 2½ to 3 inches in length (always dibbling them in the right end upwards) will make excellent plants. With the ground prepared well and deeply, let the be transplanted, lay the line along and plant these pieces, three in a place, at angles with each other, and about 5 inches apart, letting these stools be about 21 inches asunder, and each row of trios-plants about 2 feet apart. This may seem somewhat close to some cultivators' minds, but is by far the more profitable way. In dibbling the pieces in mix them—those with and those without actual crowns in each triple planting. So dibble them in that a good pressure be

needed to make the bottom end of each find a firm seat on the ground. *W. E.*

NOTICES TO CORRESPONDENTS.

AZALEAS: *B. D.* Prune as soon as flowering is over, and before growth recommences. You must keep them in a mild genial atmosphere, to induce them to break freely.
BOOKS: *W. G. Warmister*, Thompson's "Gardener's Assistant" (Blackie & Son), and Paxton's "Botanical Dictionary" (Ridgway, Evans & Co.), *Alpha*, Paxton's "Botanical Dictionary,"—*B. S. R. A.*, "Thompson's Practical Treatise on the Grape Vine" (Blackwood).
CAUSE OF VINES DYING: *E. Bryant*, We cannot explain the cause of the death of your Vines from the few facts before us. We cannot attribute it to the dressing of Gishurst Compound applied, nor to the dead pig buried in the border (however questionable that may have been). Were the stems of the Vines sufficiently protected from frost whilst the sap was in motion?
CISTERS: *W. W.* says that the cistern referred to at p. 204, is built with bricks, and coated with Roman and Portland cement mixed. The water is conveyed through iron pipes, and the waste runs back again through iron pipes.
CONSERVATORY: *T. S.* For flowering plants you cannot have the glass too transparent; but the rolled glass will do for foliage plants and Ferns.—*J. D. Hill*, You will only keep the slugs under by handpicking at night or in the early morning, while they are abroad feeding. You cannot use lime or salt with safety amongst the Foliage.
CREEPERS: *L. B.* The following may suit you—*Virginia Creeper*, *Ivy*, *Clematis*, *Wistaria*.
GLASS: *R. R.* The only difference between what is called *reds*, *reds*, *reds*, and *reds*, or sheet glass, consists in quality. "The fourth" is quite good enough for ordinary horticultural purposes.
GRAFTING CLAY: *Alpha*. One-half loamy clay, or clayey loam, and one-half horse-droppings, such as may be picked off the public roads, mixed up together, will answer very well. Grafting is alluded to in several gardening works, but there is no special work in English on the subject. See "Thompson's Gardener's Assistant."
NAMES OF PLANTS: *Gramineae*. A grass certainly, and apparently a *Bromus*.—*W. R.*, *Adiantum fulvum*.
**ONION SEED: *Subscriber* asks, if some one conversant with the subject will explain in detail the process by which Onion seed is harvested. The process adopted in Scotland in saving Leek seed, is, he thinks, a very tedious one, and might be much simplified.
OSIERS: *S. C. Brighton*, A well known nurseryman, Mr. Scailing, to whom we sent your query, says, that the measuring of a bolt of rods is 42 inches in girth at 16 inches from the cut (technically called the butt). The bunch of rods may be any measure agreed upon.
PRIM TREE: *L. P.* Are the blossoms and young fruit protected from frosts? Pay attention to this. Root-pruning is not required, as you have already plenty of blossom.
SEAKALE: *B. D.* The produce being bitter and tough, might be owing to contact with the raw dung, and to its being subjected to excessive heat, but more possibly to its not being cut as soon as ready. Of course the longer it stands after it becomes fit to cut the tougher it becomes, and the stronger in flavour.
SHOE VARNISH: *A. M.* Ordinary commercial alcohol is that which should be used.
SOOTY QUA: *Cucumber*. *Mugby*. It should be grown as a tender Cucumber, and should have a strong heat, and abundance of space and of water.
TRAINING VINES: *A Wonderer*. Let the three shoots grow as you propose, giving them plenty of room to develop themselves; then next season prune back, leaving just as much of new rod as will break the vines strongly.
VINE ROOTS: *J. S.* It is all but certain that your Vine roots have been attacked by some insect,—very possibly the new pest, there being no trace of insects now, but it left their marks behind, either in the shape of little galls, or minute cup-like depressions. The roots have a very unpleasant smell. Watch the leaves when they expand for the little tubercles which contain the cocoon and its eggs. You must look for these tubercles on the upper, not the under side of the leaves. *M. J. B.*
VIOLETS: *Constant Reader*. See Garden Operations, p. 349. The old plants should be planted out for increase as soon as practicable.
ERRATUM.—In the report of the Royal Horticultural Society's meeting at p. 348, the new *Aspidium* name was given by Messrs. E. G. Henderson & Son. We shall give a description of this plant shortly.
CATALOGUES RECEIVED.—Kirk Allen, Descriptive Catalogue of Florists' Flowers.
COMMUNICATIONS RECEIVED: *J. H. J. S.*—*H. P.*—A Country Clergyman.—*W. B. S. E.*—*A.*—Another Old Gardener.**

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CROQUET GROUNDS, FINE LAWNS, and other ornamental
purposes.** 20s. per bushel. 30s. 3 bushels per acre.

**SUTTONS' PERMANENT MIXTURES for
CRICKET GROUNDS and BOWLING GREENS.** 18s.
per bushel. 30s. 3½ bushels per acre.

For further particulars, and complete information on the Formation
and Improvement of PASTURES, CRICKET GROUNDS,
CROQUET GROUNDS, and LAWNS, apply to

SUTTON AND SONS, Seedsmen to the Queen, Reading.
GRASS SEEDS.—Fine Lawn Grass Seed, 1s. per lb.
Permanent Grass Seed, mixed or separate, 6d. per lb.,
and 1s. per lb.
White Dutch Clover, per lb. 12 of 12, 10 of 10, 8 of 8, 6 of 6,
Red Clover " " 9 of 9, Timothy Grass " " 11 of 11, 9 of 9
Sweet Vernal, per lb. 10 of 10, 8 of 8, 6 of 6, 4 of 4,
Lobs on application.
JOSEPH MAY, Seedman, 35, Bridges Street, Covent Garden, E.C.

**RAYNBIRD, CALDECOTT, BAWTREE,
DOWLING and COMPANY (Limited),
CORNS, SEED, MANURE, and AGRICULTURAL MERCHANTS.
Address, 26, Seed Market, Mark Lane, E.C. 1, or Basingstoke.
Samples and prices sent free on application. Price Medals, 1871,
for Wheat, 1869, for "Excellent Seed Corn," and for "Best Seed."**

BIRD'S KING of the CUCUMBERS.
The best for exhibition. Length 24 to 30 inches. White spine,
handsome fruit, short neck or handle. Price 2d. 6d. per packet.

BIRD'S QUEEN of MELONS.
The best green-fleshed Melon, handsomely netted, fine flavour.
Average weight, 5 lb. Price 1s. 6d. per packet. May be had of all the
Seed Trade, and of
JAMES BIRD, Nurseryman and Seedman, Downham Market.

Cauliflower Plants.
DAVID ROBERTSON has to offer to the Trade a fine
healthy stock of **THE LONDON CAULIFLOWER
PLANTS, and EARLY and LATE VARIETIES OF CABBAGE PLANTS;**
also a large quantity of the best **HOLLAND** CABBAGES.
Hermatine Nurseries, Helsenburgh, N.B.

SEED POTATOS, at reduced prices, of Early Hands-
some, Dalmahoy, Fluke, Fortyfold, Myatt's Ashleaf and Early
Lemon Kidney.
ASPAUGH'S, sylv., strong, for forcing, 5s. per 100; also 2s. 6d. per
100, very healthy, 1s. per 100.
SEALE, strong, also 2 and 3 sylv. roots.
ARTICHOKES, strong, 7s. 6d. per cwt.
H. and R. STRICKLAND, skerton Nurseries, Lancaster.

A Valuable and Interesting Novelty.
SUTTON'S MINIATURE HARICOT BEAN.—
This will become exceedingly popular as soon as its merits
are known. It is of very dwarf habit, growing only from 12 to 18 inches
high, the pods being from 2 to 3 inches in length, very closely set,
and the Beans are about as large as small Lupines. It is very early,
and may be sown in March, in French Beans; or the seed when ripe
forms a delicate dish, and is called the **Haricot Blanc**. Seed scarce at present,
and can only be supplied in packets, 2s. 6d. each.
SUTTON AND SONS, Seedsmen to the Queen, Reading.

To the Trade.
H. AND F. SHARPE have a surplus stock of the
following varieties, PEAS, &c., which they can offer at low
figures:—
PEAS—Dillstone's First Early PEAS—Eugénie
Beck's Gem, or Tom Thum's Napoleon's Green Marrow
Bishop's Improved Longpod Essex Royal
Early Avenge Broad Windsor
Dickson's Favourite Scarlet Runners
Kingwood Marrow Altringham Carrot
Princess Royal White Belgian Carrot
Champion of England Fine Curled Cress
Hair's Mammoth
The above are all fine samples, and of 1870 growth.

The New Broccoli, Matchless.
GEORGE COOLING has much pleasure in intro-
ducing this splendid variety; he can with confidence recommend it
as being one of the finest white self-protecting Spring Broccoli ever
sent out. It has been grown side by side with the most noted
kinds, and pronounced by market gardeners and other growers to be
the best of all Broccoli ever sent out. It is a First-Class Certificate
from the Royal Horticultural Society on the only occasion on
which it was exhibited, April 20, 1870.
Extract from the *Journal of the Horticultural Society*, April 21, 1870.
"Mr George Cooling, of Bath, sent a selected Broccoli called
Matchless; this is a variety of very superior selection of the old self-
protecting Broccoli. The heads were large and white, and the
variety was considered a valuable acquisition, and was awarded a
First-Class Certificate."
From the *GARDENERS' CHRONICLE*, April 23, 1870.
"From Mr G. Cooling, of Bath Street, Bath, came several speci-
mens of a fine new close-bearing Broccoli, named 'Matchless,' to
which a First-Class Certificate was awarded."
Having this Seed in a very limited Stock, early application for Seed
is desirable. In sealed packets, post free, for 30 stamps.
The Seed Warehouse, 45, Broad Street, Bath.

CARTER'S NEW GRASS SEEDS
FOR
PERMANENT PASTURES
Are now ready, carriage free.

For Ordinary Soils—Best quality, 26s. to 30s. per acre.
Second quality, 20s. to 24s. per acre.
For Heavy Soils—Best quality, 28s. to 32s. per acre.
Second quality, 20s. to 26s. per acre.
Reduced rates for quantities of more than Five Acres.

From Lady CABBERY, Castle Freke, Feb. 1, 1871.
"My Lady Carey is glad to say Messrs Carter's Seeds (Grass and
Green Crops) have proved excellent, and been much admired in their
results."

JAMES CARTER and CO., THE ROYAL SEEDSMEN,
237 and 239, High Holborn, London, W.C.
For TRADE PEDIGREE Seed.
BARLEY, and Black and White OATS.
Apply to Captain HALLETT, Brighton.

To the Trade—Agricultural and Garden Seeds.
H. AND F. SHARPE are now prepared to make
a special offer of the above Seeds, comprising TURNIP,
CABBAGE, CARROT, MANGEL WURZEL, GARDEN PEAS,
and BEANS, grown from the finest selected stocks, and free
from adulteration of any kind. They are all harvested in splendid
conditions, and are growing in the most favourable conditions.
MR. JAMES FRASER (of the late Firm of
MR. J. & J. Fraser, Lea Bridge Road), undertakes HORTICUL-
TURAL VALUATIONS of every description, SALES by
Auction, and Valuations, London, E.C. 1.
**WHOLESALE and RETAIL SEED ESTAB-
LISHMENT** to be LET, by Borough Market. For particulars
inquire of
MR. JAMES FAIRHEAD, Park Lodge, Sydenham, S.E.
NURSERY.—To be LET, or the LEASE SOLD, an
old-established and compact NURSERY, situated within four
miles of Covent Garden, in a first-class neighbourhood. Consists of
Dwelling House, about 14 acres of Ground, 500 square feet of Glass,
heated with Hot-water Apparatus; 1000 feet of Cold Frames, &c.
C. P. C. 44, Wellington Street, New Kent Road, S.E.

FOR SALE, an old established NURSERY and
SEED BUSINESS, within a few miles of London, containing
about 12 Acres of General Nursery Stock, numerous Glass Structures,
Dwelling House, and other buildings.
For particulars apply, by letter only, to G. H. H. C. 47, Bess-
borough Gardens, Fimlico, S.W.

SALES BY AUCTION.
City Auction Rooms.
38 and 39, GRACECHURCH STREET, CITY, E.C.
MESRS. PROCTER, ROBEY AND MORRIS
will sell BY AUCTION, without reserve, at the City
Auction Rooms, 38 and 39, Gracechurch Street, E.C., on THURSDAY,
March 23, at half-past 12 o'clock precisely, 10,000
BULBS of the first-class collection of CARNATIONS, PICOTEES,
and FINKS, the surplus stock of an eminent Grower; a quantity of
SWEET FRUIT TREES, and a large number of American Plants, including
CAMELLIAS and AZALEA INDICA coming into bloom, selected
SHRUB TREES, DASHES, FUCHSIAS, VERENAS,
GLADIOLI, LILiums, &c.
On view morning of Sale; Catalogues had at the Rooms as above,
and of the Auctioneers and Valuers.
Liliums from Japan, Conifer Seeds, Dutch Bulbs, &c.
MR. J. C. STEVENS will sell BY AUCTION, at
his Great Rooms, 38, King Street, Covent Garden, W.C., on
THURSDAY, March 23, at half-past 12 o'clock precisely, 10,000
BULBS of LILIUM AURATUM and other LILIES from Japan;
CONIFER SEEDS, including Wellingtonia gigantea, and the
late Thomas Ashton Smith, Esq., at a cost of several
thousand pounds, erection of an Eleven double-light Pine Pit,
with 1000 feet of cast-iron Hot-water Raising; 1000 feet of
Slate Slabs, quantity of Bath and Tisbury Stone (principally
consigned to the above named Conservatory).
On view the morning of Sale; Catalogues had at the Rooms as above,
and of the Auctioneers and Valuers.

Choice Orchids.
MR. J. C. STEVENS will sell BY AUCTION, at
his Great Rooms, 38, King Street, Covent Garden, W.C., on
FRIDAY, March 24, at half-past 12 o'clock precisely, a fine
ORCHIDS, from Assam, in the finest condition, including the new
and beautiful Dendrobium chrysanthum, Devonianum, Cypripedium
bisulcatum, Cymbidium eburneum, Vanda cœrulea, V. cristata,
Dendrobium nobile, and Dendrobium Wallichianum, the finest
masses ever imported, and 18 Lots of Oncidium Krameri.
On view the morning of Sale; Catalogues had at the Rooms as above,
and of the Auctioneers and Valuers.

South Tedworth, Wilt.
9 miles from Andover and 14 from Salisbury Stations on the South-
Western Railway.
TO NOBLEMEN, GENTLEMEN, HORTICULTURISTS, and OTHERS.
Important Sale of a very noted CONSERVATORY, 908 feet in
length, and 40 feet in width, with span roof, supported by cast-
iron pillars, and having a complete set of machinery, and a fine
late Thomas Ashton Smith, Esq., at a cost of several
thousand pounds, erection of an Eleven double-light Pine Pit,
with 1000 feet of cast-iron Hot-water Raising; 1000 feet of
Slate Slabs, quantity of Bath and Tisbury Stone (principally
consigned to the above named Conservatory).
MR. FREDERICK ELLEN has been favoured with
MR. Instructions from F. S. Stanley Esq., (the Mansion being Let),
to sell BY AUCTION, on the premises, on WEDNESDAY, the 22nd
inst., the above valued and unusually attractive HORTICUL-
TURAL PROPERTY. The Conservatory will be first offered in its
entirety, and the surplus of such Lots as may be agreed upon
at the time of Sale.
Catalogues may be had of the Auctioneer, Andover.
MESRS. HEPPER AND SONS have pleasure in
informing Gentlemen, Nurserymen, and Gardeners, that they
have received instructions from the Rev. W. Richmond, of Moorfield
House, Mallow, Leeds, to sell BY AUCTION, without reserve, in
the FIRST WEEK in MAY, his valuable COLLECTION of
ORCHIDS and STAGS, and CABBAGE SEEDS, and other plants, and
furniture, to experts, and specimens from which have taken
First Honours at Leeds, York, and other great Shows.
Dates of Sale, and further particulars, will be given shortly in the
Leeds Mercury and *Yorkshire Post*.
Edw. Partridge, Leeds, Feb. 20.

Livingstone Dayrell, Bucks.
IMPORTANT SALE OF SHORTHORNS.
MR. STRAFFORD has received instructions to offer
FOR SALE BY AUCTION, at Livingstone Dayrell, near
Buckingham, on THURSDAY, March 23rd, THIRTY-SIX HEAD
of very superior SHORTHORNS, and the property of
A. J. Roberts, Esq., being the chief portion of his valuable herd,
consisting of the Darlings, Lady Harringtons, Wild Eyes,
pernicious, &c. Bulls of the first class, and large size, such as
3d Grand Duke (16.80), 7th Grand Duke (16.87), 6th Grand Duke
(16.60), &c. Duke of Tregentur (16.21) is also in the Sale.
Mr. Strafford can, therefore, strongly recommend this Stock to the
admirers of the Bates blood, the Cattle are fine heads, and a
regular breeding state (several are near calving), and the whole will be
sold without any reserve.
Catalogues, with Pedigrees and other particulars, may be had on
application to Mr. STRAFFORD, 13, Euston Square, London, N.W.;
or of Mr. ROBERTS, Livingstone Dayrell, near Buckingham.

Gaddeby Hall, Leicestershire.
IMPORTANT SALE OF SHORTHORNS.
MR. STRAFFORD begs to announce for SALE
BY AUCTION, on WEDNESDAY, April 5th, next, FIFTY
SIX HEAD of very superior SHORTHORNS, belonging to
Edward H. Cheney, Esq., of Gaddeby Hall, Leicestershire, which
have been selected and bred, and reared, from a small herd of
the best Herds in the kingdom, and are chiefly descended from the re-
nowned Kirkclevington blood, viz., the Blanche, Waterloo, and Eves
herds. They are principally of the following strains:—The Young
Duchess, Engathorpe, Prince, and Sarnis tribes. The Young
Duchess are principally by General Napier (16.20), a Bull uniting
the famed Duchess and Princess blood, and do credit to these favour-
able strains. Some of the Cows being served by him and the 7th Duke of
Dev. (17.75). The Heifers are principally by the 1st Duke of Devon-
shire (16.20), a pure-bred Duchess Bull. Mr. Strafford can, with
confidence, recommend the Stock to the favourable notice of
nurseries; they are found in fine healthy breeding condition,
and will be sold without the slightest reserve.
Catalogues, with Pedigrees and other particulars, may be had on
application to Mr. C. BLAND, Gaddeby Hall, near Leicester; or of
Mr. STRAFFORD, 13, Euston Square, London, N.W.

**BATH and WEST of
ENGLAND SOCIETY**
(ESTABLISHED 1777),
and SOUTHERN COUNTIES
ASSOCIATION.
GUILDFORD MEETING, 1871.
ENTRIES CLOSE APRIL 12.
Forms for the Entry of Stock, Poultry,
Implements, &c., forwarded on applica-
tion to
JOSHUA GOODWIN, Secretary,
4, Terrace Walk, Bath.

**ROYAL AGRICULTURAL
SOCIETY of ENGLAND.**
WOLVERHAMPTON MEETING,
1871.
STOCK and IMPLEMENT PRIZE
SHEETS are now ready, and will be
forwarded on application to
H. M. JENKINS, Secretary,
12, Hanover Square, London, W.

NOTICE to ADVERTISERS.—FRIDAY,
April 7, being GOOD FRIDAY, the *GARDENERS'
CHRONICLE* and *AGRICULTURAL GAZETTE* for that
week will be published on THURSDAY, at 2 p.m.
ADVERTISEMENTS for THAT WEEK must reach the
Office on WEDNESDAY MORNING.

The Agricultural Gazette.
SATURDAY, MARCH 25, 1871.

**HOW to turn to agricultural account the im-
mense store of fertilising matter which
is to be available from the growth-waste of so
well-fed an animal as man, is a problem of the very
highest national importance. Various methods
of solution have been applied to it. Some would
mix the excrement with earth, others would
load it on water. To the former of these plans
it is objected that only part can be thus collected,
and the cumbersome and laborious process of car-
riage and collection in this way involves great
cost; while, as it depends so much on personal
care, it also involves great risk of failure. Of
the latter, it is said that water laden with the
filthy stuff distributes itself in spite of you, and
pollutes foundations, streets, and rivers. The
latter method, however, has the advantage of
collecting everything, and of thereafter entrusting
the carriage of it all to self-acting machinery.
Once you have the whole material laden on water,
it only needs that your pipes be watertight, and a
sufficient fall will take the stuff to the water,
and it will naturally exist, the pump must be used; but even so the burden is
more simply and cheaply carried upon water
than on wheels. And the economy and decency,
and cleanliness and comfort of the latter plan
are so unquestionable, that it is certain to prevail.
The sewage difficulty is, therefore, one which
must be faced; and, seeing that all methods of
precipitating and separating its valuable in-
gredients in tanks have failed, we cannot doubt
that sewage irrigation is inevitable.
No one has a better right to give a lecture, to
teach, or even dogmatize, on sewage utilisation
than Mr. HOPE, the author of a lately published**

pamphlet on this subject.* He has long been the most obstinate and most earnest advocate of sewage irrigation; and after observation, study, and experience such as few can boast, in connection with town sewage, he has stated his latest views in a useful, and practical, though, comparing it with his previous publications, somewhat prosaic essay, given as a lecture at West Derby the other day.

The sewage has been brought to the land; how is it to be distributed and used? That is the question he discusses. He does so by the aid of his Romford farm, a plan of which prefaces his publication. And he claims for it that it alone, of all sewage farms, is laid out in the only proper manner for utilising sewage by irrigation. Mr. HOPE is, we believe, quite right in claiming for the final processes of sewage distribution by far the greater importance when compared with the mere conveyance of it to the land, which alone, as yet, has been the work of engineers. Indeed, he blames engineers for having hitherto neglected the question of sewage utilisation:—

"The fact is, they have not given their minds to it. It is not too much to say that any first-class civil engineer who sat down calmly to consider what was to be done with the sewage which he had conveyed from a town to a farm, and to find out the means by which the land and fertilising the crops, would at once say that the success of the whole operation depended more upon this latter part than upon any other, and that it necessarily involves a great amount of care, patience, and forethought."

Mr. HOPE had always felt that it was this part of the system of utilising sewage by irrigation which demanded the most care and attention. Accordingly, many years ago, he made it his business to ascertain what were the different systems in use, and he found that practically there were only two:—

"The altogether ridiculous hose-and-jet system, which has failed over and over again from its expense; and the system of 'floating-on,' as it is called, in large quantities of liquid sewage, on what is generally known as the 'catch-water' system, that is to say, it is turned out sideways over a number of successive breadths of land. Two other systems were talked of in a vague sort of way, but were never carried out anywhere, so far as I have been able to learn. They were, first, the 'pan system,' which is analogous to the Spanish system of irrigation by water, where rectangular and generally square plots of land are laid out perfectly flat, surrounded by a low bank a few inches in height, and generally on successive levels. This is the system adopted in the neighbourhood of all the old Moorish canals in Spain, some of which I have visited; and the water is run on until the entire surface is covered and forms a shallow pond. That such a system should ever have been even thought of for sewage irrigation sufficiently shows how little the subject was understood by those who entertained such ideas. The fourth system that I found talked about was termed the ridge-and-furrow system—a term easily understood by agriculturists. The land was supposed to be laid out in long strips raised up in the centre, with a carrier or gutter along the ridge, over the surface of which the sewage was to flow; but this had never, so far as I could learn, been carried out—I am talking of some ten years ago—although in a rough sort of way it is carried out in some water meadows. This was the system of application which recommended itself to my mind, because it seemed to combine the advantage of getting a considerable body of liquid on to the land by means of a comparatively small amount of labour, being in this respect the opposite of the hose and jet, with the means of regulating very accurately the quantities."

We cannot quite agree with the account of ridge-and-furrow system of irrigation as having been only talked of "some ten years ago"—though in a rough sort of way it is carried out in some water-meadows.* On the contrary, the ridge-and-furrow system of irrigation is, and has always been, by far the most common method in this country. Water-meadows have been generally waterside levels, and this is the only method available under such circumstances. What is called the catch-water method has been confined to hill-sides and slopes; and it has not been so successful as the other, chiefly because there has not been a sufficient quantity of water to use in such places.

Spring or river water generally contains a certain proportion of nitrates and organic matter, but so small a proportion that its usefulness in irrigation depends upon the power of flooding the land with many thousands of tons per acre during the few months when it is applied. In the case of sewage, however, a small quantity suffices; because though it, too, is a weak manure, yet it is many-fold stronger than the foulest river water. This small quantity ought, of course, for the best result, to be applied with perfect fairness to the surface to which it is allotted; and it could be doled out equally to all

the plants upon that surface, nothing more could be desired. But this would need, either that it should fall upon that surface as the rain, or that every plant should have its individual feeder. Failing these it becomes necessary that we bring the sewage in surface carriers, and that the liquid overflowing these should travel past the plants nearer to these carriers on to those at a greater distance. If the land is either very hollow or very flat, it is necessary that these carriers be near to one another, as otherwise the further plants will not be reached. If the land is tenacious, or presents a sloping surface, these carriers may be further apart, for the water will not sink so rapidly, and thus plants further from the carriers will receive their proper share. Where the slope is so considerable that the water will run a long way before it sinks away, it then becomes necessary to collect it from the surface over which it flows in a contour-furrow at some distance below the carrier, because it is apt to get into runnels and lose its even distribution. Filling thus a contour-furrow, which, if it be thought desirable, may also receive a certain contribution of headwater, it will again start fair upon the lower part of the slope which it is still capable of wetting, and which yet remains to be wetted.

Such is the process of irrigation. Whether it be called ridge-and-furrow, or pane, or catch-water irrigation, there is in every case a certain combination of passage over the surface, with gradual disappearance through the substance of the soil, by which the whole of the space between the one carrier and the next, and between the surface of that space and the drain beneath it, is saturated, fed, and fertilised.

While, therefore, believing that the Romford farm is laid out very well (for it is a farm of very hollow soil and subsoil, and distant carriers could not properly wet the whole land), we yet do not see that any other principle is adopted there than is adopted elsewhere. And we do not sympathise with Mr. HOPE's confident condemnation of a method on which, after all, his own differs only in degree. Such a passage as the following, for example, puts far too strongly the difference on which he is insisting:—

"The great majority of sewage farms are laid out on the 'catch-water' system, and the objections to this are, in my judgment, insuperable. First, as the bulk of the effluent water escapes by flowing off the surface into open ditches, and not through the land into subsoil drains, there is clearly no real security that the sewage is purified at all; and in wet weather, if the watermen are a little careless, or allow the sewage to run too long in any given direction, the result must always be pollution of the soil."

The purification of sewage by land depends mainly on three things—absorption by contact with soil, oxidation by contact with air, and consumption by growing plants. Now those who insist so strongly on the need of immediate sinking of the sewage through the land—so strongly on the great risk of mischief which arises when you allow it to pass over the surface to the neighbouring ditch—have no distinctive force in operation peculiar to their method on which to depend for their alleged special immunity from risk. We can indeed imagine a soil so loose that it would greatly increase our confidence in its cleansing powers if only we could keep it longer on the surface, and in the surface, than it is willing to stop. The sewage which is running over the surface, equally with the sewage which is sinking through the subsoil, comes in contact with earth, with air, and with plant roots; and the longer it remains in contact with these three, and especially with the last, before it leaves them for the drain or for the ditch, the more likely is it to leave its riches and its filth behind. Let the process be but strictly described, and the words which must be used will answer perfectly for either plan; and whether you depend on the Romford method, or on so-called catch-water irrigation—whether you hope that this particular ounce of sewage which has just come upon the farm shall pass over yards of surface and visit scores of plants, or only wet a particular square foot and feed the roots immediately below it, before it leaves the farm, the process is in both instances virtually the same. There is, in any rate, we believe, no such absolute difference as leads Mr. HOPE to pronounce one plan wrong while the other is right.

"Sewage Irrigation," by Mr. HOPE, well deserves wide and general perusal. Towns will very soon be forbidden by the law to pass their drainage waters into rivers. They will all very soon have to adopt sewage irrigation; and it is certain that information of the kind, which this

pamphlet offers will soon have interest every where.

ON Wednesday night an important debate was raised in the House of Commons by Mr. CARNEGIE, who moved the second reading of his Bill for abolishing the SCOTCH LAW OF HYPOTHEC, explaining that the difference between the law of hypothec in Scotland and the law of distress in England mainly was, that in Scotland a landlord had the power of preventing a tenant from disposing of his crop before the rent became due. The great evil of such a law was that tenants were tempted to let their farms to men of small capital, and hence a reckless competition, which gave a factitious value to land.—A discussion, which appeared at first likely to be interesting only to Scottish members, soon acquired greater importance by a speech from the LORD ADVOCATE, who, as one of the Royal Commissioners appointed to consider hypothec, declared it to be an exceptional and highly artificial law. Arguing that rent was nothing but a personal debt, he asked why the landlords should have a preference over all other creditors. If hypothec were abolished, landlords nevertheless would not hesitate to let their farms to honest and frugal tenants of slender means. The present Bill would receive the support of her Majesty's Government, and if he were asked if it might not have a bearing on the law of distress in England, he should reply that that was a matter which might be considered when the necessity arose, but that meanwhile the law of hypothec in Scotland ought not to be continued.—The prospect of so serious an alteration of the law affecting the tenure of land in England which was thus foreshadowed, soon brought a large house together, and the second reading of Mr. CARNEGIE's Bill, though supported by the Government, was rejected by a large majority.

The Bill, nevertheless, with all the consequences which Mr. YOUNG foreshadowed, will, we presume, one day pass. The *Times*, indeed, which tempers with the question in the interest of the existing state of things, says:—"Land is a commodity so easily misused, and so entirely dependent for its value upon the solvency and skill of the tenant, that unless landlords had some exceptional security for their rent they would be compelled, for the due protection of their interests, to deal with none but large and substantial farmers. They would either themselves cultivate their land more extensively, or its occupation would become a monopoly of capitalists." But in the first place, though land be a commodity which can be easily injured, it is one which, unlike the property of its tenants, is especially incapable of anything like destruction, or, indeed, of anything but a limited and temporary injury; and, in the second place, its tenancy is already "a monopoly of capitalists." No one can take land without capital; and the more it is in the hands of men with sufficient, or even abundant capital, the better for everybody—especially for landowners. If the proposed alteration of the law should have the tendency which the *Times* foresees, such an alteration ought to excite no fear anywhere.

—The Wheat market showed a slight improvement last Monday in Mark Lane, and it was firm on Wednesday.—Monday's improvement in the Cattle market was hardly maintained on Thursday.

—THE PEASANT FARMERS' SEED FUND amounting now, with the aid of £13,000 from the Lord Mayor's Fund, to about £40,000, has provided seed corn sufficient to sow 14,000 acres of spring Wheat, 9,000 acres of Barley, and 10,000 acres of Oats. Besides this, 600 tons of seed Potatoes have been despatched to Boulogne and Honfleur. With this, and that which is being got ready, and the donations of seed stock in the coming year, the Government agriculturists will have secured the crop of nearly 40,000 acres of land to the poor French farmers. The committee have not attempted to remedy more than the most pressing wants of the small farmers in the districts devastated by the war. But the seed sent out, being all of the finest quality, its produce, besides the immediate benefit, may take permanent hold in the country, and thus perpetuate for years to come the remembrance of the warm sympathy which prompted the generous arrangements now being made for sending supplies of seed for early forage crops, the extent of which, with that of the much-coveted seed Potatoes, will depend on contributions.

—The reference in last week's paper to the late JOHN FOWLER's earlier proposal to APPLY SEWAGE-PRODUCTS TO TILLAGE OPERATIONS needs explanation. In the autumn of 1845 he called at Whitfield Farm,

* *Sewage Irrigation.* A lecture by W. HOPE, Esq., V.C. Delivered at the Lecture Hall, West Derby, near Liverpool, Edward Stanford, 6 and 7, Chancery Square.

near Berkeley, in company with the late JOSHUA HUNT, of Almondsbury, near Bristol, to explain his scheme of drawing drainages in between a mole-plough by means of a steam-driven windlass. We were, however, able then to inform him that his idea—which he afterwards carried into effect—had been forestalled; that our earliest correspondent, Mr. M. SAUL, of Garstang, had sent us a drawing illustrating this very proposal several months before which, we published in one of the spring months of that year. We reproduce the



FIG. 78.—MOLE-PLOUGH DRAINAGE.

sketch (fig. 78) as it then appeared, exactly representing as it does the scheme which Mr. FOWLER afterwards carried into execution.

OUR LIVE STOCK.

CATTLE.

THE sale of Mr. Richard Stratton's Shorthorns took place at Burdorp on Wednesday the 15th inst. Mr. Thornton acting as auctioneer. The stock was in very fair condition, considering the severity of the past season. There was a large gathering of agriculturists and breeders, but no very high bids were elicited. The first half-dozen lots were all above nine years old, and made from 24 to 31 gs. each. Next followed *Matchless* 10th by ST. GEORGE (20,773), which was purchased by Mr. Hawkins for 52 gs. This was followed by more mediocre prices, until *Frivolity*, lot 18, brought 71 gs. from Mr. Hoddinot. Mr. Trotter brought *Splendour* by 8TH DUKE OF YORK, a son of 7TH DUKE OF YORK, for Lord Cawdor, at 41 gs.; *Linda*, by the same bull, became Mr. Fair's property at 52 gs., and the same purchaser secured *Golden Drop* by JAMES 2D (24,203), for 68 gs. The bulls met with a fair sale, averaging 36 gs. The price for the day, 79 gs., was given by SPECTATOR by JAMES 1ST (24,202), which was knocked down to Mr. W. H. Dunn for the sum of 79 gs. Few men have been more successful exhibitors of Shorthorns than Mr. R. Stratton. He has been a frequent winner at the "Royal" and other principal shows, and Mr. Little, of Lawhill, in proposing his health at the luncheon before the sale, mentioned that he had taken £500 in prizes. Notwithstanding these successes in the showyard, and the acknowledged beauty of the Burdorp stock, 71 gs. was the highest price given for females: 44 cows brought an average of £32 19s. 4d.; 11 bulls made £37 19s. 9d. each; and the 55 animals sold realised an average of £33 19s. 6d., and total of £1868 9s. 6d. Showyard honours are, therefore, not everything, and apparently at the present day cannot compete with "fashion." It is worthy of remark that *Frivolity*, the highest priced female, was furnished with one of the fair, 79 gs., by SILL, her dam came from Northallerton, contiguous to the cradle of the Shorthorns, and therefore, though unrecorded, her pedigree is in all probability excellent.

—Mr. Thornton sold the Preston Hill herd, the property of Charles Stubbs, Esq., on Friday, the 7th inst. Forty-one cows made an average of £28 8s. 6d.; 15 bulls averaged £18, and 56 animals brought an average of £25 12s. 8d. Among the best prices given were 55 gs. for *Kirklevington 4th* by SYLPH PRINCE, a bull by LORD RAGLAN (13,245), and well descended on the female side. This cow was secured by Mr. H. J. Gibbon. The Rev. H. Beckwith gave 40 gs. for *Chamois* by THORNDALE'S GRAND DUKE (20,967), and tracing back a good old FAVOURITE 12th. *Hinda* by LORD LYON (24,417) became Mr. Robottom's for 40 gs.; and *Coralline* by LORD LYON, dam *Cassida* by MCTURK (14,872), and also of FAVOURITE origin, was purchased by Mr. Bradburn for 81 gs. In the bull sale 46 gs. was given by Mr. W. Nevett for CHARLES EDWARD (25,743), by NORTHERN DUKE, and of the famous "Waterloo" tribe; and 30 gs. 7d. were previously given for two members of the *Cassida* by MCTURK family, the first by LORD LYON, and the second by CHARLES EDWARD.

—We have received a copy of the Gaddesby sale catalogue, just issued by Mr. Stratford. It contains a list of 48 cows and heifers, and 8 bulls. "Nearly half of the stock are by GENERAL NAPIER (24,023), a bull uniting the *Duchess* and *Princess* blood," and it is well known that many of the cows are in calf to the famous 7TH DUKE OF YORK, now no more. An examination of the catalogue reveals the names of three descendants of *Blanche* by BELVEDON, half a dozen *Bright Eyes*, descended from *Bright Eyes* by 3D DUKE OF YORK, and previously from the noted "Wild Eye" tribe; and several members of the "Crags," "Fogghatone," "Surmise," "Elvira," "Tellaria," "Waterloo," and "Cherry Duchess" families.

—The Stanwick Park herd was, according to Thornton's Circular, originally founded by Mr. Wood's father, the breeder of the celebrated bull ST. ALBAN'S (25,84), and the well-known cow *Nell Guynne*. Since the late Mr. Wood's death, the herd has maintained its excellence in the hands of his son, the best proof of which is that the 1st prize for bulls at the Royal Agri-

cultural Society's meeting in 1862, and for cows in 1865, were won by animals bred and exhibited by Mr. John Wood. At the Highland and other principal Scotch shows individuals of this herd have also obtained high honours. The present herd is not large, but is exceedingly good; nearly all the pedigrees trace to *Premium* by SIR CHARLES (593), and *Rosbud* by MARGARET (2263). First-class bulls from Messrs. Booth's herd have been bred since 1853, and several of the cows are by VALASCO (15,443).

—We learn from Stanwick Park that the herd is very healthy, and consists of 32 animals, 19 of which are females, and 13 bulls. Of the former, nine have had calves, two heifers are in calf, one 2-year-old has only just been served, and one is not yet served; two of the females are 20 months old, two are 14 months old, and there are two young calves. Of the bulls, LORD PLYMOUTH (24,455) by Mr. Booth's LORD ALBERT, and out of the Royal prize cow *Corinne*, is the sire of several of the younger animals. She is being used. Other four young bulls are "useful," being used 13 times, and about eight months, and there are three young calves. Nearly all are promising. Mr. Wood's sale is advertised by Mr. Thornton to take place on April 20.

—The Kingscote herd has had a valuable addition. On Saturday last *Oxford's Ada*, one of the purest and grandest of her sort, gave birth to a red cow calf, by 3D DUKE OF CLARENCE. From such a dam and sire something very superior was looked for, and the expectation has been, so far as can be at present judged, in every way fully realised.

HORSES.

"As with flowers," writes Mr. Darwin, "so with our domesticated animals, no character is more variable than colour, and probably in no animal more so than with the horse; yet, with a little care in breeding, it appears that races of any colour might soon be formed. Hofsacker gives the results of matching 216 mares of four different colours with like coloured stallions, without regard to the colour of their ancestors; and of the 216 colts born, 11 alone failed to inherit the colour of their parents. Autenrieth and Ammon assert that after two generations colts of a uniform colour are produced with certainty."

POULTRY.

OUR poultry being allowed a wide range, often steal their nests, and as there are many foxes in the neighbourhood, we have to protect the sitting hens and ducks. We find the best way is to adopt the simple practice of the country, of putting a couple of iron hoops over them (the old rusty ones off barrels answer best), put firmly one against the other, so as not to be in the way of the sitting bird. A few years ago, when the foxes were more than usually troublesome, a duck was found on her nest with her head and wings stretched out, as if she had died of fright in defending her eggs, which were almost hatched, but even in this case the hoops had protected her, and the bird and nest were both untouched. G. E. O. [It is not clearly explained in what way these hoops are to be placed.]

—The following is an easy mode of keeping eggs in a perfectly edible condition for ten months. Have ready a square deal box, of the size you are likely to require; cover the bottom with a layer of sweet bran, about 3 inches thick; as the eggs are brought in from the fowl-house, wipe them carefully over with a piece of new flannel, well saturated with sweet oil; lay them carefully on the layer of bran, taking care that they do not touch each other; then add another layer of bran, and proceed as before. We are now using eggs which were so treated, and which were laid as long ago as the 4th of last June, and are perfectly good for all kitchen purposes. *The Manor House, Staines, March 20.*

FARMING WITHOUT MANURE.

A RECENT visit, after a month of frost, to a Thames-side farm, below Barking, to see a thousand tons of Mangel Wurzel in a single acre, deserves a record. It had seen these Mangels some after they had been harvested, covering a square surface of ground, 9 or 10 feet thick, banked up at the sides 1 or 2 feet high with earth, and thereafter with straw and chaff from the threshing floor, in a wall some 2 feet thick, and covered over the flat level top of the mass with a mere shattering of half-straw straw; and thinking that if they had stood the winter of 1870-71 thus almost unsheltered, it was worth letting Mangel growers know, I went down to see the Mangels close at hand. They were then in course of sale. A considerable extent of Mangel growing land is here cultivated—in many instances, year after year, with the same crop—and the large quantities thus grown are carted together close by the river side, and in early spring they go off, a barge-load at a time, to the cowkeepers of London and its suburbs. About one-third of the quantity had been already quarried out and were gone. The opposite 1 foot, and 2 feet thick, with a thick, well-trodden wall of half-straw straw, and on opening it the roots appeared large, and sound from the bottom to the top. Even at the very top no rotten roots occurred; and standing there one could kick open what covering existed, so slight was the depth of it. There appeared, however, to have been an additional quantity laid upon them

after my first visit, and it lay from 4 to 6 inches thick. The frost had been so unusually prolonged and sharp, that Mr. Mitchell, who manages this property for Mr. Hall Dare, had thought the usual quantity insufficient. It had, however, proved enough up to the time when it was supplemented by an addition to its thickness, for no harm had been done up till then.

The farm at Barking, near Rainham, on which these Mangels were grown, is interesting, especially for the illustration which it gives of the extraordinary store of fertility which lies almost locked up—at any rate expressing itself but meanly in an annual sward of middling grass—beneath the surface of the Thames-side marsh land in that neighbourhood. There are here some 800 acres, of which about 300 are arable; and 500 are grass land, laid yearly for from £4 to £5 an acre, which will grow 5 or 6 inches of grass, and 6 inches of the lower soil, and leaves the soil apparently thoroughly well tilled—broken up and shattered, without a blade of grass uncovered. It is then put to Mangel Wurzel—perhaps, dibbled in, in the first instance—after being harrowed and clod-crushed. Holes are dibbled, plants are planted in them, and these are watered, for 30s. an acre. The watering is done from a hose in the end of a water-cart, two rows being watered at once, by a man walking behind the cart as it is drawn toward over the planted ground. Mangel Wurzel has been taken five or six years in succession, without any manure, from this newly broken up land, without any apparent failure, except, perhaps, the increasing ill effect of imperfect drainage in the flatter and lower parts of the fields, which cannot be well water-furrowed into the ditches. Mr. Mitchell is now having the land deeply drained to a low-tide outfall, and this fault will be remedied. There are 300 acres of Mangel Wurzel, and 20 of them in Wheat, 30 in Beans, 100 in Mangel Wurzel, 30 in Oats, and about 20 in Barley. Twelve horses do the work, including some considerable carriage work to London, and about 100 acres are steam-cultivated every autumn, chiefly for the Mangel Wurzel crop of the succeeding year.

There is very little attention to crop rotation, but such as is given where it is thought most likely to succeed. Rivett's Wheat may be taken after the short-strawed rough chaff sort, and then possibly Beans, followed by Mangel Wurzel; or the Mangel crop and Wheat may be taken time about for a number of years; or Mangels may be taken for many years together after Mangels. The Barley is taken chiefly on the lighter gravelly land above and beyond the marsh land, and it is then taken after catch garden crops, on which whatever dung may be collected in these large fields.

Great crops of all sorts are raised. Sixty tons of Mangels have been had per acre off the yards is used; 7 and 8 qr. of Wheat are often grown per acre. There is a good deal of very rough-looking manure, nevertheless; as, for example, when Wheat is drilled over the land just after the Mangels have been taken and the leaves spread abroad, and is ploughed under with a shallow furrow. But the harvest justifies everything—even the practice of taking heavy crops of straw and grain and roots right off the land, and restoring nothing. There are two styles of management to be seen in operation, almost in adjoining fields, down here. In the one, Mr. Circuit puts enormous dressings of town and yard manure upon a gravelly, dry, and easily worked soil, repeating this at short intervals, and taking Cabbages and Broccoli, and Onions and Cucumbers; thus utilising what he thus applies. In the other, Mr. Mitchell is at work on a deep, somewhat heavy, fat alluvium, covering, for 3 or 4 feet, a bed of peat. It is by bringing manure to the land by tools and seeds, or plants. He takes away, by cart and barge and waggon, immense stores of grain and straw and roots—nearly 3000 tons of Mangel have been thus sold from off less than 100 acres annually. And, comparing 1870-71 with 1854 or 1855, when he first came to it, there is a wonderful apparent improvement in the estate, notwithstanding this great draught upon its resources.

It is fair, however, to notice that at the outset of his management for Mr. Hall Dare, on this estate, the land was waterlogged. His first step was to put a drain through the embankment, to feet below the surface of the land, so as to enable drainage to that depth at low water. Thereafter he deepened and straightened all the ditches, and thus obtained a certain amount of drainage. He is now draining to 10 feet cill the whole of the estate, by a drain being 80 feet deep, and from 7 to 4 feet deep. He may be expected, that the productiveness of the fields will be made more uniformly good, and the tillage operations of the early spring, on which fertility so much depends, will not be prevented and delayed by patches in unfit condition. Hitherto, however, the increase of fertility has been obtained only by improvement in the means adopted for extracting it and exhibiting it. Better, deeper tillage has been pos-

was grown in this district, saying it was the most beautiful flour he ever saw in his life.

(Signed) "E. HENSLEY.
"Parkham Rectory, Bideford, Jan. 25, 1869."

"In answer to your inquiry about my opinion of your King Richard, I beg to state that, after two years' trial of its cropping, I am well pleased with the results, and have no hesitation in thinking that, as a new variety, it will prove a valuable addition to the Wheats of the country, and take a high position where it is tried. Last season I had 13 acres sown with this Wheat, about two-thirds of which was dug gravely land; and so, in such a season as the last, unfavourable for a trial of every kind of Wheat, notwithstanding the 13 acres average 48 bushels per imperial acre. On the best part of the land, where the soil was deep and good, the crop was particularly bulky, the heads averaging from 4½ to 4¾ inches in length. As to the milling and baking qualities of King Richard, I cannot do better than send you the enclosed letter, which I have just received from Mr. Hislop on the subject; and as he has taken care to purchase all he could get from me, I think he may be considered a very impartial witness. (Signed) "ALEX. BEGGIE.
"Barney Hill, Dunbar, Feb. 6, 1869."

"The Wheat I have had from you of the King Richard variety is, without exception, about the finest I had made into flour, the quantity I have had of it enables me to say with confidence what are its merits—beautiful colour, strength for baking, and a produce far exceeding Wheats of the same weight. Certainly in my experience I never have had any flour that gave more general satisfaction. (Signed) "DAVID HISLOP.
"Dunbar, Feb. 3, 1869."

"I sowed 1 qr. of your Wheat, called King Richard, in the autumn of 1867, and being satisfied with the yield of grain and bulk of straw, I have sown 2½ Scotch acres with this Wheat for crop 1869. At present my King Richard Wheat is looking well, I may even say promising. (Signed) "ALEX. M'DOUGAL.
"Carlawerock, Tranent, April 12, 1869."

"I am now able to give you my candid opinion of your King Richard hybrid Wheat, crop 1868. I never saw a heavier or better crop grow, and my only fault to it is its lightness in the bushel, which may, however, be owing to the season. At all events, this deficiency is amply compensated for by the large yield both of grain and straw, and also by the favourable reports of the respectable millers to whom I sold the Wheat, who state that the flour was rich, very white, and the produce most satisfactory. (Signed) "ALEX. M'DOUGAL.
"Granton, April 15, 1869."

"For the last two years I have had some experience of your hybrid King Richard Wheat, crop 1867. I had not only a bumper crop, which was so pleased with the general appearance of the grain and straw that I determined to sow all the produce for crop 1868. I had no reason to regret doing so, as I cut a most magnificent crop last autumn, the grain of first-rate quality, and the produce most satisfactory; and should the like occur this season, I will sow nothing else."

"I may mention I have this year 20 Scotch acres of King Richard looking remarkably well, the other variety growing on this farm being Hunter's Wheat; so I will have a fair test of one of the old King against the new. (Signed) "GEORGE HARVEY.
"Whittingham Mains, May 13, 1869."

Home Correspondence.

Mr. Gibbs' Machinery for Drying Hay and Corn.—It may seem unreasonable to say this and attempt to call attention to future harvests, but I suppose the most sanguine will admit the possibility of another series of wet seasons after the three or four of unprecedented dryness we have recently enjoyed. To those who have sufficient prudence and forecast to prepare for a rainy day, I would say that it is not one week too soon to set about such preparation. How they can save themselves from loss and anxiety in this matter has been fully discussed, and strongly advocated by almost the whole of the kingdom; that I need not do more than explain why an early investigation and decision are requisite. It is that the machinery, although simple, takes a long time to construct. It cannot (unfortunately) be made and sent out by return of post, and hence the manufacturers will no more be able to supply the sudden demand that a first wet harvest will create, than Noah could have built the ark when the flood was upon him. My object in devoting to this the best years of my life to the development of this process was not so much a desire for personal gain as for the general good; and therefore, to hasten on the day when neither a trust of hay nor a sheaf of corn shall be spoilt by bad weather, I will cheerfully forego all royalty or license fees to those who are wise enough to provide themselves with a hay and Wheat dryer for the coming harvest. They shall be at liberty to give their preference to it, or to be constructed by their own implement makers, to whom every facility for taking drawings and measurements shall be given, on condition that the essential points of construction shall not be changed for mere caprice or false economy. After this season I shall of course resume my patent rights, both of manufacture and sale, as the only means of fair repayment for the large sums of money which I have devoted to this subject.

William A. Gibbs, Giltwell Park, Sewardstone, Essex, N.

Steam Culture and Crop Rotation.—"Midland," at p. 357, says:—"I was fortunate enough to get the

loan of a neighbour's steam cultivating apparatus, which broke up and worked across 50 acres of Wheat stubble for me early in September last. Thirty acres of this land had the advantage of two turns of the same tackle in the summer of 1869." This is a bit of good evidence, proving that I was right when, at p. 359, I said that "the contractors, as well as the farmers generally, like work done twice over," which also proves clearly that they do not know how to apply the power of steam economically. Twice over two years together, with coal to be added, makes a large sum for two years seed-beds, say £2 8s. Why, such a sum upon my plan would form my heavy clay land for seven years under the following cropping, say in—

1871.	For Beans, a ridging and subsoiling	5	d.
1872.	For Wheat, a smashing by steam, 4s. 8½d., and a cross by harrow with horses,	6	3
	1d. 3d.		
1873.	For Barley, a ridging and subsoiling by horses, 2s. 3d., and a cultivating with horses, 2s.	5	1½
1874.	For Beans, a ridging and subsoiling	8	3
1875.	For Wheat, the operation the same as in 1873	8	3
1876.	For Barley, " "	8	3
1877.	For Beans, " "	18	6
	Total	42	2

The cropping shown above will be the cropping on my heavy land for the next seven years, and the power of steam is so certain (be the weather what it may) that I can tell what my operations and costs will be for a more years' cropping, and those all corn crops. The operations and costs will be as shown above. Let landlords, farmers, and contractors all look to this. It will help to open their eyes a little. "Midland" asks for information about his cropping on the 50 acres. If his land is clean, harrowing and drilling ought to be enough for both Barley and Mangel, and with 6 cwt. of superphosphate per acre he ought to grow a good crop under his proposed cropping. William Smith, Woolston, Blechley Station, Bucks, March 18.

Pleuro-Pneumonia.—Having, like many other owners of stock, suffered in consequence of the prevalence of the above disease amongst cattle, I think it right to mention the result of my experience, hoping that it may be beneficial to others. For the first half-dozen cases I called in a veterinary surgeon, but I am sorry to say that he did not save one. With the next case I tried the following treatment, and with two subsequent cases, all of which, I am glad to say, have recovered, I have found that the animal loses its appetite, which I have found to be the first symptom, I got rid of Messrs. Day, Son & Hewitt's red drenches, and when that has taken effect, I give their gaseous fluid as directed on the bottle. I have no personal knowledge of the firm, and only wish to make public what I believe to be a valuable medicine. Charles Currys, Old Charlton, Kent, March 15.

Mr. Smith, of Woolston, on the History of Steam Cultivation.—At p. 353 I see your portrait of Mr. John Fowler. After speaking of Mr. Fowler, you write thus:—"As we all know, there have been other independent and successful labourers in the field. Mr. Smith, of Woolston—as original, as confident, even as successful, indeed, the first successful steam-cultivating farmer in the country." I always had his place in the history of steam culture; but that history would not have been written had it not have been made by Mr. Fowler." Now, sir, I have no desire whatever to detract one atom from anything Mr. Fowler did, but I cannot understand how the history of steam-culture was "made by Mr. Fowler." In 1855, after years of practice with horses in smashing Bean stubbles for Wheat, and ridging and subsoiling Wheat stubbles for Beans, I contrived and made two implements to be worked by steam-power, viz., my now well-known smasher, and my not so well-known ridger and subsoiler. I patented them on March 19, 1855, and in the June following I proved their strength, &c., by trying them with horses on a piece of hard Clover lea. In the July following, I went to the show at Carlisle to find a manufacturer to make for me an engine and a windlass to work them by steam-power. Mr. Robert Ransome was the first I met and knew in the showyard. I told him at once my business. He took me to Mr. Fowler, to whom I explained what I wanted, whereupon I contracted at once with Mr. Ransome for the engine, and with Mr. Fowler for the windlass. They both agreed to deliver at Michaelmas. I received the engine in due time, but Mr. Fowler thought so little of my project, that he had only on October 8, just been to Ipswich to receive the order to Messrs. Ransome. This I learned by letter in answer to my inquiry. On December 15, 1855, I received from Messrs. Ransome the windlass, and on December 17 was the first trial of steam cultivation at Woolston, and by that night's post I sent Mr. Fowler his money, according to contract. On December 28 Mr. Fowler acknowledged the receipt of the money, and proposed, as a friend, to send a man with a steam-gauge to try a few experiments. The man came on January 8, 1856, and he remained in the neighbourhood till the 18th. My men who worked the tackle would have it that, whereupon he denied that Mr. Fowler had any intention of trying to plough by steam-power. On January 15, 1856, Mr. Allen Ransome came, as a friend, to Woolston, to see

how I got on. He slept one night with me, and left on the 16th. My brother, who was staying with me, with others, would have it that Mr. Ransome came not as a friend. On January 30, 1856, Mr. Fowler read a paper on steam cultivation before the Society of Arts. The paper merely described what had been done down to that period. Mr. Fowler had done nothing, therefore he had nothing to say of his own doings. Here is what he said of me:—"Mr. Smith's experience would fully justify me in saying that it may be done at a saving of 40 per cent. over horse-labour. Mr. Smith's calculations are as follows:—Four men and boy will plough an acre in 2½ hours, or 4 acres a day. Thus only the same number of men are required as for horse-labour, consequently the saving of the horse-labour saved, which, deducting the cost of 7 cwt. of coal, gives a saving of nearly half, as the wear and tear will hardly exceed the wear and tear of eight horses. Another advantage he considers must not be lost sight of is that the land is not injured by the treading of the horses in wet weather, and consequently he can work it when he otherwise should be at a standstill. Mr. Smith has been for some years moving with horse-power a sort of grubber instead of the plough, and with it, I think, the best results." (See Society of Arts Journal, February 1, 1856.)

In February 4, 1856, I discovered through the patent list that Mr. Fowler was taking out patents for steam ploughing, thereby proving that his man was sent to Woolston as a spy, and as Mr. Fowler's second patent was taken out on the day on which Mr. A. Ransome left Woolston, I am quite certain that he came in the interest of Mr. Fowler. Now with this evidence, and with what I have done since February, 1856, before us, I want to know how and when Mr. Fowler made the history that has been written upon steam cultivation. It is true that Mr. Fowler was supported through thick and thin by the Royal Agricultural Society, and it was that support that placed him in the position that he took. If he had never attempted to have made the old roll-over plough, he would not have taken that position, for that society prizes its machinery upon its implement, yet something else would, to have secured that position, the history would have been made and written. It is quite certain that I could not have had that support, for the society would have the old plough, and I would have nothing to do with it; but for all that my part of the history would have been written the same as it is now. In justice to myself I must beg space for this. William Smith, Woolston, Blechley Station, Bucks, March 23.

Double-furrow Ploughs Again.—On my way into this district by the train from London last Wednesday, I was grieved to observe that the severe winter had thinned many crops of Wheat; in fact, in general they are thin and backward. In the East Riding of Yorkshire, where decidedly the most intelligent and best farmers live, the Wheats are generally looking promising; and in the western fields, where the timely application of the press-roller has, and is, doing much to give vitality, and the manures strength and power to thicken into fully developed crops. At Malton I was invited by Mr. Yates, agent to the Messrs. Howard, of Bedford, to witness a trial of a light double-furrow plough, of Bedford make, tested against one of the native-made wood ploughs. The soil was light, and, as the custom is, the cultivation was 5 inches deep, the maximum for the soil, and much less for everything else; the field was Wheat stubble (where the Clover had failed), manured for Oats. The work by the double-plough was perfect, the enthusiastic admiration demonstrated by the numerous farmers present, and the sound calculative scrutiny of its simple mechanical details, revealed the earnest interest taken in this valued economist of labour by these noble farmers, who have by high farming, and the judicious use of the steam engine, made the most productive districts in the kingdom. The ploughing was 4½ inches deep by 8 wide, the draught of the double-furrow was 3½ cwt.; the two light half-bred horses walking away with ease, doing an acre within three hours without turning a hair on them. The single-furrow plough, which made very inferior work at the same sized furrow, drew 3 cwt., the draught being very irregular and irritating for the horses, which the eye exposed more severely than the others. I am convinced that the double-furrow plough must rapidly come into general use on all soils cultivated by two horses in the single plough, for I have never met with an instance where the two horses in the single plough were easier worked than three in the double plough; but in many instances the extra draught of the two-furrow plough has been (as in this trial) very small. I shall not lose an opportunity of investigating closely these trials. L. B.

Uhlans: Sewage: Game: Buckwheat.—It appears from the comments of the papers on Mr. Tattersall's paper, that it is supposed by some at least the German Uhlans are light, whereas, when I was in Germany, I was informed they are heavy cavalry. [See lines 5 and 6, p. 320, Mr. Tattersall's speech; ¶ 1, col. 4, p. 321.] In reference to your article on the utilisation of sewage, perhaps you would be interested by being informed how the Italians manage in some of (if not all) their large towns. Cesspools and closets are emptied after midnight into water-carts, which are drawn into the country, and emptied into buckets, and carried into

the fields, and which are, in their turn, emptied in giving the contents to the plants. About half-a-pint is carefully given to each plant of Maize, Cabbage, Beet, Melon, &c.; for Hemp it is diluted, and put through a gardener's watering-pot without the rose. The effect on the crops is really astonishing. With regard to Mr. Loche's name Bill, I think the farmers [may be glad it] is lost. Deprive the large and rich non-landholding class of Englishmen of the power of hiring shooting, and you would at once deprive the farmers of their farms; for, rather than be without these sports, the class I allude to would immediately compete with the farmer, and successfully too, whenever a farm happened to be in the market to let.—It is rather surprising to me that no gift of the new book has been made to the English Peasantry Farmers' Seed Fund Committee. It is not generally known this grain is very largely grown in France for the consumption of the country inhabitants? *W. T.*

Woolston Marvels.—Mr. Smith is at it again. A seed-bred for Wheat, he says, costs only 5*s.* 1*d.*, including the labour, and he gets 1*s.* 1*d.* for the steam-till, while contrary work costs (as he tells us) 20*s.* per acre. But his steam-till is not the only marvel at Woolston, for they can put 3 cwt. of superphosphate to the acre by hand labour (sowing it broadcast) at 1*s.* 6*d.* per acre! Surely, Woolston is a marvel of cheapness! Reading on in your paper, I find the next article to the Woolston one is an extract from Mr. Lawes' lecture, and there I find that to sow 5½ cwt. of artificial manure at Rodhamsted costs 1*s.* 6*d.* per acre, whereas Mr. Smith can put 3 cwt. for 1*s.* 6*d.*, which would be a trifle over 2*s.* 6*d.* for his 5½ cwt. It is possible that Mr. Smith has mistaken his shillings for pence, or is it only another instance of his fun? Steam-power, saith Mr. Smith, has no chance against these figures—1*s.* 6*d.* per acre for putting in artificial manure—and I quite agree with him. But I wonder how it is that all the other farmers of England cannot do likewise. Think of it, ye clodhopping dunces, they do far behind this Woolston prodigy—a seed-bred for Wheat at 5*s.* 1*d.* per acre, and your artificial manure laid in by hand for 1*s.* 6*d.* more. Wake up, my brothers, and seize Fortune as she flies! A few years of such work, and you will soon be as rich as Cressus. But although you follow his lead where he shows you such marvels, let me strongly advise you against throwing away your money by spreading 3 cwt. of superphosphate broadcast over an acre of "heavy land Wheat"; it will have about as much effect as a pinch of snuff scattered over your own drawing-room carpet. *G. A. H.*

Foreign Correspondence.

TORONTO, CANADA: February 20.—I trust that some of your readers feel such an interest in our new country, that a brief notice of our proceedings may serve for amusement if not instruction. Unfortunately we (agriculturally speaking) are yet in a most primitive state. Farming in Canada, with the great majority, is considered to consist in ploughing, sowing, and following, laying down to grass to the land, and then—as soon as Nature has recuperated the exhausted elements of the soil—ploughing, sowing, and following again. They crop as long as the land will bear it, and when the crop either ceases to come to a remunerative perfection, or gets so smothered with weeds that they can do nothing else with it, they fallow the land again, working it under our hot suns, and killing all the weeds of perennial growth by making their roots into hay, and getting rid of many annuals as they can by cultivating, and the finest possible division of the soil, by which annual and other seeds grow and are destroyed; and he is thought by his neighbours to be the best farmer who can do all this agricultural murder with the least labour, and at the least cost, and consequently the least possible quantity of manure. The result is but little yield of grain, short crops of straw, and no more of either hay or straw than they can manage to keep their cattle and sheep alive through the winter. There are some, however, who make honourable exceptions to this rule in every neighbourhood, but the great mass of Canadian farmers go on year after year taking all out of their land, and putting the least possible quantity back, until the farm will no longer support the family, when it is sold out at a cheap rate to some one who knows what good farming is and should be; he becomes a rational improver, and is made so by his neighbours, and the original owner of the soil and his farm strike out for the bush to make a new farm from the forest, and gradually wear it down to the same state as the old one, when a fresh exodus takes place to the woods, and the land, supposed to be worn out, finds some one who can make it productive.

Our Ontario Government has seen the evil of this, and the present session of Parliament, under an enlightened Minister of Agriculture and Public Works (the Hon. John Carling), has commenced a work of enlightenment which will be followed by the best results. He has published a highly interesting report for the past year (of which, by the present mail, I send you a copy); he has taken up especially the subject of the insect plagues with which this continent has been in a measure devastated for some years, and that part of his report is profusely illustrated with woodcuts, showing the form and nature of many of

these noxious tribes, and giving such a history of their nature and proceedings as will enable the farmer and gardener to meet the ravages of their insect foes with human intelligence; and our author can cannot at the best of times do much in the war against insect nature, yet the discoveries of our entomologists have informed us to what we may attribute our losses, and we no longer need sit down hopeless and helpless, and ascribe every insect ravage and whatever mischief may occur from it to a "blight," caused by east, west, north, or south winds, as the case may be, or to thunder or lightning, or some other natural occurrence, which has no more to do with the mischief than the planet Saturn has.

You will also perceive that it is proposed to establish means of instruction and technical education, not only for the farmer but for the other industrial classes, all of which must be most beneficial to the provinces, and gradually conduce to a better state of things. I trust you will be able to bestow a few hours' consideration to this report; it will of course be only A, B, C work to our learned English agriculturists; but there may be something interesting even to the most advanced of the science of agriculture and horticulture. A similar and most valuable report of the Minister of Agriculture in the United States is annually issued. It is always a thick octavo volume, and is very full of most interesting matter.

Another step in progress is now made for Canada. We are manufacturing on a considerable scale superphosphate of lime, purely from our native production. We have extensive deposits of mineral phosphate of lime in Central Canada. This substance occurs in columnar masses of crystalline formation of a greenish or reddish colour, and also in more extensive masses in the form of beds. It is very pure, but in its native state is entirely inactive as a manure; it looks like, and is a hard spar—too hard to carve or work like gypsum, and quite intractable. It is taken out of the rock by mining, sorted over, and separated from the worthless part, and in this state is exported to England and the United States for various purposes of the arts. They tell us it is used most extensively in pottery; but we believe it all—or the greater part of it—goes to the artificial manure makers. Our respected friend, Mr. Lawes, could no doubt enlighten us on this head if he wished to do so. We have also extensive deposits of sulphuret of iron, *i.e.*, iron pyrites, and these substances (the phosphate of lime and iron pyrites) occur nearly together: such a conjunction was certain to lead to good.

From the iron pyrites is now manufactured a rough sulphuric acid, the phosphate of lime is ground or powdered with crushers; the two substances are mixed, and we at once have superphosphate. This is of excellent quality, because pure, and at present is entirely absorbed by the artificial manure makers of the United States. Thus the elements of unbounded fertility are within the reach of our farmers—as soon as enterprise and knowledge combined shall stretch forth the hand to seize them, and apply them to Canadian farms. We have no doubt the exportation of foreign supplies of bones, but have our superphosphates within our own bounds.

You have also, doubtless, heard that we have on the shores of our northern lakes monstrous deposits of copper, the same metal in its various ores is also found throughout the Laurentian formation, from Lake Superior to Lower Canada. A large portion of these ores of copper is the yellow sulphuret, which is also a fruitful source of sulphuric acid. It is thus made in large quantities in Boston, United States. The course is to separate the metal from the sulphur, take the latter out, in the form of sulphuric acid, and reduce the copper to a metallic state in the usual way. The supply of this manure, and also of the sulphuret of iron (iron pyrites) is very great, I may almost say boundless, so that, from one source or the other, we shall not want for one of the chief elements of fertility to our soil in the future.

You have, of course, heard of our salt, the deposits of which are now proved to extend over an area of 60,000 square miles, and to be 20 to 30 feet thick. We have only to pierce the soil from 1200 to 1400 feet in depth, and we come to a deposit of the purest salt in the world, in strata varying from 30 to 60 feet thick, and for all practical purposes illimitable in extent. We do not mine it, but pump the brine, which comes up at or near the full saturation strength, perfectly bright, pure, and transparent, and only requiring one evaporation from the sea-beat in the form of brine. Chemical analysis has shown this to be the fact. Our Goderich salt is the purest that has ever been produced, and with the most simple possible evaporation yields a salt as white as the new-fallen snow. The expense of pumping this saturated brine is very small; the real cost of the salt is the evaporation. We have no coal: and, although at present we have plenty of wood, yet that must fail in time, and we must then trust to solar evaporation, or use the brine as it is; it will become a mere question of "carriage" *versus* "fuel."

The possession of these native elements, salt, the sulphurets of iron and copper, the mineral phosphate of lime, and of gypsum, or sulphate of lime in quantity, as well as of the purest limestone, is most suggestive to the agricultural chemist. If we could find some way of uniting these various elements in their natural and

moist shape, we should have such a source of fertility as would provoke the admiration and envy of the world. Thus in the reduction of the copper ores, and of the iron pyrites, we obtain sulphuric acid in a weak but wonderfully cheap state; the cost of concentrating it. By a mixture of this weak acid with our saturated brines of salt, also so cheap as to be scarcely worth reckoning the cost of, we have the elements of the production of soda and hydrochloric acid; the latter passing off in the gaseous state would at once unite with lime exposed to its influence, and thus give us a valuable chemical and a valuable manure at the same time, at one operation, for few know how beneficial chloride of lime is to vegetation.

Superphosphate of lime plants leads to the action of the sulphurous vapour, in the reduction of the mineral ores before-mentioned, we have the elements at the cheapest possible rate of superphosphate, and with that substance, as we have before said, any amount of fertility.

These are the indications merely of future operations; the elements are there, and only require human intelligence to combine them; this will be done, and, in the meantime, we have the power to export our artificial manures, or our grains and cereals, to the markets of the eastern hemisphere?

We are also striking out in another direction, and are determined to reduce our dependence on Europe by another manufacture, namely that of the sugar of the Beetroot.

There is scarcely a farmer in Canada who is not acquainted with the process of manufacture of sugar from the Maple; but the sap that glows in our forest is so pure that it requires no rectification, but merely boiling down: the impurities which finally appear in the manufactured sugar have all been produced in the course of its manufacture; they did not exist in the original sap. If the sap were evaporated in vacuum pans from the beginning, the result would be white pure sugar. This is not the case with either the Sugar-cane or the Beet; both these sources of saccharine matter have their special constituents, which will combine with the future sugar, and especially in the case of the Beet, must be removed at any cost or trouble.

Our farmers being thus *au fait* at sugar-making, take to the idea wonderfully well, and I have no doubt we shall see a great breadth of roots planted this year; all are impressed with the importance of the manufacture, and all allow that the Sugar-Beet is quite equal as a field crop to the Mangel Wurzel. It takes less storage, as it contains more of the elements of nourishment in it than the Mangels, and the cattle can eat the roots better in the winter, because there is less water in the root to be assimilated by the system of the animal.

The course proposed to be adopted, is to grow the root in the most approved way—grind or grate it, extract the juice, and then condense or concrete this juice into a solid substance, or into a rich, thick, rough syrup, for the sugar refiner; thus we reduce the farm work to mere mechanical operations. The machineries we purchase to do this are not the end of the work, and delivers the syrup at the other, all being done without handling in the intermediate stages, and without chemical knowledge being required, in any shape—a steam-engine such as all our people will learn how to use in a few weeks, and the simplest kind of self-acting machinery (not more complicated than a saw-mill or threshing-machine) being all that is necessary, and this we consider to be within the reach of a very large percentage of our people.

I have had the pleasure of collecting and condensing all the information procurable respecting Beetroot, and beetroot-sugar, and of embodying it in the columns of the *Canada Farmer*. I have put it in the simplest language, such as our farmers can understand, and have omitted all heavy calculations and all chemical terms, which are so alarming to unlettered persons; and herewith I have the pleasure of sending you all the numbers of the *Canada Farmer*, which contain the results of my researches. I trust you will find some, or all of them, useful for the *Agricultural Gazette*, to bring the subject before the old country farmers and market gardeners, who would I am sure find them accurate in carrying the manufacture into operation, provided they do not go into the refining process. So long as they stick to mechanical operations and simple evaporation they will succeed; the concentrated juice will be the most valuable article, and will find a ready market with the refiners, who will naturally be anxious to keep the business in their own hands. Sugar refining is a business of great skill, and, consequently, great profit, and a very short time will see the refiners anxious to have their raw material produced at home instead of abroad.

There is only one drawback to this new branch of industry, namely, the removal in the concreted juice of the mineral elements of the land; the sulphates and soda in their forms of carbonates, nitrates, and phosphates, are abstracted, and pass off from the sugar in the shape of very impure molasses. These should be purchased by the farmer, and restored to the soil; the cake or pressed root will, of course, be fed on the farm; and if the molasses from the Beet as obtained from the refiners were also fed on the farms, not only would a valuable flesh-forming element be added to the pressed

cake, but all the abstracted minerals would be restored to the soil in the resulting manure.

I have no doubt that the course of this industry in Canada will be the production of the concreted juice by the farmer, and the refining it in small manufactories, perhaps two or three in each township, by men who have neither the capital nor the wish to make a "big concern" of it, but who are quite capable of doing such an article, or either white or brown sugar, as will answer for all domestic purposes throughout the Dominion of Canada. *Fetis.*

Societies.

SOCIETY OF ARTS.

On the Cultivation and Uses of Sugar-Beet in England.—The following are extracts from the recent capital paper on this subject by Dr. Voelcker:—

The Plant.—Good Sugar-Beet possesses the following characteristics:—

1. They have a regular, pear-shaped form and smooth skin. Long, tapering, Carrot-like roots, are considered inferior to pear-shaped Silesian Beets.
2. They are symmetrical, and do not throw out forks, or fingers-and-toes.
3. Good Beets have a white and firm flesh, a delicate and uniform structure, and clean sugary taste. Thick-skinned roots are frequently spongy, and always more watery than Beets distinguished by a uniform firm and close texture.
4. They weigh, on an average, from 1½ to 2½ lb. a-piece. Neither very large nor very small roots are profitable to the manufacturers of sugar. As a rule, Beets weighing more than 3½ lb. are watery, and poor in sugar; and very small roots, weighing less than 1½ lb., are either unripe or woody, and in either case yield comparatively little sugar.
5. Good Sugar-Beets show no tendency to become necky, and their tops are always smaller than those of inferior Beets.
6. Good Beetroots are considerably denser than water, and rapidly sink to the bottom of a vessel filled with water. The specific gravity of the roots affords a pretty good test of their quality, for the greater their specific gravity the richer they will be found, as a rule, in sugar. A still better test than the gravity of the root itself is the specific weight of the expressed juice. The juice of good Beetroots has usually a specific gravity varying from 1.06 to 1.07. When very rich in sugar, the gravity of the juice rises above 1.07, and in some English-grown Beets I have found it as high as 1.078. These roots contained over 14 per cent. of crystallisable sugar. The juice of roots per cent. of sugar invariably falls below 1.060, and thus by taking the specific gravity of the juice of different Beets, a pretty good idea may be formed of their comparative richness in sugar.
7. In a well-cultivated soil Beetroots grow entirely in the ground, and throw up leaves of moderate size. The tendency of the root to bury itself in the soil is characteristic of good Sugar-Beet.

The Soil.—The best soils are those in which neither clay nor sand, nor lime greatly preponderate, but which contain these constituents, together with a fair proportion of organic matter, so mixed together that the land is neither too stiff nor too light, and crumbles down after being ploughed into a nice friable loam. There should be a sufficient depth of soil, for all soils incapable of being cultivated to a depth of at least 16 inches are unsuited for the growth of Sugar-Beets, which, unlike the common yellow Globe Mangel, grows almost entirely underground, and therefore cannot be cultivated with advantage in any shallow soils. The subsoil should be thoroughly well drained, and be rendered friable by autumn cultivation and free admission of air. A deep friable Turnip loam, containing a fair proportion of clay and lime, on the whole appears to be the most eligible description of land for Sugar-Beets. Lime is a very desirable element, for in land deficient in lime Beets are liable to become fingered-and-toed.

Many persons entertain the mistaken notion that clay soils are not suited for the cultivation of Beets, and that the crop will only flourish in light, sandy soils. Some of the finest crops of Beets which I ever saw were grown on clay soils, and some of the worst crops on light, sandy land. It is true, a badly-worked, half-drained clay soil does not bring Beets to perfection, but even stiff clays, when properly drained, may be brought into a fine friable condition, and the land is broken up by the cultivator early in autumn, and left in ridges as roughly as possible during the winter, and not touched until the season of sowing the seed arrives, when it suffices to pass a pair of harrows over the land. The land in general is much improved by deep autumn cultivation and exposure to the air in a rough state; and, according to my own observation and the testimony of the most successful of the heavy land farmers, it is far better never to touch the land after it has been put roughly into ridges than to give it a second ploughing in spring.

The Manure.—If possible, Sugar-Beets should be grown with as little farmyard manure as possible; and when dung has to be used, as in the case of very poor

soils, care should be taken to apply the dung in autumn, or during the winter months as early as possible.

Heavy dressings of common farmyard manure, such as are generally applied to land upon which Mangel Wurzel is grown for feeding purposes, must not be employed if the land is intended for Sugar-Beet.

The effect of heavy dressings of dung, and, I may add, of all animal nitrogenous matters, as well as of ammonia, is to produce abundant and large leaves, and big but watery roots, which are not only comparatively poor in sugar, but also contain nitrogenous matters, which greatly interfere with the extraction of sugar in a crystallised state.

Common salt, and saline manures in general, although useful when used in moderate doses, say at the rate of 2 or 3 cwt. per acre on light soils, should be avoided on the majority of soils, for experience has shown that Sugar-Beets, grown on soils highly manured with common salt, produce roots the expressed juice of which is largely impregnated with salt, a constituent which is dreaded by the manufacturer of sugar even more than the albuminous or nitrogenous qualities of the juice.

Peruvian guano, sulphate of ammonia, and nitrate of soda require to be used with discrimination. If the land is in good agricultural condition, it which it always contains a sufficient amount of available nitrogen to meet the wants of the crop, neither guano nor sulphate of ammonia should be used as a manure for Beets. It is true guano and sulphate of ammonia largely increase the weight of the produce per acre, but at the same time it has to be borne in mind that heavy crops produced by the aid of guano and purely ammoniacal manures generally are poor in sugar. Beets grown with an excess of guano or sulphate of ammonia, moreover, furnish a juice that presents much difficulty to the sugar manufacturer.

If the land is very poor naturally, it will be found necessary to manure it, and if farmyard manure cannot be obtained in the required quantity, and be applied in autumn, it may be desirable to use some guano or sulphate of ammonia. In that case I would recommend 3 to 4 cwt. of Peruvian guano, or 2 cwt. of sulphate of ammonia, mixed with 2 cwt. of superphosphate of lime, to be sown broadcast in autumn; and when the seed is sown in spring, to drill in with it at the same time 2 cwt. more of superphosphate.

Superphosphate of lime and bone dust, or the refuse bones of glue-makers, are excellent manures for Sugar-Beets, and other phosphate manures are suitable for every description of land; they never injure the quality of the Beet crop, like the indiscriminate use of ammoniacal manures; on the contrary, superphosphate decidedly favours early maturity, and for this reason I would never sow a crop of Beets without drilling in at the same time 2 to 3 cwt. of superphosphate.

On light soils, in which potash is often deficient, the judicious use of potash salts has been found serviceable. The salts of potash, however, should not be used by themselves, but always in conjunction with superphosphate and phosphatic guanos; for such soils I have found 3 cwt. of superphosphate, 2 cwt. of crude sulphate of potash, and 1 cwt. of sulphate of ammonia, or 1½ cwt. of Peruvian guano, very useful for common Mangels, and have no doubt that this mixture would be equally useful for Sugar-Beets.

Cultivation.—The best time for sowing Beetroot is the beginning or middle of April. If sown too early in spring, the young plants may be partially injured by frost, and if sown later than the first week in May, the crop runs the risk of requiring to be taken up in autumn before it has had sufficient time to get ripe.

From 10 to 12 lb. of seed, or about double the quantity of seed usually sown for common Mangels, is the quantity of seed required per English acre. Much more seed is sown, because Sugar-Beets are planted more closely than common Mangels. As regards the width between the plants, I may state that, generally speaking, the distance between the rows and from plant to plant should not be less than 12 inches, nor greater than 18 inches.

Should the young plants be caught in spring by a night's frost, and suffer ever so little, I would advise to plough up the crop at once and to resow, for plants checked by frost are certain to run to seed. Beets that have run to seed are practically useless for the manufacture of sugar.

Like root-crops generally, Sugar-Beets require to be frequently horse and hand-hoeed. As long as the young plants are not injured by hand-hoeing, the repeated application of the hoe from time to time is attended with the greatest benefit to the crop. It is advisable to gather up the soil round each plant, in order that the hoeing may be done as completely as possible.

Sugar-Beets must be taken up from the soil before frost sets in, else they suffer. When the leaves begin to turn yellow and flabby, they arrive at the age of maturity, and the crop should then be closely watched that it may not get over-ripe. If the autumn is cold and dry, the crop may be safely left in the ground for a week or ten days longer than is needful; but should the autumn be mild and wet, it is highly desirable to remove the roots as soon as possible after they arrive at maturity, for if left in the soil they are apt to throw up fresh leaves, and nothing does so much injury to Beets as a second growth of tops after the roots have become ripe. Particular attention, therefore, should be paid by the grower of Sugar-Beets in watching the ripening of the crop. It is a good plan to test the gravity of the

expressed juice. A root or two may be taken up at intervals, and be reduced to pulp, by grating it on an ordinary hand-grater. By pressing the pulp through calico the juice is obtained, which is to be tested with an ordinary float, used for ascertaining the density of liquids heavier than water. As long as the gravity of the juice continues to increase, when the roots are tested from time to time, the crop should be left in the land. The juice of Beets of good sugar-yielding qualities has a specific gravity of about 1.065, and when rich in sugar it rises to about 1.070.

Immature roots cut across with a knife rapidly change colour on the surface laid bare by the knife, turning first red, then brownish, and finally quite dark. If the newly-cut slices of Beet turn colour on exposure to the air, the ripening process is not completed, but if they remain for some time unaltered, or turn only slightly reddish, it may be assumed that they are sufficiently ripe to be taken up. By this simple means, the state of maturity may be ascertained with sufficient accuracy for practical purposes. The crop should be harvested in fine, dry weather. In order that the roots recently removed from the ground may part with as much moisture as possible, they are best left exposed to the air on the land before they are stacked, but they should not be left longer exposed to the air than a few days, and are guarded against fire by direct sun and rain. Perhaps the best plan is to cover them loosely with their tops in the field for a couple of days, and then to trim them, and at once to stack them. For storing roots, especial care should be taken to prevent their germinating and throwing out fresh tops, which is best done by selecting a dry place for the storage ground. The roots may conveniently be piled up in pyramidal stacks, about 6 feet broad at their base, and 7 feet high. At the top, earth or straw should be put, but this, covered with tiles, in order that the moisture may readily evaporate, and subsequently, when frosty weather sets in, another thicker layer of earth, not exceeding 1 foot in thickness, may be placed on the stacks.

Quality.—The cultivation of Sugar-Beet has been largely extended, in 1870, on Mr. Robert Campbell's estate at Buscott, Berkshire, as well as in the neighbourhood of Mr. Duncan's sugar factory at Lavenham, in Suffolk.

In both localities the sugar-producing qualities of the roots have been most satisfactory. The Beets, on an average, contained 12 per cent. of sugar, and Mr. Duncan informed me that he expects, as the result of the season's campaign, to obtain from the whole of the roots which were supplied to him in 1870, 89 per cent. of saleable crystallisable sugar of fine quality.

On a small scale, Beets were grown last season in a good many places in England, Ireland, and Scotland, and I had occasion to analyse many samples of excellent roots. Thus, in Beets grown by Mr. De Morny, at Cold Harbour, near Wallingford, Berkshire, from 12½ to 13 per cent. of sugar in Beets grown in Yorkshire, from 10½ to 13½ per cent.; and in Surrey, 11½ per cent. Again, in 10 lots of Beet, grown on various farms in the county of Kilkenny, I found in three lots nearly 15 per cent. of sugar; in two lots, nearly 13½ per cent. of sugar on an average; in three lots, nearly 12 to 12½ per cent.; and in two lots, about 10 per cent. on an average. I much question whether better Sugar-Beets have been raised during this season in the most favoured Beetroot districts of Belgium or France.

Dr. Voelcker then proceeded to describe the beet-sugar manufacture. In conclusion, he referred to the Beetroot pulp.

The refuse pulp which is produced in Beetroot sugar manufactories or distilleries is a valuable feeding material. When obtained by submitting the grated Beets to strong hydraulic pressure, it appears in the form of thin cakes, which can be readily broken in pieces, and mixed without difficulty with straw-chaff, meal, and such like feeding materials.

In round numbers, the refuse pulp of sugar-factories where presses are used contains, in 100 parts—

Water	..	..	..	70.0
Sugar	..	..	..	1.5
Albuminous compounds; (flesh-forming matter)	..	..	..	1.5
Crude fibre and a little lactic acid	..	..	..	24.0
Mineral matter (ash)	..	..	..	2.0
				100.0

In 100 parts of pulp, it will be noticed, there are 30 per cent. of dry matter, whereas 100 of Sugar-Beet from which it is obtained contain only 15½ parts of dry substance on an average, and common Mangels but 11 parts.

A ton of Beetroot pulp accordingly contains 672 lb. of dry matter, or 32½ lb. more than a corresponding weight of the roots, and 425½ more dry matter than a ton of common Mangels. In other words, a ton of pulp contains not quite, but nearly, the same amount of solid food as 2 tons of Silesian Sugar-Beets, or 3 tons of common Mangels. Nobody probably will dispute the fact that the dry substance of Sugar-Beet or a Mangel is more valuable for feeding purposes than the dry substance of the pulp. The question, however, which requires to be settled is, not whether the perfectly dry pulp is less valuable than perfectly dry roots from which it is made, but whether the 672 lb. of solid matter contained in a ton of pulp are worth more or less than the 347 lb. of solid matter present in a ton of Sugar-Beets, or 246½ lb. of the solid matter of which common Mangels consist. I find, moreover, that, weight for weight, the pulp contains more albuminous

(flesh-forming) matter, much more fibre, and but little sugar. On the one hand, we have in Sugar-Beets an excess of 8 per cent. of sugar, and in common Mangels an excess of 4 per cent. over the amount of sugar in the pulp; and on the other hand, we have 24 per cent. of fibre in the pulp, against 34 in Beets, or 3 per cent. in common Mangels, besides an excess of 1 per cent. of albuminous matter in the pulp.

The question thus resolves itself into this—Are 4 lb. of sugar the excess in 100 lb. of common Mangels, or 8 lb. of sugar (the excess in 100 lb. of Sugar-Beets), worth more or less than 1 lb. of albuminous or flesh-forming matter, and 21 lb. of the finely-grated fibre, which constitutes the excess in 100 lb. of the pulp? As the difference in the amount of nitrogenous matter in the pulp and in the roots is comparatively small, we may, for simplicity's sake, throw it together with the excess of fibre.

Taking into consideration the probable difference in the feeding value of sugar and vegetable fibre, I am inclined to think that a ton of fresh Beetroot pulp, as it comes from the presses, or old pulp, not containing more water than flesh, is worth fully as much for feeding purposes as 1½ ton of the Beetroots from which it is obtained, or as much as 2 tons of common Mangels.

Beetroot selling at 12s. a ton is, unquestionably, a cheap and valuable food, which may be used as a good substitute for roots, and, in fact, worth more than 22s. a ton to the farmer, and therefore can be no doubt that the refuse pulp of sugar manufactories or distilleries always command a ready sale in England.

I have seen in Belgium large numbers of beasts fed upon nothing else but the refuse pulp of sugar manufactories. This, however, in my opinion, is not a good plan, and I would advise it to be mixed with some bean meal, or Indian Corn, or better still, cotton cake.

A mixture of refuse pulp and cotton cake is an excellent food for milch cows, for it produces abundance of milk, and milk of good quality.

Mr. NEWELL V. SQUAREY said there was one important question which had not yet been touched upon, viz., whether, when the crop of Beet was produced, it would not be more advantageously employed in feeding cattle than in being converted into sugar, and that, when the refuse pulp of sugar manufactories was the waste, which, as the W. Indies, where the saccharine matter could be produced in enormous quantities, whilst the supply of animal food in England was anything but adequate to the requirements of the population. He suggested, therefore, the question whether the sugar contained in the roots might not be as advantageously employed in feeding cattle as in any other way, particularly as he understood it was now becoming a common practice to feed cattle upon refuse sugar obtained from other countries, treated &c.

Mr. LIND, C.B., the chairman, said the question raised by Mr. Squarey was, no doubt, one of great importance, viz., whether it would be more profitable to convert the root at once into sugar or at once into meat, and this was a consideration which must weigh greatly with those who took an interest in the subject. The price of meat was gradually rising because the number of consumers was increasing more rapidly than the production of meat to satisfy their wants, and, it might be said, was a good reason why in this country sugar cultivation might be profitable on the Continent, but might not be successful. The answer, however, was this, that the price of butcher's meat on the Continent was also rapidly increasing; but, notwithstanding that, the manufacture of Beetroot sugar was also constantly increasing, and wherever it was adopted it had been uniformly followed by an increased production, not only of Wheat, but also of fat cattle, in a similar ratio. On the Continent the production of Beetroot sugar had now become a vast industry, having grown up really from nothing. In 1868, the production was about 664,000 tons; the next year, 658,000; in 1869, 841,000; and, in 1870, 925,000 tons; and of this vast quantity England had imported 76,000, or nearly one-twelfth of the whole. Now, it so happened that it was not the hotter parts of Europe which were best adapted for this cultivation, but the northern parts of France, and the cooler districts of Belgium and Germany, and, in other words, in those districts whose climate most approximated in its character to the eastern, south-midland, and south-eastern counties of England, and to the south-eastern counties of Ireland. One important consideration as to the introduction of this industry into England was the cost of production, but in every point of view he thought England could compete successfully with the Continent. Coal, which was one large item of cost, 900 tons having been used at Lavenham last year, was cheaper; labour was quite as cheap, if not cheaper; land in that part of Suffolk where the Beetroots had been grown was cheaper than generally on the Continent, and only the roots themselves were dearer, and that was in favour of the farmers. If most of the items in the cost of cultivation were lower here, certainly there was a higher value for the sugar produced, or the Continentals would not send us so much here; and as the pulp, so far as it was used for food, was of the very best quality, yielded a high price, it would be evident that every advantage was in favour of the English cultivator. There only remained one or two practical points upon

which he would touch. Mr. Duncan said, from his experience in his own case, and from what he had learned on the Continent, that nobody should enter into this enterprise unless he were in a position to complete the process of sugar manufacture, because if he confined himself to the manufacture of syrup he could not always be sure of a market, and the syrup could not be kept any considerable time. At the same time, a small factory which, in his opinion, would pay, involved a capital expenditure of about £5000. In his case, in consequence of the crop being small, and the supply of roots not being equal to his power of machinery, his machinery had not been in full work, and therefore operations had been carried on at a disadvantage. Last year he had only used about 4500 tons, but he reckoned that if he had had 6000 tons he should have made a profit of 6s. a ton, 7s. if he had used 7000 tons, or 8s. if he had had 8000 tons, simply because with the larger amount he should only have been able to fully employ this machinery.

With regard to the farmers themselves, the crop this year had been rather a light one, but he had recently had the pleasure of meeting most of the Beetroot growers of the neighbourhood of Lavenham, and although they were not particularly enthusiastic, and spoke about the difficulties attendant on the cultivation of roots of a proper average size, and so on, yet they were all willing to contract, and did contract, to continue to grow roots, and to supply the market. This was quite enough to show that in their opinion it was an agricultural success. Then it must be borne in mind that they got back the pulp, 1 ton of which was worth, for feeding purposes, 1½ ton of the roots themselves, at 12s. a ton, while they sold the 1½ ton of roots for 30s., which was by no means an unprofitable transaction. There was something, no doubt, to be said as to its being an exhausting crop, and this was a point which, in fact, he had not time to go into to consider. But the same might be said of other things. Potato culture, for instance, which for the last 20 years had been carried on very largely, especially in the East Lothians. In that case nothing was returned to the land, whereas in the case of the Beet, where between one-third and one-fourth of the entire weight of roots sent off the ground could be returned in the form of pulp, and the balance could be easily made up if there was a profitable business, as was done by Potato growers by the purchase of manures as were necessary to keep the land in good condition. Upon the whole, his own impression was that, whilst the value of meat, as compared with the value of sugar, was a serious question to consider, the most successful plan of operations would be to combine the production of the two. If the production of sugar realised a profit, and supplied an article in immense demand, it would afford the means of purchasing those articles which would produce the meat, which was also so much required. The last question of all, which was perhaps the most important, was, How did this branch of industry affect the labourer? Any one acquainted with the south-midland and southern counties of England knew that one of the greatest difficulties in those districts was how to tide over the winter months, when labour was slack, when there was little outdoor work to be done, and when any kind of employment was an immense boon to a vast number of people. Now, this particular kind of industry seemed especially adapted for the object. At Lavenham, in the hundred days during which the manufacture was going on, there was an expenditure for labour of about £1000; for coal, gas, oil, tallow, &c., about £400; £500 in railway transport; a certain amount in local rates, and a large sum contributed to the public revenue. There was, therefore, a large infusion of capital spread over the whole of this agricultural village which it had never had before, and if these roots had been applied directly to the feeding of the herd, instead of converting them into sugar, not one-tenth of the amount of labour would have been employed.

Notices of Books.

Harold Erle, a Biography. By the author of "The Story of a Life." E. Moxon, Son & Co., 44, Dover Street, W.

The author of this charming volume has very beautiful as well as merely useful thoughts, and is proved by mechanical, as well as literary success, to be what he possesses rare power of expressing both. It is with the former, so far as they are agricultural, rather than with the latter, that in these columns we have to deal; but having in another page a reference to Mr. Gibbs' machinery, we are glad in the same number of this journal to have so pleasant an opportunity of referring to that other, even brighter side of him, which is shown us in his posthumous "Harold Erle." It is a story of heroic self-denial, which it will do busy countrymen, as well as townsmen, good to read. Unlike other instances of a similar kind, which have been sung by poets—the results of morbid or transcendental sentiment, and therefore not so wholesome for those who may be charmed by the songs they have inspired—it seems to us that the life of Harold Erle, here so beautifully told, is the result of a reasonable and manly, as well as a heroic, and heroic, sacrifice; so that the reader of the book is made by it all the reader and fitter for the every-day duty of ordinary life.

Farm Memoranda.

HAMPSHIRE: March 14.—The genial weather which has prevailed since the break up of the severe frost has produced a great and favourable change in the appearance and promise of the pastures, and also of the Rye, Wheat, Barley, Vetches, &c., where the plant has been maintained, but, on the other hand, the cold spells of the hill farms great injury has been done to the crops, and some fields will require to be resown. The Wheat plant is generally good (although very backward), except on lea ground, where the seed was sown in the last week of October and first week in November, in which case much has been so injured by the frost that partial or entire resowing with April Wheat has been adopted; early sown Wheat, as well as the late sowings, are doing well.

At the time we are writing we cannot remember so great a scarcity of food for cattle. Although the Swedish Turnips were a great failure, what few were saved have rotted; so that generally nothing remains but a few young Turnips and the Mangel crops, which have kept well in heap. Added to this the water meadows are rather later for feeding than usual; the Clovers and field grasses, too, are not half a plant, with the other green crops very late. This is, indeed, a discouraging prospect for the large flock-masters, particularly if we should get a dry cold April. Let us, however, hope that, as we have not had a really early spring for many years, we may get it this season. Hay and straw are very dear, and must continue so for the remainder of the spring. Both are now being generally used as fodder in conjunction for feeding horses, cow cattle, sheep, &c., and many who in past seasons have ignored the value of straw for sheep feeding are now from necessity obliged to use it. Maintaining large flocks of ewes and lambs, even when the crops are early, must be very expensive; we find that cotton cake of the best sort, and also molasses, are being used in conjunction with dry fodder, and the effect is well spoken of, but under any circumstances hay is the dearest article to feed with—if it can be obtained. Until the rains came within the past few days the land has been in good till for sowing, and much Barley, Oats, Beans, Peas, &c., have been put in under favourable circumstances. Much, however, remains to be done when the land again becomes dry. All kinds of Clover and grass seeds are again very dear, particularly Sainfoin seed. We still find that the yellow suckling obtains favour both for admixture with broad Clover and white Dutch, as it comes fit to cut about the same time.

The cultivation of Cabbage is greatly increasing, but it will never find favour when planted in the autumn in field culture. Nearly all the plants set before Christmas have been destroyed by the frost, birds, and other enemies. Seed sown now will produce crops within a few weeks as early as autumn-planted, and without the risk. The Mangel crop is still making way in public estimation, and is deserving of more attention, both by early sowing and liberal manuring.

The large flocks of Hampshire Down sheep, for which the chalk farms of this county are celebrated, have now, for the most part, finished lambing, and the lambs are generally well upon their feet. When serious loss of lambs has occurred it is the exception; the crop of lambs may be considered over the average, last year's fall being an average. This is fortunate when we consider that this is the third successive season when the stocks of sheep have been unusually drawn upon owing to failure of root crops; and to such an extent has this been carried, that we cannot recollect so few fat sheep in the farmers' hands as at the present time. Fat horned cattle equally scarce, and no doubt will be very dear unless consumption can be largely diminished. Store cattle and sheep are more in request than have been expected with the scarcity of food. Buyers are, however, no doubt anticipating a favourable spring and summer. Let us hope they may not be disappointed, as a favourable season is now more than ever wanted, not only in the interest of the farm, but of the whole community.

The uncertainty of root crops has induced more attention to be given to Potato culture—the new kinds have called for a more extensive and productive, and upon loamy good soils leave the land in a capital condition for Barley and Clover in succession. *Joseph Blundell, Southampton.*

Obituary.

THE *Mark Lane Express* of Monday announces the death on Monday, March 13, of Mr. FRANCIS HAWKSWORTH FAWKES at his seat, Farley Hall, at the advanced age of 74. The descendant of a family whose members for many generations took an active part in public affairs, Mr. Fawkes was distinguished for political freedom when such action was anything but popular. Mr. Fawkes was eldest son of Walter Ramsden Fawkes, who was one of the members for the county of York in 1806. The father of the deceased was one of J. M. W. Turner's most enthusiastic and kindest patrons. He formed a collection of Turner's paintings of unequalled extent and great value. This collection was carefully guarded by his son, who, however, was always desirous to allow the gallery at Farley Hall to be inspected; and it need

hardly be said that admirers of the great English landscape painter from all parts of the world have availed themselves of this privilege. As an agriculturist, or more especially as a breeder of Short-horns, Mr. Fawkes was also well known. His career in this way may be said to have begun with Mr. Whitaker's stock; but still he had tried his 'prentice hand at both Bates and Booth before, and never bought or hired from either of them again. His first purchase was NORFOLK (2377), a roan bull by 2D HUBBACK, and such a favourite of Mr. Bates' that he sent four heifers from Kirkclevington expressly to be served by him. One of them was "my best *Duchess*" 334, the great-grand-dam of GRAND DUKE; another, *Blanche* by BELVEDERE, from whom *Rose Duchess* 2 is in direct descent; and a third, founded the Waterloos of Aylesby and Springfield farms. NORFOLK himself was from *Norparill* by MAGNET, rather a gaudy cow, from Mr. Barker's (of East Layton) sale, where Sir Charles Knightley purchased the *Rose* and *Primrose*, which, along with RUFUS and LITTLE JOHN, of Mr. Arbuthnot's breeding, virtually founded the Fawleys herd. In 1834 Mr. Fawkes bought *Verbena* and the magnificent *Madora*, for 39 gs. and 55 gs., at Mr. Richard Booth's Studley sale, and bred nine calves from *Madora*. The year previous Mr. Whitaker sold off his herd, and again bought about three dozen well-bred cows, for the use of his work-people at the Burley mills. Mr. Fawkes was so much struck with the looks of some of them, that he arranged with his neighbour to allow him to select 20 for service principally by NORFOLK. The compact was to be in force for three years, and 10 gs. was to be paid for each of them, double or not, at the expiration of a week, provided it was not at blackness, and had no symptoms of unsoundness. Hence 60 were transferred during that period from Greenholme to Farnley, and the first 10 bull calves by NORFOLK averaged 100 gs. each.

It had been Mr. Fawkes' habit to have periodical bull sales, which have at times reached an £80 average. Roams were his favourite colour; and the result of his experience was that a white bull upon a red cow was much more certain to produce them, than a red upon a white. As a general rule, he did not sell his females. The agent of the Emperor of the French transplanted three roan heifer-calves by *Bridgetown*, along with *Maid of Lorn*, from this herd to the Imperial stalls; and Kentucky and Ohio have not left it unranked in their searches after blood.

Notices to Correspondents.

BOOKS: A. P. Prof. Wilson's "Farm Crops" (Blackie & Son, Paternoster Row), Morton's "Farmers' Calendar" (Warne & Co., Bedford Street, Covent Garden).

MANURE FOR GRASS: *Y. McKenzie*. Is the land drained? If so, it might probably be well to make a compost with lime and ditch earth, and apply it in autumn—giving a dressing of superphosphate of lime (3 cwt.), and about 1 cwt. of nitrate of soda per acre.

MANURE FOR WHEAT: *W. J. J.* You may sow 1 cwt. of nitrate of soda and 2 cwt. of common salt per acre on your young Wheat, with advantage.

Markets.

ENGLISH WOOL.

During the last week the demand has continued with unabated spirit, and prices, though slowly, are gradually hardening, with every prospect of a steady further rise.

HAY.—Per Load of 36 Trusses.

SMITHFIELD, Thursday, March 23.

Prime Meadow Hay, 120s. 10137s.	Clover, old ..	135s.	142s.
Inf. do. ..	100 110	Inf. do. ..	120 130
New Hay ..	—	Prime 2d cut do. ..	130 135
Inf. do. ..	—	Inf. do. ..	110 120
Straw ..	80 85		

CHIMBERLAND MARKET, Thursday, March 23.

Sup. Meadow Hay	125s. to 140s.	Inferior Clover	120s. to 130s.
Inferior do.	110 124	Prime 2d cut do.	— —
New do.	— —	New do.	— —
Inferior do.	— —	Straw	45 50
Superior Clover	137 147	JOSHUA BAKER.	

METROPOLITAN CATTLE MARKET.

MONDAY, March 20.

“We have a few more Beasts than last Monday, still the supply is short, and the average quality but middling. There is an active demand, and our quotations are well maintained. We have a larger supply of Sheep; choicest quantities are readily disposed of, at fully late rates, but trade is slow for other kinds. Choice Calves are very scarce, and dearer. Our foreign supply consists of 755 Beasts, 610 Sheep, and 70 Calves; from Scotland there are 92 Beasts; from Ireland, 140; from Norfolk and Suffolk, 1500; and 360 from the Midland and Home Counties.

	s. d.	s. d.		s. d.	s. d.
Best Scots, Here-	5	80s 10	Best Long-wools	5	80s 0
ford, &c. ..	5	80s 10	Do. Shorn ..	4	65 0
Best Short-horns ..	5	6—8	Ewes & 2d quality	4	4—5
2d quality Beasts	3	6—8	Do Shorn ..	—	—
Do. Lambs ..	—	—	Do. Lambs ..	—	—
Half-breds ..	6	4—6	Calves ..	4	0—6
Do. Shorn ..	—	—	Figs ..	—	3—8

Beasts, 2550; Sheep and Lambs, 16780; Calves, 75; Figs, 35.

THURSDAY, March 23.

Although the number of Beasts is smaller than last week, it exceeds the demand; lower prices are taken for all descriptions, yet a clearance cannot be effected. There are a few more Sheep, and trade is exceedingly dull; the

greater number are short. The choicest Downs and half-breds meet with purchasers, at nearly Monday's quotations, but other kinds are much lower. Choice Lambs command high rates. Calves are lower. Our foreign supply consists of 300 Beasts, 450 Sheep, 95 Calves, and 5 Figs.

	s. d.	s. d.		s. d.	s. d.
Best Scots, Here-	5	40s 8	Best Long-wools	5	60s 8
ford, &c. ..	5	40s 8	Do. Shorn ..	4	65 0
Best Short-horns ..	5	2—3	Ewes & 2d quality	4	4—5
2d quality Beasts	3	4—4	Do. Shorn ..	—	—
Best Downs and	6	2—6	Lambs ..	7	0—0
Half-breds ..	6	2—6	Calves ..	3	0—6
Do. Shorn ..	5	4—5	Figs ..	3	4—5

Beasts, 855; Sheep and Lambs, 6230; Calves, 120; Figs, 10.

METROPOLITAN MEAT MARKET, March 23.

Best Fresh Butter ..	—	19s. per dozen lb.
Second do. do. ..	—	16s. —
Small Pork, 4d. to 5s. 6d.; Large Pork, 3s. 8d. to 4d. 6d. 8 lb.		

MARK LANE.

MONDAY, March 20.

There was a short supply of English Wheat to this morning's market. Factors commenced by asking an advance of 1s. to 2s. per qr., which checked sales, the few selected parcels were taken at an improvement of 1s. per qr. There was a fair demand, and the demand for foreign Wheat was in retail quantities, at last week's rates. Barley brought full prices. Beans and Peas unchanged in value. Oats were rather easier. There was no change in the value of Flour.

	2. 6.	2. 6.		2. 6.	2. 6.
WHEAT, Essex, Kent, Suffolk. White 47—55 Red	55	56	—	—	—
— fine selected runs	56—61	Red	48—57		
— Talavera	52—61	Red	—		
— Norfolk	45—61				
— Foreign	45—61				
BARLEY, Grind & dist. 30s to 34s. Chevi. 43	46	Malt ..	36—41		
— Foreign ..	30s to 34s	Malt ..	35—43		
OATS, Essex and Suffolk ..	26—28				
— Scotch and Lincolnshire. Potato 28—30	Feed ..	25—28			
— Irish ..	28—30	Feed ..	25—28		
— Foreign ..	28—30	Feed ..	21—26		
RYE ..	32—36	Foreign ..	33—36		
RYE-MEAL, Foreign ..	49—50	Harrow ..	49—50		
— Pigeon ..	51s. to 52s.	Winds ..	Longed ..		
— Foreign ..	51s. to 52s.	Winds ..	Longed ..		
PEAS, Essex, Kent, Suffolk. Small 43—47	Egyptian ..	42—44			
— Foreign ..	43—47	Egyptian ..	42—44		
— Maple, 40s. to 44s.	Grey 36—40	Foreign ..	36—40		
MAIZE ..	32—35	Foreign ..	32—35		
FLOUR, best marks delivered, per sack 42—50					
— 2d ditto ..	ditto 36—42	Country ..	36—42		
— Foreign ..	per barrel 28—30	Per sack ..	38 60		

WEDNESDAY, March 22.

Business on the Corn Exchange to-day was transacted cautiously, but prices ruled firm. There were only limited arrivals of both English and foreign Wheat, which sold freely at firm prices, particularly for red and nursery samples, which are in demand for France, at an advance of 1s. per qr. on Monday's currencies. Barley was less inquired after, but choice samples were fully as dear. Malt was inactive, on former terms. There were only limited supplies of Oats on sale; nevertheless the inquiry was quiet, and inferior samples were exceedingly weak; sound corn, however, realised extreme prices. Maize was purchased readily, at fully the late improvement. Beans and Peas met a slow sale, at Monday's currencies. Flour was little inquired after, but country marks were somewhat advanced.

ARRIVALS OF GRAIN, &c., INTO LONDON BY WATER CARRIAGE.

	Wheat.	Barley.	Oats.	Flour.
English & Scotch ..	990	360	—	Sacks.
Irish ..	—	—	—	—
Foreign ..	—	1350	6250	{ 370 bbls.
	990	2110	6290	—

LIVERPOOL, March 21.—There was a fair attendance of local country millers and dealers, who took Wheat to a good amount, at fully 1d. per cent. advance on the rates of last Tuesday, for red. White was not quotably dearer, but it met a more extensive sale. Flour, dull, and American demand at 6d. per barrel reduction. Barley unchanged. Beans 2d. per qr. cheaper. Peas, flour scarce, brought 1s. 12d. per qr. more money. Indian Corn offered in good quantity, and was freely taken at a reduction of 6d. for American and 3d. per qr. for Danubian.

AVERAGES.

	Wheat.	Barley.	Oats.
Feb. 11 ..	53 7d	35 8d	23 9d
— 18 ..	53 11	35 7	23 7
— 25 ..	53 9	35 10	24 5
March 4 ..	53 2	35 5	24 7
— 11 ..	53 8	36 0	25 0
— 18 ..	54 7	36 1	25 7
Average ..	53 9	35 9	24 5

SEED MARKET.

There has been a large business doing in seeds during the last week. The French demand for Clover seeds is strong for many other kinds of seeds, has continued without abatement. The heavy purchases which have been made for France have reduced our stocks here very considerably, and have raised values fully 2s. per cwt. White Clover is quiet but firm. Alsike seed is in short supply. For new Trefoil seed the sale is quiet, at late rates. Grass seeds of all descriptions are in brisk request, at advancing rates. White Mustard seed must be quoted 1s. per bushel dearer. Sowing Rape seed continues scarce and dear. Hemp and Canary seed are without alteration. Spring Tares are in fair request. Linseed is steady.

JOHN SHAW & SONS, Seed Merchants,
16, Water Lane, London, E.C.

WHEELERS'

GRASS SEEDS

FOR PERMANENT PASTURE ON THE
OLD RED SANDSTONE.

30s. per acre.

Carriage Free. Five per cent. discount for cash.

WHEELERS' GRASS SEEDS

FOR PERMANENT PASTURE ON
THE LIMESTONE.

30s. per acre.

Carriage Free. Five per cent. discount for cash.

WHEELERS' GRASS SEEDS

FOR PERMANENT PASTURE ON
CLAY SOIL.

29s. to 33s. per acre.

Carriage Free. Five per cent. discount for cash.

WHEELERS' GRASS SEEDS

FOR PERMANENT PASTURE ON
THE LIAS.

29s. to 32s. per acre.

Carriage Free. Five per cent. discount for cash.

WHEELERS' GRASS SEEDS

FOR PERMANENT PASTURE ON
THE OOLITE.

28s. to 30s. per acre.

Carriage Free. Five per cent. discount for cash.

WHEELERS' GRASS SEEDS

FOR PERMANENT PASTURE ON THE
NEW RED SANDSTONE AND MARL.

29s. to 32s. per acre.

Carriage Free. Five per cent. discount for cash.

WHEELERS' GRASS SEEDS

FOR PERMANENT PASTURE ON
THE COAL MEASURES.

28s. to 32s. per acre.

Carriage Free. Five per cent. discount for cash.

J. C. WHEELER and SON,
SEED GROWERS, 59, MARK LANE, LONDON,
Seedsmen to the Gloucestershire Agricultural Society, Gloucester.

GREEN'S PATENT SILENS MESSORS,

OR

NOISELESS LAWN MOWING, ROLLING, AND COLLECTING MACHINES, FOR 1871.

THOMAS GREEN AND SON, in introducing their PATENT LAWN MOWERS to the Public for the present season, take the opportunity of acknowledging the unprecedented patronage that has been accorded to them in former years, and can assure their future Patrons that nothing will be wanting on their part to maintain the confidence so long given to them.

Every Lawn Mower that is sent out by them is warranted to give entire satisfaction, otherwise it can be returned at once, free of cost to the purchaser. Our Machines have been submitted to numerous practical tests in Public Competition, and have in all cases carried off every Prize that has been given.

The following are their advantages over all others:—

- 1st. Simplicity of Construction, every part being free of access and easily managed.
- 2d. They are worked with far greater ease than any other Lawn Mower.
- 3d. They are the least liable to get out of order.
- 4th. They make little or no noise in working, as is the case with Cog-wheel Machines.
- 5th. They perform their work in a neat and smooth manner, and leave no notches or scores.

PATRONIZED BY

HER MOST GRACIOUS MAJESTY
THE QUEEN,
ON 45 DIFFERENT OCCASIONS;
H.R.H. THE PRINCE OF WALES;
THE KING OF THE BELGIANS;



THE EMPEROR OF THE FRENCH;
THE EMPEROR OF RUSSIA;
AND MOST OF THE
NOBILITY, CLERGY, and GENTRY
OF THE UNITED KINGDOM.

PRIZE MEDALS AWARDED TO GREEN'S PATENT NOISELESS LAWN MOWERS.

International Exhibition, London, 1862.

International Exhibition, Dublin, 1863.

Agricultural and Horticultural Society, Brussels, 1862.

Agricultural and Horticultural Society, Brussels, 1863.

Agricultural and Horticultural Society, Hamburg, 1863.

Agricultural and Horticultural Society, Liege, 1861.

Agricultural and Horticultural Society, Namur, 1862.

Agricultural and Horticultural Society, Laeken, 1862.

Agricultural and Horticultural Society, Gand, 1862.

Agricultural and Horticultural Society, Linneene, 1862.

Agricultural and Horticultural Society, Linneene, 1863.

The following are a few of the principal places where Green's Patent Lawn Mowers are the only Machines in constant use, and have been for a number of years giving entire satisfaction:—

THE ROYAL GARDENS, WINDSOR.
BUCKINGHAM PALACE GARDENS.
MARLBOROUGH HOUSE GARDENS.
SANDRINGHAM HALL GARDENS.
CHISWICK HOUSE GARDENS.
ROYAL HORTICULTURAL SOCIETY'S GARDENS,
SOUTH KENSINGTON.
ST. JAMES'S PARK.
GREEN PARK.
KENNINGTON and BATTERSEA PARKS.

ROYAL BOTANICAL GARDENS.
ROYAL HORTICULTURAL GARDENS.
KENSINGTON PALACE GARDENS.
TEMPLE GARDENS.
ZOOLOGICAL GARDENS.
CRYSTAL PALACE GARDENS.
SOUTH KENSINGTON MUSEUM.
BERKELEY SQUARE GARDENS.
RUSSELL SQUARE GARDENS.
GORDON SQUARE GARDENS.
PARLIAMENT SQUARE GARDENS.

BRUNSWICK SQUARE GARDENS.
ROYAL HOSPITAL, CHICHESTER.
ROYAL NAVAL SCHOOLS.
HYDE PARK GARDENS.
LIVERPOOL PARK.
BIRKENHEAD PARK.
PRESTON PARK.
SUNDERLAND PARK.
HALIFAX PARK.
BRADFORD PARK.
LEEDS ROYAL PARK.

NOTICE OF REDUCTION IN PRICES.

With the increased advantages and facilities we possess for the Manufacture of Lawn Mowers, we are enabled to Sell them at a greatly reduced rate on former years. as will be seen from the following Scale of Prices:—

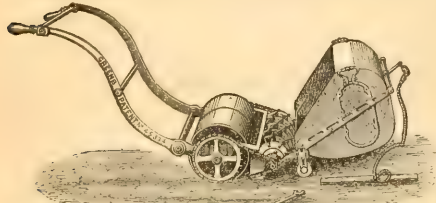
SINGLE-HANDED LAWN MOWER.

HORSE, PONY, AND DONKEY MACHINE.

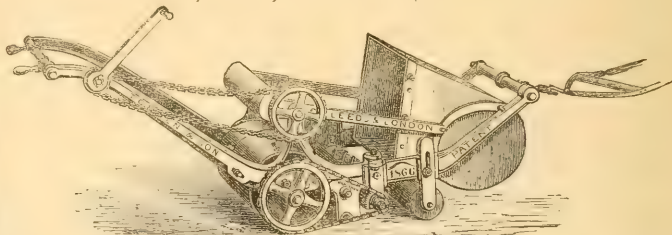


To cut 8 inches	..	..	..	Price	£2	10	0
" 10 "	..	..	..	"	3	0	0
" 12 "	..	..	..	"	4	0	0
" 14 "	..	..	..	"	5	0	0

DOUBLE-HANDED LAWN MOWER.



To cut 16 inches	Price	£6	0	0	This can be worked by one Man, on an even lawn. By Man and Boy.
" 18 "	..	7	0	0	
" 20 "	..	7	10	0	
" 22 "	..	8	0	0	
" 24 "	..	8	10	0	



Prices of Horse, Pony, and Donkey Machines, including Patent Self or Side Delivery Box, Cross Stay complete; suitable for attaching to ordinary Chaise Traces or Gig Harness.

DONKEY AND PONY MACHINES.

HORSE MACHINES.

To cut 26 inches	..	..	£13	0	0	To cut 30 inches	..	..	£21	0	0
" 28 "	..	..	15	0	0	" 36 "	..	..	24	0	0
" 30 "	..	..	17	0	0	" 42 "	..	..	27	0	0
Leather Boots for Donkey	..	..	18	0	0	" 48 "	..	..	30	0	0
Ditto for Pony	..	..	12	0	0	Leather Boots for Horse	..	..	1	6	0

The 26 and 28 inches can easily be worked by a Donkey, the 30 inches by a Pony, and the larger sizes by a Horse; and as the Machines make little noise in working, the most spirited animal can be employed without fear of its running away, or in any way damaging the Machine.

SPECIAL NOTICE.

Both the Horse, Pony, Donkey, and Hand Machines possess (over all other makers) the advantage of self-sharpening; the cutters being steel on each side, when they become dull or blunt by running one way round, the cylinder can be reversed again and again, bringing the bottom edge of the cutters against the bottom blade, when the Machine will cut equal to new. Arrangements are made that the cylinder can be reversed by any inexperienced person in two or three minutes.

The Handles of the Machines can be altered to suit the person using them, by either raising or lowering them.

Delivered Carriage Free to all the principal Railway Stations and Shipping Ports in England, Ireland, and Scotland.

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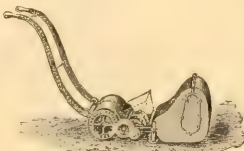
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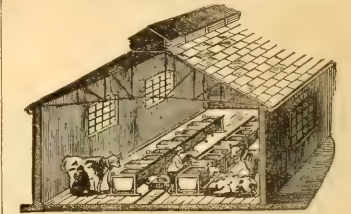
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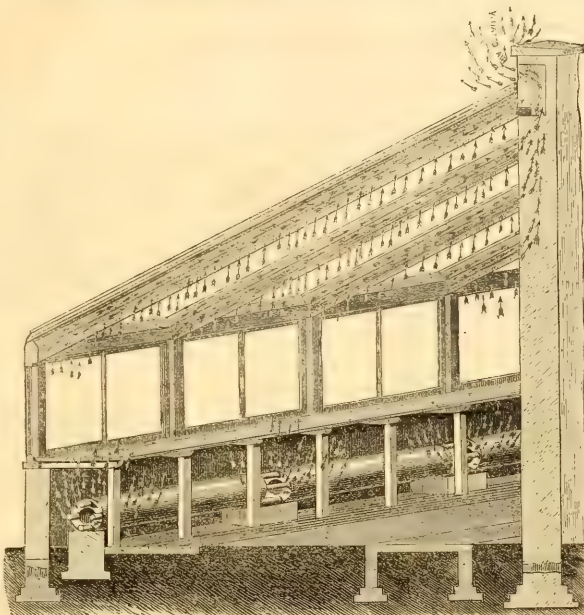


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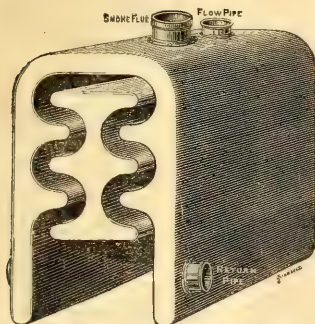
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Are better than Cast-Iron Boilers, because—

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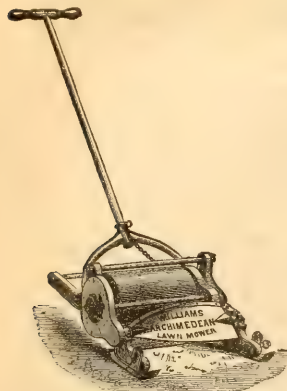
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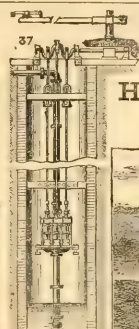
2½ inches 1 9 0
3 " 1 18 0
3½ " 2 7 0
4 " 2 15 6



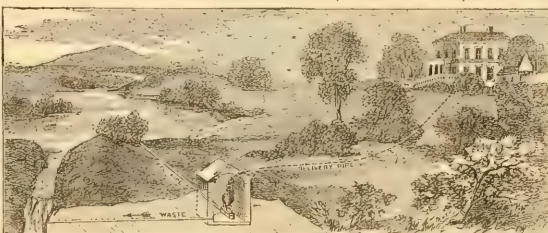
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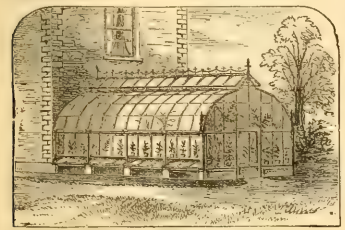
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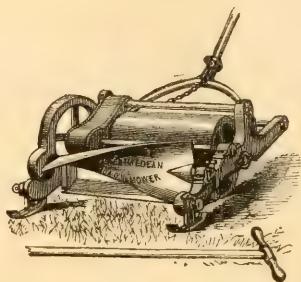
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GIANT ASPARAGUS PLANTS, the best that money can procure, all certain to grow, 2s. 6d. per 100. This delicious Vegetable does not require half the expense usually incurred in planting it. See RICHARD SMITH'S SEED LIST for 1871. Extra strong SEAKALE, 2s. per dozen. RICHARD SMITH, Nurseryman, Worcester.

Cauliflower Plants. DAVID ROBERTSON has to offer to the Trade a fine healthy stock of EARLY LONDON CAULIFLOWER PLANTS, and EARLY and LATE CAULIFLOWER PLANTS; also a large quantity of the best HOLLYHOCKS. Prices on application. Hermitage Nurseries, Edinburgh, N.B.

SEED POTATOS.—Carter's Ashpot Fluke, 10s. per bushel of 50 lb. Price per Ton on application. MAURICE YOUNG, Milford Nurseries, near Godalming.

SEEDLING CROCUS. MAURICE YOUNG, Milford Nurseries, near Godalming. ONE-YEAR PORTUGAL LAURELS. MAURICE YOUNG, Milford Nurseries, near Godalming. Price 8s. per 100.

STRONG Transplanted SILVER FIR. 1½ to 2 feet, 30s. per 100; 2 to 2½ feet, 40s. per 100. RICHARD SMITH, Nurseryman and Seed Merchant, Worcester.

To the Trade. TWO-YEAR SEEDLING EVERGREEN OAKS. WOOD and INGRAM offer the above, very fine, at 15s. per 100, in cash or on credit. The Nurseries, Huntingdon.

TO ARRIVE, from Australia, CORYPHA AUSTRALIS, and SEAFORTHIA ELEGANS, SEED; also, from Calcutta, CELOSIA DECCA, and NOTING HILL, F. VAUGHAN, 5, Stanhope Terrace, Gloucester Road, South Kensington.

GORSE.—Best new French Seed; also FARM and other SEEDS of all sorts. Priced LISTS free on application. JAMES DICKSON and SONS, Ltd, Eastgate Street, Chester.

Special Notice.—To large Consumers of Seed. JAMES CARTER and CO., having harvested their Stocks of FARM and GARDEN SEEDS in splendid condition, are now prepared to make special low quotations for large quantities, at 23 and 23½, High Holborn, London, W.C.

Seeds for 1871. WM. CUTBUSH and SON Descriptive Priced CATALOGUE contains every requisite for the Garden. Post free on application. Highgate Nurseries, London, N.

Transit Agency for Plants, Seeds, &c. C. J. BLACKITH and CO., late BETHAM & CO., Blackith, Cox's and Hammond's Quays, Lower Thames Street, London, E.C. Forwarders to all parts of the World.

To Large Buyers. SPECIAL MODERATE PRICES for the BEST and MOST GENUINE FARM SEEDS, on receipt of list of sorts and quantities required. JAMES DICKSON and SONS (Old Established Nursery and Seed Business), Ltd, Eastgate Street, Chester.

To the Trade.—Continental Flower Seeds, &c. GEORGE MACINTOSH, Agent to F. W. Wendel, Seed Grower, &c., Erfurt, Prussia, begs to announce that he can now supply CATALOGUES of the above free and post paid on application. The Nursery, High Road, Hammersmith, London, W.

Notice. **GARDENERS' CHRONICLE and AGRICULTURAL GAZETTE.** The VOLUME for 1870 is now ready. Price, in cloth, 4s. 6d. W. RICHARDS, 41, Wellington Street, Strand, W.C.

Notice to Subscribers. THE SUBSCRIPTION to the GARDENERS' CHRONICLE and AGRICULTURAL GAZETTE is £1. 1s. per annum, including postage to any part of the United Kingdom. May be had of all Booksellers. Published by W. RICHARDS, 41, Wellington Street, Covent Garden.

ROYAL HORTICULTURAL SOCIETY, SOUTH KENSINGTON. NOTICE—FLOWER SHOW, FRUIT and FLORAL COMMITTEE MEETING, to be held in the Conservatory, on WEDNESDAY, APRIL 12, at 11 o'clock. GENERAL MEETING at 3. Band of the Royal Horse Guards from 3.30. Admission 2s. 6d.

ROYAL BOTANICAL SOCIETY, Regent's Park. EXHIBITIONS of PLANTS, FLOWERS, and FRUIT, MAY 26, JUNE 16, and 23, Tickets, before May 15, 4s. each. SPRING FLOWERS, April 12, 1s. each. AMERICAN PLANTS, June 16, 1s. each. TICKETS, at 6d. each. NEXT MEETING for the ELECTION of NEW SUBSCRIBERS, SATURDAY, April 8.

MANCHESTER BOTANICAL and HORTICULTURAL SOCIETY. GRAND ANNUAL HORTICULTURAL EXHIBITION, 1871—MAY 20 to JUNE 2. ROSE and FRUIT SHOW, JULY 2 and 8. Schedules are now ready, and may be obtained on application to the undersigned. BRUCE FINDLAY, Botanical Garden, Manchester.

STAMFORD FLORAL and HORTICULTURAL SOCIETY. THE SCHEDULE of PRIZES, &c., for the grand Show of ROSES, FRUIT, and other collections, to be held at Stamford, on WEDNESDAY, June 21, is now ready, and may be had of the Hon. Secs., Mr. JOHNSON, Bookseller; or of Mr. CHAS. EDMONDS, Solicitor, Stamford.

Verbenas, Verbenas, Verbenas. PHILIP LADDS is now sending out PURPLE, SCARLET, and WHITE VERBENAS, with plenty of Cuttings, at 2s. per dozen.—Nursery, Ashley Heath, Kent, S.E.

VERBENAS, VERBENAS, VERBENAS. SCARLET, PINK, WHITE, PURPLE, and other colors; spring stock, and strong, with from two to four cuttings on each. Also light and dark HELLBOG, for 10s. per 100, clean plants, included. S. BIDE, A. A. Nursery, Farnham, Surrey.

Novelties for 1871. VERBENAS.—Eckford's fine selection, nine varieties. Many First-class Certificates. The set for 21s. to the Trade. See KEYS' CATALOGUE. Castle Street Nursery, Salisbury.

New Verbenas and Fuchsias. KNIGHT solicitors orders for the above, which we have now ready in 2s. and 4s. clean plants, by the dozen. Priced CATALOGUES free. Floral Nurseries, Hailsham, Sussex.

The most beautiful FRENCH ASTER grown in FRANCE. RICHARD SMITH, Nurseryman, Notting Hill, W. Bonell, and Pivoine varieties. 500 Seeds for 1s., post free. A choice selection of first-class FOREIGN SEEDS at moderate prices. ALFRED HAMMILL, Sedwin Street, Salisbury.

Palms.
JOHN H. LEY, Exotic Nursery, Lansdowne Road, Clonsilla, is prepared to supply all kinds and sizes of PALMS at the most moderate prices, as follows:—
12 good sorts, established in small pots, 18s.
12 very fine, established in 5-in. pots, 45s.
12 new and choice, strong, for and 12s.
A GENERAL CATALOGUE OF FERNS (Hardy and Exotic), STOVE PLANTS and PALMS, will be ready shortly, to be sent gratis to all customers and applicants.
N.B. Package of above gratis for cash.

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For the BEST and MOST PRACTICAL INFORMATION HOW, WHEN, and WHAT TO SOW, see
CARTER'S ILLUSTRATED FARMER'S CALENDAR for 1871, sent gratis and post free.
JAMES CARTER and CO., The Royal Seedsmen, 237 and 238, High Holborn, London, W.C.

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THOS. BUNYARD and SONS, Maidstone, Kent.

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THOS. BUNYARD and SONS, Maidstone, have a fine stock of **ARBUZUS**, **JUNIPERUS SINENSIS**, **BIOTA AUREA**, **BIOTA ELEGANS**, **THUJA PYRAMIDALIS**, in sizes; and Climbers of the following sorts:—**AMPELOPSIS**, **TEITCHIA** and **HEDEERA**, **ARISTOLIA**, **GRANOTUS AZUREUS** (best kind), **CLEMATIS AZUREA**, **FLAMMULA**, **IVIES** of sorts, **LONICERA FLEXUOSA**, **VITIS HETEROPHYLLUS**, **WISTARIA**, &c. Prices and particulars on application to
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(A charming plant for decorative purposes.)

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ZINNIA ELEGANS, Double White, very large	1 0
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B. S. WILLIAMS' DESCRIPTIVE CATALOGUE of Flower, Vegetable, and Agricultural Seeds is now ready, Post Free on application.

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ROYAL EXOTIC NURSERY, KING'S ROAD, CHELSEA, S.W.,

DESIRE TO DIRECT THE SPECIAL ATTENTION OF INTENDING PURCHASERS TO THE FOLLOWING VERY FINE

MIXTURES OF GRASS AND CLOVER SEEDS,

which they guarantee are not to be surpassed in quality and selection.

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Specially prepared from the finest Evergreen varieties,
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Composed of kinds which thrive on poor soils, 25s. to 30s. per acre.

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This Mixture has been most carefully prepared from the finest dwarf kinds, and cannot fail to give satisfaction.
20s. per bushel; 1s. per lb.

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These Mixtures are formed of the best CLOVERS, FESCUES, RYE-GRASSES, &c., according to requirement, and in ordering it should be stated whether it is required for one, two, or three years' lay.
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This Mixture consists of the best PERENNIAL GRASS SEEDS and CLOVERS, and will greatly improve the Pasture. Sow to 12lb. per acre. 9d. per lb.; 80s. per cwt.

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And all other AGRICULTURAL SEEDS of finest quality, PRICED CATALOGUES of which are now ready, and will be forwarded Post Free on application.

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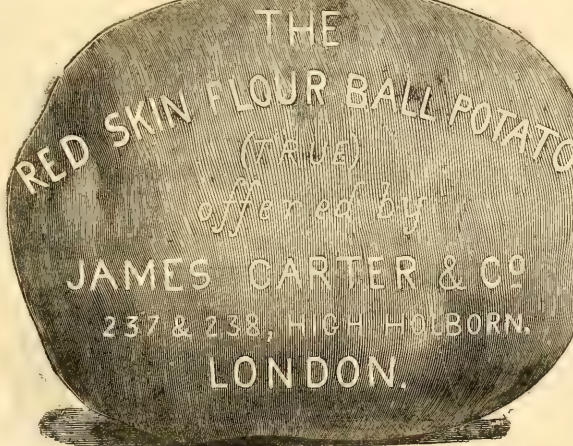
CARTER'S CHOICE POTATOS—CARRIAGE FREE.

THE
RED-SKINNED
FLOURBALL
POTATO.

Price 10s. per bushel.

Much cheaper in large quantities.

We have purchased a stock of this fine Potato from the original raiser. Too much cannot be said in its favour, as it is the heaviest cropper and best cooking late Potato in cultivation; especially valuable for late use and winter storing, and producing tubers all of uniform size, which are very large.



Per Bushel, 10s.; much cheaper by the Ton.

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Price 10s. per bushel.

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Contains a large amount of farinaceous matter. The enormous quantity of 20 tons per acre can be grown on land where finger-and-toe destroys the Turnips, also on land where Mangel cannot be grown profitably. With extra culture, 40 tons per acre have been grown. This Potato keeps in good condition for 12 months, and is excellent for table use.

British Fern Catalogue.

ROBERT SIM will send, post free for six postage stamps, Part I. British Ferns and their varieties, 36 pages, including prices of Hardy Exotic Ferns, of his PRICED DESCRIPTIVE CATALOGUE OF BRITISH AND EXOTIC FERNS, No. 7. Foot's Clay Nursery, Sidcup Hill, Kent.

PRIVIA HUMILIS.—A very elegant Greenhouse Plant, of moderate size, for table decoration, producing racemes of scarlet berries. Free from Pests, and very ornamental. N.B. Superb strains of CALCEOLARIA, CINERARIA, and PRIMULA, 2s. 6d. per packet. B. BRÄCHER, Seed and Foreign Seed Warehouse, Halifax.

Russell's Pyramid Primula.

GEORGE CLARKE has this season secured a quantity of this very striking, in excellent condition, which he recommends, feeling assured that no other possesses such a robust character, with really splendid flowers. Mixed, Red and White, 2s. 6d. per pkt. Instructions for raising and growing sent if required. Nurseries: Streatham Place, Brighton Hill, London, S.W.; and Mottingham, Kent, S.E.

To the Trade.

CALCEOLARIES.—Aurea, Kayii, and Gem, fine autumn-struck plants, 6s. per 100. GERANIUMS (E. J. S. P.), strong plants from cuttings, 8s. per 100; Christine and Crystal Palace Gem, 10s. per 100. WM. GROVE, Tuppiner Nursery, Hereford.

Verbenas.—Verbenas: 6s. per 100; 50s. per 1000. WILLIAM BADMAN offers well rooted cuttings of VERBENAS—Purple, White, Scarlet, Crimson, Rose, &c., 6s. per 100, 50s. per 1000. EUCALYPTUS—best market sorts, from stores, 6s. per 100. GERANIUMS—Vesuvius, Lord Derby, Madame Lemoine, Wilhelm Pfitzer, 2s. 6d. per dozen, 25s. per 100; Crystal Palace Gem, finest yellow leaf, 2s. per dozen; 15s. per 100. Scarlet Geraniums, from store pots, 8s. per 100. Package included. Terms, cash. Cemetery Nursery, Ipswich.

New Catalogue.

MR. WILLIAM BULL begs to intimate that his CATALOGUE OF NEW PLANTS for 1871 is now ready. Establishment for New and Rare Plants, King's Road, Chelsea, London, S.W.

NEW FRESH SEEDS OF ANTHURIUM SCHERZIANUM—6d. and 1s. per packet. For other CHOICE SEEDS, vide MR. WILLIAM BULL'S SEED CATALOGUE. Every article priced. Establishment for New and Rare Plants, King's Road, Chelsea, London, S.W.

Prompt and Careful Execution of Seed Orders.

MESSRS. SUTTON execute all Orders in rotation, and as rapidly as is consistent with the care required. Several orders have been received from the Name Address of the Sender attached; it is, therefore, requested that any Customers who may not have promptly received the goods ordered, will communicate such information as may enable MESSRS. SUTTON to dispatch the same forthwith. Royal Berks Seed Establishment, Reading.

NOTICE TO ADVERTISERS.—FRIDAY, April 7, being GOOD FRIDAY, the "GARDENERS' CHRONICLE AND AGRICULTURAL GAZETTE" for that week will be published on THURSDAY, at 2 p.m. ADVERTISEMENTS for that WEEK must reach the Office on WEDNESDAY MORNING.

The Gardeners' Chronicle

SATURDAY, APRIL 1, 1871.

MEETINGS FOR THE ENSUING WEEK.

MONDAY, April 3	Entomological .. 7 P.M.
	Royal Horticultural (Fruit and Floral) .. 3 P.M.
WEDNESDAY, 5	Royal Horticultural (Fruit and Floral) .. 3 P.M.
	Ditto (Scientific Committee) .. 1 P.M.
THURSDAY, 6	Ditto (General Meeting) .. 3 P.M.
	Linnæan .. 8 P.M.

THE main points established by the discussion on the subject of GARDENERS' PERCENTAGES, so far as it has gone at present, we take to be that questionable practices, both on the part of some gardeners and of some nurserymen, do exist. To say thus much, is not to cast a slur on the whole body. There are plenty of honest gardeners, and many upright traders. It is clear these are not the class of men at whom our remarks are directed. In this, as in all similar instances, much harm is done to a good cause by indiscriminate censure, and in our own remarks we have studiously avoided sweeping assertions and exaggerated statements. So far as we are concerned, we protest against a bad system, but we leave details on one side, and we give our correspondents the opportunity of stating their own opinions.

Those who object to what has been said on this matter, have to choose between two alternatives, either to deny the existence of the practices in question, or, if they admit them, then to justify them if they can. In our thinking, evils of this kind, if allowed to pass without comment, or without at least an attempt to remedy them, must eventually bring discredit and disaster not only to those of easy conscience, but to the whole fraternity. We can imagine nothing more likely to check the pro-

gress horticulture and a love of gardening is now happily making, than a hidden canker like this; and it is for those who have the best interests of their calling at heart to denounce it.

Assuming the existence of the disease, we have to look for its causes, and then if possible to apply a remedy. On the part of the nurserymen, as with most other of the trading communities at the present day, the evil arises from an excessive desire "to do business." The desire to get on in the world is legitimate enough in all conscience, though as much cannot be said of some of the means said to be made use of for that purpose. It surely cannot be honest trading to endeavour to injure one's neighbour, and yet we learn that the offer of a bribe to the gardener in the form of increased discount by one nurseryman or his traveller, in order to take away the trade of another nurseryman, is not an altogether unheard-of proceeding.

That there should be a good feeling between gardeners and nurserymen is a right and proper thing. Each has in his power to render the other service; and, so long as this good understanding does not directly or indirectly injure the employer's or purchaser's interest, nothing can be said against it. But it is easy to see how this good understanding may, in certain cases, degenerate into something worse, if the gardener forgets that it is his master's interests he has to serve, and not those of the nurseryman; and it is easy to see how those who stoop to dishonourable practices of this character are likely in the long run to foster a disgust rather than a love of horticulture, and in this way to injure their trade, or at least drive purchasers to markets which are cheaper before less heavily taxed.

On the part of the gardeners, we believe the evil arises from several causes—imperfect education and training, to begin with, and then the circumstance that there is no sufficient organisation among them, no means of excluding from the honoured name of gardener those who, from defective education and lax conscience, have really no good title to call themselves gardeners in the best sense of the term. There is unfortunately no means of drawing a line of demarcation between the gardener, properly so-called, and those whose only right to the title lies in the fact that they call themselves so. It is men of this stamp who bring discredit on the whole body; it is men of this class who, as it were, prey on the smaller nurserymen, and who, when making a purchase, demand almost as of right a discount, or something tantamount to it. It is hard to reach such men as this, but we believe if the gardeners of the country would combine they would at least be able to let the public feel that there were gardeners and gardeners! An organisation such as we are alluding to, would, if properly managed, be of incalculable advantage to the fraternity in raising its tone, protecting its interests, and securing the independence of its members. Of this more at another time.

Let us pass on to what we take to be another potent cause of the evils we have alluded to—deficient wages. This is a question that has often been raised in our columns, and we have never hesitated to assert that, considering the years of toil, the knowledge and skill demanded of them, the anxious cares that beset them, the foresight and judgment they require to exercise their calling aright, the general rate of wages for the better sort of gardeners is much too low. Employers should study their own interests in this matter, and if they sometimes complain that they are badly served, or that evil practices exist—that their gardeners make considerations from their tradesmen—they must remember that they have, to a large extent, the matter in their own hands, if, by a liberal remuneration, they afford no excuse or room for temptation. In this matter, again, it is the swarm of ill-qualified men who injure their own calling, and often bring discredit on the heads of those who do not in the least deserve it.

It is some 16 years since that a valued correspondent of the late Sir W. J. HOOKER gave him some seeds which had been brought by a Mexican traveller from the coast of the Pacific, and which had proved highly sensational, and a source of some amusement and speculation amongst the passengers on board the steamer, on the voyage to Southampton. These seeds and their peculiar motions were fully described at the time by Sir WILLIAM at p. 304, vol. vi., of the "Journal of Botany and Kew Garden Miscellany," from which we make the following extracts:—"The seeds are about the size of a small horse-bean. Their real nature will be best understood by saying that the

fruit to which they belong has an affinity to that of an Euphorbia or Spurge, and very much resembles the common Caper-spurge of our gardens, which, as is well known, is a three-lobed fruit or capsule, and separates, when ripe, into three portions, or three seeds, each surrounded by its hard shell. The shape of each of these shelly seeds is convex on the back, and nearly plane, having, however, a slightly projecting ridge or keel in the centre, on the front or inner side. If asked to guess the plant to which the seed belongs, I should say to some species of Colliguaya (perhaps Colliguaya odorifera, Hook.), a common shrub on the coast of Chili. When these seeds were placed on the convex back, they showed a tendency to stir. Sometimes the motion was confined (always in jerks) for some minutes. Sometimes one or other seed would remain quiet for a few seconds or minutes, or even for half an hour. While active, the movement was generally what sailors would call fore and aft, with little or no progression; now and then a very sudden jerk would bring a seed on one of its ends, and sometimes it toppled completely over, lying on its other plane side. In this position the motion is different, and the jerks, very short, and backward, at times so continuous in one direction, that the seed fairly works its way off the sheet of paper on which it has been placed, and finally off the table." After watching these movements for some time, it was suggested that possibly an insect within the shell might be the occasion of these movements; and, upon opening one, a fine white fat maggot was found. Extent of these seeds is at least sign of any aperture, or the least indication of the presence of an insect. Internally there is no portion of the seed or kernel left, but the cavity is entirely occupied by the maggot. "Its movements appear muscular, never in very rapid succession, and like what we see in the spring of a salmon or dolphin out of the water; and to every motion of this kind, of the insect within the shell, the seed or nut responds. It is not easy to account for the forward impulse in a continuous line when the seed lies on its flatter side; but it may be due to the movement of the insect, and the fact that the seed shell being for a time in one and the same direction, and in the form of the seed being longer than broad, and probably in some measure to the little ridge or keel, so that, being impelled to move it is in a continued line, like that of a boat, even when influenced by a side wind." At the time the account was written, of which the above are extracts, the name of the insect had not been determined, but Mr. L. O. WESTWOOD, who has since examined them, has given to the little creature the name of CARPACRA SALIATORIA. MR. WESTWOOD has recently received at the Museum some specimens of these seeds containing the living larva, and has been much interested and amused at their movements. They are much more active when placed near the fire. A few put in a small cardboard box, and placed on a mantelpiece, soon began a lively motion, making a clicking noise against the sides of the box, and creating some consternation and speculation amongst the occupants of the room to the cause of the peculiar and mysterious noise. Another remarkable thing connected with these seeds, is the manner in which the moth (a little larger than an ordinary clothes moth) makes its escape from the seed. A circular piece, about the size of a Radish-seed, is removed from one end, not eaten, but appearing as if actually punched out, inasmuch as the little lid, after being removed, is often found near the seed; and it is through this opening that the moth makes its exit.

The following memorial, relative to the PURCHASE OF POSTAGE STAMPS, has been forwarded to the POSTMASTER-GENERAL by the Committee of the Seed Trade:—"That your memorialists, whilst agreeing generally with the principle advanced by the POSTMASTER-GENERAL in the House of Commons on March 14 last, that the indiscriminate purchase of postage stamps by postmasters is open to objection, are yet of opinion that under certain restrictions such purchase would be a great boon to many tradesmen, and especially to seedsmen, who are in the constant habit of supplying small quantities of seeds through the post, and receiving the postage stamps in return for the same. Your memorialists therefore respectfully urge on your consideration the desirability of a provision being made, by means of which the proprietor of any respectable business, the president or secretary of any established society or institution, or the like, may be enabled to obtain from the POSTMASTER-GENERAL a permit, letter of authorisation, or some such instrument, on the presentation of which to the Postmaster of the head office of the District in which the applicant resides, the Postmaster shall be authorised to purchase for the person named in the instrument postage stamps to the value of not less than 4s."

The *Industrial Gazette* of Chemnitz, Saxony, says that, in the beginning of 1870, BEYER and EMMERLING, of Berlin, found that INDIGO might be prepared from isatin, artificially produced from cinnamonic acid. The drawback to this mode of preparation was the difficulty of obtaining the cinnamonic acid. Quite recently, however, EMMERLING and ENGLER have discovered that the same result may be accomplished by means of benzoic acid, which is quite easily obtained from the urine of horses. It is expected that by improving this method, the importation of indigo from

Oriental countries will be considerably diminished. A mixture of benzoate of lime with acetate of lime, if subjected to distillation, yields a compound which may be regarded as the alcohol of benzoic acid, in which the hydrogen of the water has been replaced by the radical methyl. If this body is treated with strong nitric acid a product containing hydrogen is obtained, in which one atom of hydrogen is replaced by one atom of hydrogenic acid. The chemical formula of this only differs from that of indigo blue in having a surplus of two atoms of hydrogen and two of oxygen. Now, by simply adding hydrogen, which is accomplished by heating the compound with a mixture of soda, lime, and zinc dust, water is formed, and indigo is obtained, although in very small quantity. BEYER is also the author of the artificial preparation of the principal pigment from madder, alizarin, which is now manufactured on a large scale in Germany.

— We have much pleasure in announcing that His Serene Highness the Prince of TECK has consented to preside at the 28th Anniversary Festival of the GARDENERS' ROYAL BENEVOLENT INSTITUTION, and that he has named Tuesday, June 20, for that purpose. We have every reason to believe that on this occasion there will be a very strong muster of the friends of the Institution.

— THE CANDLE-BERRY TREE (*Aleurites triloba*) is well known in the Moluccas and the Pacific Islands on account of its valuable oil-seeds, which are strung on sticks and used as candles; the oil is also expressed and used for culinary purposes, and has been imported in small quantities into this country. In China another species of *Aleurites* (*A. cordata*), known as the Tung-shu tree, yields such an abundance of oil that it is said to be one of the largest products of the province of Szechuen. In point of quality it is inferior to that of the Camellia, but it is very extensively used for lighting purposes. The natives call it tung oil.

— In the centre of the great conservatory of the Royal Horticultural Society there was on view during the past week a plant, or we should rather call it a TREE, for it is upwards of 20 feet high, of the old RHODODENDRON ARBOREUM, which is now covered with innumerable trusses of deep blood-red flowers, realising all that the late Dr. WALLICH ever wrote of the glorious effect produced on the northern slopes of the Himalaya, where vast tracts are entirely covered with them.

— It is very pleasant to observe the steady diffusion of a TASTE for FLOWERS among our town and suburban populations. Under the circumstances few things are better calculated to serve as antidotes to the ill effects of town life and town pursuits than local flower shows. The report of the East London Amateur Floricultural Society, whose meetings are held at Bow, is before us, and we observe that the Society held two successful exhibitions last year—one in the spring, the other in the summer. These shows were of three days' duration. One feature of this Society is worthy of notice.—Plants were given to the school children of the district to be grown by them and exhibited at the premier show. Several prizes were awarded, and the premier prize fell to the lot of a lad attending one of the district schools.

— We are pleased to find that our BELGIAN friends are taking active steps to compete at the FORTNIGHTLY MEETINGS of the ROYAL HORTICULTURAL SOCIETY. The arrangements for the purpose are under the direction of the Federation of the Horticultural Societies of Belgium.

— Mr. SORBY has contributed to the "Quarterly Journal of Science" a valuable paper on the chemical substances which produce in leaves the varying tints of AUTUMN. He divides them into five classes, distinguished variously by their solubility in water, alcohol, bisulphide of carbon, and by the particular ray which they give in the spectrum. During complete vitality and growth, leaves contain different kinds of chlorophyll and chrysochlorophyll, producing more or less bright green; during low vitality and change, erythrophyll and xanthophyll make their appearance, producing more or less green-brown, red-scarlet, or bright orange-brown; while during death and decomposition phaeophyll and humus (brown-black) usurp their places, and gradually cause a uniform dull brown colour.

— THE METEOROLOGY of the WEEK ending March 25 was chiefly remarkable for the warm and summer-like weather which was experienced on the last three days, together with the total absence of rain at most of the stations throughout the week. The MAXIMUM TEMPERATURES for the week ranged from 72° at Salford to 56° at Newcastle, with a mean for all stations of 66°·9. In Scotland the extremes were 63°·5 (at Paisley), and 57° (at Perth), with a mean for the several stations of 60°·4,—or 6°·5 below the mean of the southern country. The MINIMUM TEMPERATURES in England ranged from 29° at Hull to 38°·2 at Liverpool, with a mean for all stations of 33°·8; and in Scotland, from 32°·5 at Glasgow to 40° at Edinburgh, with a mean for the various stations of 36°·3, thus exceeding the mean for the southern country by 2°·5. The MEAN TEMPERATURES at the various stations in England show that the highest was at

Manchester, where the mean temperature of the week was 49°·6, and that the coldest was at Hull with 43°·7, the other two stations on the east coast—Newcastle and Norwich—being next in order with 45°·9 and 46° respectively. In Scotland, Edinburgh with 49° was the warmest station, and Dundee with 45°·5, the coldest. The mean of all stations in England was 47°·3, and of the different stations in Scotland was 46°·7, thus the southern country was slightly warmer than the northern. RAINFALL.—Very little rain fell at any station throughout the two countries, 0·45 inch, which was recorded at Salford, and 0·31 inch at Manchester, being the largest in England, and 0·15 inch at Greenock the largest in Scotland. The means for the two countries were 0·07 inch and 0·05 inch respectively. (See Mr. GLAISHER'S Tables in our present issue.)

— In the *American Gardener's Monthly* we find that the possibility of a POTATO growing from the CENTRE of ANOTHER is disputed, and an explanation is given of an apparent case of the kind, wherein the shoot of one Potato had penetrated another, and thus produced the appearance in question. In our columns, however (1870, p. 103), was figured an instance of the kind alluded to, where the new shoots actually originated within the old tuber from the pith. The formation of buds from the pith, though quite an exceptional occurrence, does occasionally occur.

— THE PATENT SEMINATOR AND SULPHURATOR, represented in the annexed cut (fig. 80), invented by M. DRECHSLER (whose fumigator we noticed some time ago), is a very handy contrivance for various purposes in the garden. It consists of a tin canister, made in various sizes, with a movable top, which by twisting can be opened and closed at pleasure, or set open to any extent. On the top of this fits a cap pierced with holes forming a sieve, and sieves of two or three degrees of fineness may be had with each canister. As a seed-sower for the larger seeds it may be used without the sieves, the top being set so as to leave a convenient aperture for the passage of the seeds; for smaller seeds the sieve-cap used in addition will prevent the seeds from passing out too freely. Opened partially or to the full extent of about half the diameter, and pro-

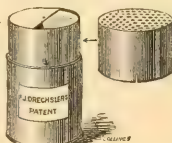


FIG. 80.—DRECHSLER'S SEMINATOR AND SULPHURATOR.

vided with the cap, it becomes a dredge, and may be used with facility for the distribution of sulphur, of snuff, of tobacco powder, &c. The inventor describes it as "a canister with safety stopper, regulator and sieves; an improvement for spreading sulphur and tobacco-powder on plants; for sowing fine flower and vegetable seeds with greater regularity and speed, in rows, patches, or broadcast; for closing up, carrying, and transvassing various dry materials with increased facility; for sifting seeds and preserving them from wet, dirt, and mice; and for storing and keeping them safe and in good order on shelves, with labels better exposed to view, &c." It is, in fact, a very simple and very useful little implement, for the above-named or any similar purposes.

— The musical arrangements for the opening of the INTERNATIONAL EXHIBITION, on May 1, are nearly completed, and new compositions, representative of France, Italy, Germany, and England, respectively, will be produced for the occasion, by M. GOUNOD, Chevalier PINSUTI, Dr. FERDINAND HILLER, and Mr. ARTHUR SULLIVAN. M. GOUNOD will produce a psalm, CHEVALIER PINSUTI a chorale to English words, Dr. HILLER a march, and Mr. ARTHUR SULLIVAN a cantata.

PORTRAITS OF GARDEN PLANTS.

ABIES (TSUGA) ROEHLII, *Rev. Hort.* 1870, 217, fig. 40. A hardy evergreen Coniferous tree, allied to Abies Hookeriana, and described as growing 50–60 feet high, and furnished with numerous drooping branches, which are clothed with thick, short, somewhat curved, crowded leaves, resembling those of *Pinus Banksiana*. The cones are oblong, and about 2 inches in length. At a distance the tree is said to resemble the Deodar Cedar. It was described last year, as having been introduced from Mexico to the French gardens.

AGAVE FILAMENTOSA, *Revue Bot.* 164.

An elegant greenhouse succulent. The leaves, which form a dense rosette, are linear-ensiform, 16–18 inches long, flat above and rounded behind, dilated at the base, and bearing a few colourless fibres on the edge. The scape is 10–12 feet high, the upper half floriferous; the flowers green, tinted with purple on the lobes, and having orange-yellow stamens. It is supposed to be a native of Mexico, and has been flowered in the fine collection of W. Wilson Saunders, Esq.

AGAVE HETERACANTHA, *Gartenflora*, t. 639.

A greenhouse succulent, stemless, with lanceolate green leaves, having broad, marginal, hoary, variously-directed, straight or hooked teeth, and a terminal subulate spine. The scape is erect, 6–7 feet high, and bears a dense spike of olive-green flowers. It is a native of Mexico.

BILBERGIA NUTANS, *Gartenflora*, t. 617.

A Bromeliaceae species perennial, furnished with numerous long, narrow, ensiform leaves, which are remotely spiny; and bearing slender nodding scapes, with a few large yucca bracts, and terminating in a short drooping spike of flowers, of which the sepals are rose, and the petals yellowish-green, both with a blue margin. Its native country is unknown.

DENDROBIUM JAMESIANUM, *Flor. and Pomol.* 1869, 187, with fig.

This handsome stove epiphyte is in the way of *D. infundibulum*, having similar hairy stems, and large white flowers; the sepals are lanceolate-triangular, the petals broad oblong-ovate, and the lip cuneate trifold, cinnabared in front, the side lobes being covered with white asperities. It was introduced from Barmah by the Messrs. Veitch & Sons, and is dedicated to the late Mr. James Veitch.

OPHYRS SPECULUM, *Bot. Mag.* t. 5844.

This pretty terrestrial hardy Orchid, from the South of Europe, has linear-oblong leaves, and a flowering stem 4 to 12 inches high, supporting several greenish flowers, the lip of which is white, spotted with orange, having the disc of a steel-blue edged with gold, and the whole broadly margined with maroon-purple. The figure was made from plants which flowered in the garden of the Comte de Paris.

ORCHIS LATIFOLIA LAGOTIS, *Floral Mag.* t. 447.

A showy, hardy, terrestrial Orchid, introduced from the Alps of Piedmont, by Messrs. Backhouse & Son. It has oblong, elliptic spatulate leaves, and an erect flower stem, terminating in a spike of pretty purple flowers, the lip of which is marked with concentric bands of deep crimson-purple.

PSYCHOTRIA CYANOCOCCEA, *Floral Mag.* t. 479.

A free-growing, suffrutescent hothouse plant, of the Cinchonaceous order, furnished with elliptic leaves, which are slightly undulated at the margin, and producing insignificant flowers, which, however, are succeeded by dense clusters of ultramarine blue berries, which, according to Dr. Seemann, render the plant very ornamental in the winter season. It was collected in Nicaragua by Dr. Seemann, and was sent by him to Mr. Bull.

STAPHYLEA COLCHICA, *Rev. Hort.* 1870, 257, fig. 44.

This is said to be a hardy, vigorous-growing, deciduous shrub, furnished with opposite imparipinnate leaves, of about five (rarely three) oval shining dentate leaflets, and producing its white flowers in terminal panicles of an ornamental character, so profusely as to become a useful pot plant for market purposes. It belongs to the Staphyleaceae, and is a native of the north of Europe. Our knowledge of it is derived from the French gardens.

STRUTHIOPTERIS ORIENTALIS, *Hook. Second Cent. of Ferns*, t. 4.

This is a remarkably fine, bold habited, hardy, deciduous Fern, and like the other species of *Struthiopteris*, bears two kinds of fronds, the fertile ones are large, in outline, pinnate-pinnatifid, a foot broad, and of a pale green colour; while the fertile ones are stout, oblong, erect, and pinnate, with thick glossy dark brown leathery pinnae. It comes from the Himalayas and from Japan, and was imported from the latter country by Messrs. Steudler & Co.

XANTHOCERAS SOBIBIFOLIA, *Flora de Serres*, t. 1899.

"This beautiful hardy deciduous plant, of the Sapindaceae order, grows into a shrub or tree of moderate size, furnished with grey bark, clothed with imparipinnate leaves, having lanceolate sharply serrated leaflets, producing, along with the young leaves, terminal racemes of largish regular 5-petaled white flowers, having at the base of the petals a stain which passes from yellow to reddish brown, and then to violet-purple." It has been introduced to the Jardin du Muséum at Paris, from China and Mongolia.

YUCCA PATENS, *L'illust. Hort.* ser. 3, l. 121, with fig.

This is a free-growing and elegant hardy form of Adam's Needle, of vigorous semi-arborescent habit, the cylindrical stem clothed with distant rigid narrow lanceolate leaves, which diminish towards the base, and are much attenuated at the tips, the horns are sharp-pointed at the summit, and are of a glaucous hue, marked by more pronounced glaucous lines on the upper surface, the margin being of a light brown and the point of a purplish brown. It has been observed in the French gardens, and is said to have come from China.

HYBRID PLANTS.

I WISH to call the attention of our horticultural friends, and especially those interested in the growth of a really scientific feeling in the Royal Horticultural Society, to a set of premiums offered for hybrid plants under a certain general condition or proviso—namely, that the plants exhibited shall be shown in a sketch calculated to illustrate the phenomena of hybridism and cross-breeding.

As it was obviously impossible to collect and produce on one given day anything approaching to a really high-class exhibition, it was thought that a special and continuous series of exhibitions through a whole season would give the necessary facilities.

In any gardening establishment, large or small, professional or private, the sowing, rearing, and flowering of seedlings, whether cross-bred or not, is a distinct

pursuit, independent, as it were, of times and seasons. The subjects come into flower at all sorts of odd times, and have to be hunted for in odd corners. Some showy and valuable, some uncommonly though interesting—fruits, flowers, weeds; branch and spray from the forest or shrubbery—these cannot be shown as you would show Geraniums or Azaleas, where the proper period of perfection for exhibition can be timed to a minute.

A larger number of premiums than usual is also resorted to in order to take in the productions of those humble aspirants who, having more brains than means and appliances, or not having taken up one special line of work alone, may yet bring forward small but important collections.

The practice of crossing plants for amusement, curiosity, or commercial purposes, has now become so common that no gardener with any pretension to skill in his profession would own to ignorance of it as part of his craft; but the number of scientific observers in this direction has been, and the conclusions arrived at, fewer; even where these hang a shadow of doubt and uncertainty. We want facts—facts accompanied by real evidence; the hybrid plant, with its existence as such rendered evident to our sight by the presence of its parents at the same time, is such a fact. There it stands, assured to our senses, a living syllogism. And so, if possible, we wish to have all subjects shown in company with the two parents thereof.

That may be considered the main point. Of course, it will not always be possible to exhibit all three plants growing in so many pots. In such cases, one or even both parents may be shown as cut specimens. Nay, there are cases imaginable where neither parents nor offspring could be shown growing. Imagine, for instance, a small Oak tree with its two parents, venerable specimens of *Quercus Cerris* and *pedunculata*!

I will read presently a short list of imaginary subjects to explain what I mean by the following instructions to judges. Marks will be given in consideration of—

- Great botanical interest.
- Great horticultural interest.
- Great horticultural merit.
- New and hitherto unattempted crosses.
- Difficult crosses.

Memoranda in writing to accompany objects exhibited will carry much weight, especially if well written, and evincing careful observation.

The above remarks were read by me at the meeting of the Royal Horticultural Society on March 1, when I observed that it would be necessary to consult with one or two competent authorities upon certain knotty points before publishing in full the conditions under which we desired the exhibition to be carried on.

Our original intention was that the exhibition should be a free and unrestricted one, admitting alike old and new plants, whether raised by the exhibitor or not, and, moreover, those raised by himself, or by his friends, however, whom I consulted—viz., our two superintendents and several men of high standing in the profession, urged the exclusion of plants shown previously, and of such as were not raised by the exhibitor. These principles, if strictly carried out, would, I think, narrow prejudicially a wide field, and exclude a multitude of interesting objects. The following modifying rule will, I believe, meet the case, which is especially one of some difficulty:—No plant to be exhibited without the consent of the raiser. This will obviate any clashing of interests, as in the case of one man exhibiting and profiting by the valuable productions of another.

It must be remembered that the premium is for a purely scientific object, less regard being had, upon the whole, to the intrinsic value of the objects than to their bearing upon a certain definite subject—that of hybridising and cross-breeding. It is to be hoped that it will be met in a like spirit, and will be looked upon and forwarded as an attempt in aid of the true interests of both the science and art of horticulture.

I conclude by expressing a hope that this may be the forerunner of a series of premiums to be held in future years for special scientific objects, and that the Fellows in general, both private and professional, will come to the aid of their Council in raising their Society to the position it once occupied, and might hold again, as the fountain of horticultural science.

The following imaginary, or rather suggestive, list was drawn up with the view of explaining some of the foregoing remarks as to the nature of the objects to be exhibited:—

Objects of Botanical Interest.

- | | |
|---|---|
| <i>Ixia</i> , <i>Sparaxis</i> , and <i>Tritonia</i> | <i>Tigridia</i> with <i>Phalœallis</i> . |
| crossed with each other. | <i>Corbularia</i> with <i>Narcissus</i> . |
| <i>Primrose</i> with <i>Convallaria</i> . | <i>Convallaria</i> with <i>Calystegia</i> . |
| <i>Eisenia</i> with <i>Ismea</i> . | <i>Ipomœa</i> , and <i>Pharbitis</i> , |
| <i>Chelone</i> with <i>Pentstemon</i> . | with each other. |
| <i>Meconopsis</i> with <i>Papaver</i> . | |

All these crosses if effected would assist botanical science by the determination of affinities.

Objects of Floricultural Interest.

Tulipa sylvestris, *oculus-solis*, *suaueolens* (Van Thol), and the early *Tulips*, crossed with each other, and with the best late-flowering sorts.

Primrose and *Polyanthus* inter-crossed to produce new forms capable of after improvement by the florist.

Anemone coronaria with *sylvestris*, *apennina*, and various others.

The garden *Hyacinth* systematically cross-bred.

The Tea-scented *Rose* crossed with the *Yellow Briar* race, also its yellow forms with *Rosa alba*, to produce fragrant white and yellow *Perpetuals*.

Religionium scutellum with *Cleome*, to verify or disprove the capability of union between the *Scarlet Geranium* and the *Ivy-leaf*.

Carnation and *Picotee*.

Tom Thumb, or other plain-leaved *Geranium*, crossed with *Mrs. Pollock*, *Golden Chain*, and *Alma*. *Baron Hugel*, or other dark-leaved sort, with the same three descriptions of variegation.

Aquilegia glandulosa with other *Columbines*.

British wild flowers, as *Veronica*, *Ranunculus*, *Lonicera*, *Digitalis*, *Gentiana*, crossed with allied exotic species.

Common *Sloe* with *Green Gage*.

Cherry Plum with the *Green Gage*.

Bramble with the *Raspberry*.

Crosses amongst the *Brassicas*, *Onions*, *Carrots*, and *Radishes*.

Black Currant and *Scarlet Ribes*.

Difficult and hitherto unattempted Hybrid Unions.

Common *Maize* with variegated *Japanæ*.

Common *Pine-apple* with variegated *Pine-apple*.

Composite plants, as *Aster*, *Dahlia*, and *Chrysanthemum*.

Native Iris, *foetida* and *Pseudacorus*, with the handsome garden sorts.

Salvia patens, with fulgens and splendens.

Mimulus cardinalis and the *Musk plant*.

Objects of great beauty and value will be readily produced from amongst the crowd of gorgeous new plants at our large establishments. Fruit and vegetable crosses are particularly desirable.

The above list must be, of course, considered as suggestive only and explanatory, showing what may, and probably can, be done in future seasons. To produce the crosses enumerated would be the work of from one to several years, but who knows but one or other may even turn up this very season? *R. Trevor Clarke*.

THE VENTILATION OF HORTICULTURAL BUILDINGS, &c.

HORTICULTURAL buildings for the growth and accommodation of the useful and beautiful in the vegetable kingdom have now become almost a necessary accompaniment of advancing civilisation in all temperate climates. Who will say it is not a rare achievement, a fine art, a commercial success, that has arisen out of this desire to collect about us in these northern climes the diadems of *Flora*, or set upon our tables the fruits or culinary delicacies of mid-summer in mid-winter? And yet how few there are who consider the sleepless nights, the toiling days—ay, the valuable lives, that have sometimes been devoted to the achievement of these practical results.

The botanical collector ventures among savage or hostile tribes, or trusts himself to the mercies of uninhabited wilds, where he may be obliged to eke out a miserable existence on that which never before entered into his bill of fare; and after hoping against hope, he may be obliged to give himself up in despair to a lonely, miserable death. Truly one life so lost in the pursuit of botanical riches should warrant a cherishing and tending with the fondest care the beautiful or useful products of the collector's industry. It is only those who are initiated, however, who can be expected to surround plants with such associations, or who regard them as monuments to the energy of their indefatigable collector. The practical everyday world value plants for their sterling and intrinsic merits. It is for the man of science, and the practical horticulturist to devise means to carry out cultivation and proper accommodation of these strangers to our land—delicate tender strangers, maybe, requiring all the combined resources of the gardener and horticultural builder before the necessary artificial climate can well be produced.

The production of artificial climates has, it is true, been rendered wondrously perfect by means of glass and hot water, but one of the great desiderata, however, has long been a perfect and safe means of winter ventilation. Every gardener is well aware of the great care he must needs exercise in giving air to his forcing-houses or stoves in winter, how he must watch the intermittent cloud and sunshine, in a manner that seems very strange to one who has seen the very plants calling forth this care growing in their native homes, in all the beautiful mazes of their wild luxuriance. No wonder that he, upon reflection, sighs for the conditions under which he once saw his cherished charge luxuriate; no wonder that scientific botanists, skilled horticulturists, and all lovers of plants indeed, feel a desire to imitate to the best of their knowledge and ability these natural conditions. Many schemes have been attempted (many of them with a very great measure of success), which were intended to modify the risk of giving air in mid-winter, but probably the very greatest measure of success has been attained by Mr. Ormson, of the King's Road, Chelsea. This gentleman has introduced a hot-water pipe, which is used in the ordinary way for heating purposes, with the following very important improvement, viz., that the pipe being double jacketed

or in the form of a hollow cylinder, the external air (admitted at the front ventilators) is obliged to travel through the inside of the double jacketed hot-water pipes, and thus becomes heated before it circulates among the plants. Such an improvement as this cannot well be over-estimated, and every other ventilating provision in Mr. Ormson's model house is all of a piece with his primary improvement. Some few years ago I should have been very thankful for such an arrangement as this, and I doubt not there are many other horticulturists who will hail such an improvement with great thankfulness. I may add that a visit to the King's Road will not be thrown away, for, besides Mr. Ormson's model house, there is in the immediate neighbourhood the nurseries of the Messrs. Veitch, Mr. Bull, and Mr. Wimsiet, all of which will repay a visit at this season. *James McPherson*.

THE AMATEUR GARDENER.

Protection of Wall Fruit Trees.—The opinions of gardeners greatly vary, both as to the desirableness of affording any artificial shelter to the blossoms and young fruit of wall trees, and the best method of doing the work if its expediency is admitted. Probably the system of letting the trees alone is only advocated by those, who possess a large number of them, and are sure to have fruit enough, whatever mischances there may be with some of their stock, but he can hardly be adopted by those who have only two or three *Peaches*, *Nectarines*, and *Apricots* to work upon. The maxim of "letting wall alone" in reference to wall trees has never found favour with ourselves since the spring of 1862, when a hailstorm at the end of April cut off a fine crop of *Apricots* as neatly and entirely as if a scythe had been applied to its surface. In that case had a net, however slight, been on the tree, the whole crop would have been preserved, and a most lamentable *disappointment* to gardener and housewife have been avoided.

But frosts and cutting winds are constant companions of the spring, whilst hail is a far less certain visitor, and when it comes may advance in a different direction to the situation of our trees; and differences of aspect and other circumstances must lead to the decision as to which trees should be protected and which left alone. Contrary to the *old* and *new* English proverb, the early spring showers are in more danger from frost in the spring than those with a north or western aspect; for gardeners should never forget that the injury from frost is often averted if the thaw takes place in the shade, while bright sunbeams in similar circumstances are sure to be fatal. And if trees, in any aspect, are well protected from side blasts, as trees on a south wall from an east wind, they will be comparatively secure. Trees, too, against a dwelling-house will be safer than those on an isolated wall, because the radiation of warmth in the former position is considerable.

We decidedly recommend that protection should be the rule, with exceptions founded on the above considerations, and then the question comes as to the best defensive material. We have seen Russian mats and calico laboriously let down at night over walls, and rolled up again in the morning, and even left on all day in unpropitious weather; but we think that these materials, besides entailing a good deal of work, shut out air and light more than is good for the advancing blossoms. In 14 years we have had nothing but *Haythorne's* (of Nottingham) hexagonal net, the coarser kinds, and have found it answer every desirable purpose. It affords so little obstruction to air and light, that when put on it does not need to be removed till the end of April, or even later, and if put away carefully, it will last a dozen years or more in effective working condition. It can be had of any length and depth, and when a long wall is carefully covered with it, it has a neat and pleasing appearance, apart from the comfortable idea conveyed to the gardener that, whatever weather may come, he has placed his fruit-buds in comparative safety.

To make the most of the Nottingham netting, it should be bound round with coarse wide tape, and have loops made of tape to hang it on the walls. It is a careless plan to run a cord round the wall, and then a fastening may be wanted, as it tears and breaks the meshes, and leads to larger rents in time. The net should not be so wide as to hang on the ground, as, if it does, it will soon become rotten. This netting is also very useful for guarding seed-plots from birds, and for protecting fruit when ripe. Those who cultivate small pyramidal *Cherry* trees will find it invaluable for guarding their treasure from the rapacity of the feathered thieves. *H. B.*

THE SPECIALITIES OF PLANT GROWERS.

THOSE who regularly attend the public sales of plants must often be astonished at the large amounts given for them, more especially for *Orchids*, and the question must often be asked—Are these plants worth the money? If we go to Mr. J. Stuart Mill he will answer No; it is, therefore, evident that lovers of plants are not much moved by such matter-of-fact men as he, and consequently we are obliged to acknowledge, in spite of Adam Smith and his followers, that



FIG. 81.—EXTERIOR VIEW OF THE ROYAL ALBERT HALL, FROM THE NORTH-EAST.



FIG. 82.—THE ROYAL ALBERT HALL, AND PORTION OF THE INTERNATIONAL EXHIBITION BUILDINGS, AS SEEN FROM THE ROYAL HORTICULTURAL SOCIETY'S GARDEN.

centre curb was very slight, only 5-16ths of an inch. Provision for seating between 8000 and 10,000 people is made in the building, and the means of ingress and egress are ample. We must refer to the ordinary journals for full details concerning this remarkable building, which reflects infinite credit on the science and patient skill of Lieut.-Colonel Scott, the architect, the secretary to the Royal Horticultural Society. The general plan, indeed, was sketched out by the late Captain Fowke, and submitted to the Prince Consort for his approval, but the carrying out of the project, and the general architectural superintendence, even to minute details ordinarily entrusted to subordinates, has devolved on Col. Scott. The building may, we well be termed "Scott's Triumph." To what uses will this vast structure be put? is a question often asked. A more pertinent one we imagine would be, to what uses will it not be put? The central hall is fitted for musical festivals or ceremonies, or exhibitions of the grandest character; the gallery at the top is intended for pictures; other portions of the building will be at once utilised for purposes of the International exhibitions. There remain a number of rooms adapted for libraries, museums, libraries, committee rooms, or the like. In fact the whole structure might not inaptly be compared with a central lake, surrounded by a town of streets, corridors, and houses! It will not be difficult in London to find uses for such a building.

Home Correspondence.

Shading Camellias.—I thank "A." for the information so kindly conveyed in his reply to my remarks on this subject, and I must ask him to excuse me, if I confess myself unconvinced by his remarks that shading should so much be relied on by cultivators to keep these plants in health. I still think Camellias may be kept in perfect health under good glass without shading. I have also seen fine plants—plants in which a man or two could hide themselves; yet these plants were under glass, and in full sunshine, and, without shading, were in perfect health. Camellia plants grown in the shade have a very passable appearance, even if not in good health, but if tested with sun exposure, would show themselves deficient, even if gradually treated with. In the shade they are at least less trouble; but the question is—Do they flower better, or live the longer? An instance of the longevity of the Camellia exists in the grounds of Tregehan, near St. Austell. This tree—for it had grown out of a bush long before I saw it—must be at this time, I should say, from 20 to 30 feet high. This plant was originally in a greenhouse; the old house was taken away, leaving the plant exposed. When I saw it, it bid fair to witness, as it had done, the coming and going of many generations. *H. M.*

The Boat Race.—As a supporter of Cambridge, my "button-hole" on the day of the race will be made up as follows:—*Muscari botryoides pallida*, a lovely shade of Cambridge blue; single blue *Hepatica* and *Anemone apennina*, surrounded with two or three leaves of the large Russian Violet. The Grape Hyacinth gives the nearest approach, of any flower I know of, to the *Light Blue*.

New Potatoes at Christmas.—Nothing new under the sun, Mr. Davidson. New Potatoes (as they are called) are produced in most large establishments, and dug from November until the supply of new spring Potatoes come to hand. Various methods are employed in their production. Mine is to plant in August, and as soon as the tops die down the ground is covered with a thick layer of good stable manure or leaves, and the tubers are dug up as required. There used to be a very favourite variety, called the Dutch, that was used many years since by my father when at Wildernesse Park, which I consider the very best kind for the purpose I ever met with, but which is now entirely lost sight of, I fear, for I have tried in vain for years to procure it. Mr. Chapman, formerly a market gardener, living at Vauxhall, used to produce large quantities of these so-called new Potatoes for the London markets. *Edw. Bennett, Exeter.*

Your correspondent, Mr. Wear Davidson (p. 381), mentions having partaken of new Potatoes at Christmas. Permit me to say that 20 years ago, when gardener to Y. Warborough, Esq., Sowerby, we always had new Potatoes from Christmas to March, grown from old tubers kept over from the previous planting. More recently I have grown them here in various ways, on good land in, and we had our first dish this winter on December 19. The supply from this time has been three dishes a week, and these out of 16-sized pots. At the present time, March 26, we have them in pits and supply them daily. *R. G., Stamford.*

Doronicum caucasicum.—In one of the newly-formed herbaceous borders at Chiswick—on the south side of the large vineery—Mr. Barron has a capital clump of this plant, that is now a mass of golden-yellow flowers. It deserves attention, because of its great value as a spring blooming plant for the decoration of the flower garden, being low in growth, thoroughly hardy, and early flowering. At Belvoir it is largely used by Mr. W. Ingram in the composition of some of those univalued beds for which it is so

famous; but is rarely met with elsewhere. It is propagated by root division, and a somewhat light soil, with a fair drainage beneath, appears to suit it best. *R. D.*

Flowers for Ladies' Hair.—*Phalenopsis* blooms are certainly very beautiful for this purpose, and they may be neatly mounted on thin copper wire, which has the advantage of being more easily bent and fixed than the common hair-pins. Unfortunately the flowers are apt to shrivel on frosty nights. Second only to these Indian moths are the flowers of *Eucharis amaranica*; indeed, some ladies prefer them as being equal, or even superior in point of beauty, and at the same time more substantial. *Colognea cristata* is very beautiful, but unfortunately its odour is far from agreeable. The flowers of *Angraecum sesquipedale* look remarkably well in dark hair, if tastefully arranged. *F. W. B.*

Budding the Vine.—In the years 1869, 1870, a good deal of discussion took place in your paper, and much interest was excited, with respect to the method of budding the Vine practised by Mr. Stevens, of Tretham; and the absence of the beneficial knowledge of what the method really was, doubt many failures have occurred in the numerous attempts made to practise it. Having followed the very distinct and authentic directions published in *The Field*, in February, 1870, I inserted last September upwards of a dozen buds, and I have the satisfaction of being able to say that almost all of them are not only growing, but "bearing fruit as freely as the natural buds," thus confirming the statement made by Mr. Stevens, and proving the value of his method. Among the buds inserted were several of the Golden Chardon, which are growing strongly; but I believe I am not alone in finding this to be a singularly barren variety. It will afford me pleasure to show the extent of my success (such as it is) to any one who will favour me with a call. *John Cock, Gr. to G. Cundell, Esq., Clarence Road, Clapham Park.*

The Cuckoo.—It may interest many of your readers to learn that both the wrynckel and the cuckoo have already been heard in Berkshire, on the Highclere Estate, the seat of the Earl of Carnarvon, as well as on the adjacent property of F. G. Saunders, Esq., Ivy House. The wrynckel was first heard on Wednesday, March 22, the latter early on the Sunday and Monday following. This is not (as may be supposed) a taken fancy. The weather at the time was delightfully warm, and the cuckoo, at repeated intervals, gave forth his soft inimitable notes to perfection, and which were attentively listened to by many persons, agreeably surprised at having been so soon called upon to welcome this harbinger of summer. *J. E.*

A Pretty Spring Bed.—Here it is, as fresh and beautiful as the opening spring itself:—A carpet of *Sedum acre* aureum, from the midst of which rises *Bulbocodium vernum*, mingled with *Crocus aureus*, and here and there the clear blue lily of the charming *Scilla sibirica*. This bed, a real taking feature in my bijou spring garden, has arrested the attention, and called forth the admiration, of many a passer-by. *R. D.*

The Sidney Seed Sower.—This little implement (alluded to at p. 376) is by no means to be despised, for although simple in construction, and novel in appearance, it will supply a want long felt by gardeners. I consider its use to effect a great saving of time, owing to the facility with which the seed is put into the ground, and with much more regularity than the most accustomed hands can scatter them, either in drills, broadcast, or otherwise. The slight modification it has undergone from the original will, I have no doubt, add to its usefulness, as some of the larger seeds block the passage, which occasions a gap in the drill, if the operator is not on the alert to shake the sower to remove the stoppage. *E. Morgan, Harrow-on-the-Hill.* [See also note on Drechler's Seminator, at p. 412. *Eds.*]

Hardy Clematis.—The past winter, very severe indeed for a time, thoroughly tested the perfect hardiness of Jackman's Clematises, supposing any one entertained a doubt on this point. I should think them capable of standing without injury the severest winter that has fallen on this country, unexampled it may be. Clematis lanuginosa, on a south wall without any covering, was cut down nearly to the roots; and *C. azurea grandiflora*, on a fence with an east aspect, and very exposed, suffered in the same way; while *C. Standishii*, by its side, was not in the least injured, and is showing bud fast. I can heartily commend this as a thoroughly good early flowering kind. C. Jackmanii, on a south wall, has already made a wonderful growth; the flowers are fully 3 feet long. A plant of this fine variety, if suffered to establish itself for three or four years, and liberally treated to manure during the winter, soon covers a great space, and for real effectiveness is perhaps unsurpassed. *R. D.*

Weather Forecasts.—I have been for about 30 years a close observer of atmospheric currents and the effects produced thereby on the weather of this country. I have thus been enabled to predict the kind of summers we have had for many years with great accuracy. If you think these ideas worth a space in your valuable periodical, I beg to offer them to you. As to the correctness of the theory I give below, I have been confirmed in its belief by information received from

many intelligent seafaring men. I have noticed that in whichever direction the upper atmospheric currents are on or about the vernal equinox, say from March 18 to 22, so they follow with more or less regularity the following six months, and also on or about the autumnal equinox with a similar effect on the following winter. It may interest and amuse some of your readers to watch the effects thus produced. Air currents blow five-sixths of the year from the south-west or the north-east. It is also an undisputed fact that whilst the north-east is most rigorous in winter, it produces soft, warm weather in summer; and also that the south-west, although it gives us the softest winters, yet when prevalence in summer it brings cold rain, and snow, and wretched weather. The reason for these effects I believe arises from the fact that the arctic region, from which the north-east wind comes, are in summer bathed in almost perpetual sunshine, but not of sufficient power to produce great evaporation, hence it gives us an unclouded sky; the sun's rays being thus undimmed by moisture, fall with all their power on the earth's surface, and thus gladden and warm us. From the south-west, if the upper current comes from the tropics, we know that it must of necessity bring with it an immense amount of vapour. Over the mist belt of the equator the evaporation is so enormous, as to cause the water of the ocean to be raised there than the other parts of the globe; this arises from the fact that the ascending mist contains no salt. This is Nature's great waterworks, and by which she supplies the other parts of the earth with the necessary rainfall. This vapour goes up 3 or 4 miles high, becoming, of course, sublimated. The clouds, as it were, but, when they are brought by the south-west current into these latitudes, the loss of temperature, of course, causes them to descend, and seeing that this descent comes from far above the line of perpetual snow, it brings cold, rain, frost, and snow, and also by obscuring the sun's rays, prevents their reaching the surface and warming it. From the foregoing remarks, and if the theory is correct, it follows that we shall have a summer very similar to the two preceding ones, which will most probably be exactly the same weather as the present season. *Richard Waygood.* [We fear that meteorological science is not yet sufficiently advanced to furnish trustworthy forecasts. *Eds.*]

Shading.—One of your correspondents asked some time ago about shading a greenhouse, and wished for something less glaring than the whitewash system. Probably the wisest plan would be to get a good one, namely, to mix a little green in the whitewash, this naturally softens the tone; if, however, he does not want anything so opaque as that, I would strongly recommend a shading which I have lately used,—Collinge's, of Peel Street, Manchester; it is excessively neat, almost like open crocket work, but yet sufficiently small in the mesh to give a very nice shade. It could be nailed up in the spring, and might remain all the summer without any further trouble. I have not used it, I should think, but very useful for the protection of Strawberries, and I hope to use it for the covering of my *Ranunculus* beds when in bloom. *D., Deal.*

The Climates where Orchids are Found.—I was very glad to see, by the note at the end of my last letter, that there was a big tree in the Singapore Islands, which with the conditions under which *Ondotoglossa* grow in their native clime, meantime I may as well send you what information I have found bearing upon this subject, even though it is sometimes only by induction. I am, as you are aware, only half satisfied that they come from an altitude of 8000 feet, and have, therefore, sought for the effects the same altitude has in other countries. I will begin with Mr. Wallace's account of his ascent of Pangerang Mountain in the island of Java; this description commences at p. 179, in the first volume of his "Malay Archipelago," but I will pass on to p. 182:—

"On ascending the mountain, we first met with temperate forms of herbaceous plants, so low as 3000 feet, where the Strawberries and Violets begin to grow, but the former are tasteless and the latter have very small and pale flowers. It is between 3000 and 5000 feet that the most abundant and rarest exhibit the most development of tropical luxuriance and beauty. The abundance of the noble Tree Ferns, sometimes 50 feet high, contributes greatly to the general effect, since of all the forms of arborescent vegetation they are certainly the most striking and beautiful. Some of the deep ravines, which have been cleared of their large timber, are full of these from top to bottom. Filling up the spaces between the trees and larger plants are hosts of *Oreohedra*, Ferns, and *Lyco-podiums*, which wave, and hang, and intertwine in perpendicular complexity. At about 5000 feet I first saw *Horsetails* (*Equisetum*); at 6000 feet, Raspberries abound; at 7000 feet *Cypresses* appear, and the forest trees become reduced in size, and more covered with mosses and lichens. At about 8000 feet European forms of plants become abundant, such as the species of *Honeysuckle*, *St. John's Wort* and *Gaultheria*. Rose abound, and at 9000 feet we first met with the rare and beautiful *Royal Cowslip* (*Primula imperialis*). The forest trees, gnarled and dwarfed to the dimensions of bushes, reach up to the very rim of the old crater, 10,000 feet high. At 10,000 feet *Bogota* is about 7 north of the equator, Java is about 8° south. In my letter of December 10 last year, at p. 1635, I quoted from Dr. Hooker's Himalayan Journals, where he says 8000 feet is the elevation that most

nearly coincides with that of London, viz., 50° ; and also that, on account of the humidity, English fruits would not ripen at 7000 feet of elevation. Mr. Purdie complained of extreme radiation. Let me take a few more extracts from Dr. Hooker's Journal to show that these two conditions—elevation with radiation, and elevation without radiation—make enormous difference to plant life. In vol. i., at p. 185:—

"The radiation to a clear sky is so powerful that dew frequently forms in the shade, throughout the day, and it is common at 10 A.M. to find the thermometer sink from 70° , in a spot dried by the sun, to 40° in the shade close by, where the sun has not yet penetrated." At p. 196:—"It was in these narrow valleys only that I observed the return cold current rushing down the river courses during the nights, which were usually brilliant and very cold, with copious dew; so powerful, indeed, was the radiation, that the upper blanket of the snow beneath the coating with moisture, from the rapid abstraction of the heat by the frozen tarpaulin of my tent—elevation, 8666 feet; temperature, 32° ." P. 100:—"Kursung, 4800 feet: The spring of this region and elevation most vividly recall that of England. The Oak flowering, the Birch bursting into leaf, the Yellow Cuckoo-bird, and Arum, Vaccinium, wild Strawberry, Maple, Geranium, Bramble. A colder wind blew here; mosses and lichens carpeted the banks and road-sides. These flowers are so notoriously the harbingers of a European spring that their presence carries the same date at once to the writer from the mountains of European prototypes, and are accompanied at this elevation, and for 2000 feet higher up, with Tree Ferns, Pothos, Bananas, Palms, Figs, Peppers, numbers of epiphyllal Orchids, and similar genuine tropical genera. The uniform temperature of the climate of the mountains here favour the extension of the tropical plants into a temperate region."

In the extract I have given you from Mr. Wallace's book, there is nothing remarkable; I have given it because the mountain he ascended is about the same distance from the Equator as Bogota, and he clearly tells us what is found at an elevation of 8000 feet.

Following it, I have chosen some extracts to show the force of radiation, and to explain how humidity can mitigate such effects. Now, what must be the irresistible conclusion forced upon us in the case of an Orchid that we are assured, has come from an elevation of 8000 feet? If that altitude means the prevalence of European plants, trees, and flowers, and the temperature of London, we should be able to grow it also out-of-doors—the greatest advocate of cool treatment does not go so far. If they are subject to a frosty climate, and to heat and cold, and radiation, we cannot supply such conditions, and therefore can no more grow them than Swiss alpine plants, or that splendid Java *Primula imperialis*. But we do grow to perfection Orchids that are said to come from such elevations. Granted that this is true, as far as growing the Orchids, must we not say that, if the altitude is also true, humidity must have so far modified all other conditions that it can only be regarded as a secondary cause. The altitude as a reason why cool treatment should be adopted? No one has been able to grow purely terrestrial Orchids successfully, and Dr. Hooker fully explains the reasons why we cannot supply alpine conditions in our gardens. These points I will not enter upon now, but will give two quotations to show what Orchids are found between 6000 and 7000 feet of elevation, and I am fully convinced that should *Odontoglossa* come from such elevations they must be found in the same sort of woods and bogs. At p. 102—"Pacheco stands at an elevation of 7300 feet. Epiphytes are rare, still I found some white and purple *Coclogynis* and other Orchids." Again, turn to the valuable list Lieut.-Colonel Benson gave us at p. 796, on June 11 last year. This list stops at 2500 feet, for all but the Pleioneas and *Cymbidium tigrinum*, which he puts down at from 6500 to 7000 feet. He gives only one exception, just to prove the rule—*Dendrobium inaequalidulum*, and says it suffers accordingly, as is shown by its stunted growth. I do not dispute that an Orchid at rest can stand either a very great heat or a considerable degree of cold. Lieut.-Colonel Benson mentions from 46° to 120° in the shade even on the plains, where all the classes he mentions must experience such extremes sometimes in one day. At p. 283 of the 2d volume Dr. Hooker says, in describing the flora and situation of Churra, on the Khasia Hills—"The plants of the Orchid class are found, 'the temperature in summer often rises to 100° and in winter, owing to the intense radiation, hoarfrost is frequent: elevation, 4000. In seven months' frost 500 inches of rain fell.' He computes the annual fall at 60 inches, or 50 feet. In the note at p. 292:—

"Killing, 5400 feet: *Eria*, *Coclogynis*, *Cymbidium*, *Dendrobium*, and *Stenoplia*, some of them flowering profusely, and those exposed to the sun and wind, dew and frosts, rain and droughts, they were all free, bright, green, and strong, under very different treatment from that to which they are exposed in the damp, unhealthy, steamy Orchid-houses of our English gardens."

At pages 314 and 315, in speaking of the home of *Vanda cœrulea*—elevation 3000 to 4000 feet—"Temperature in summer 60° to 80° , in winter much lower, and hoarfrost-frosts are common." The island of Ceylon is upon the equatorial line, and a description of the health station of Novera Ella will be found at p. 6 in the 4th volume of the 3d series of the "Botanical Magazine." Elevation 6200 feet: European vegetables grow freely; fruit trees are evergreen; and for though the thermometer in the morning occasionally

goes down to nearly freezing point, the cold weather does not last long enough to rest them—range, $35\frac{1}{2}^{\circ}$ to 80° ." ("Flora of Ceylon," by George Gardner, Esq., F.L.S.) P. 42, vol. 25, "Botanical Register," Mr. Gardner writes—"Organ. Mountains, elevation 3100 feet. In winter the thermometer sometimes descends to 32° at night, not higher than 84° in shade at noon—range 68° to 75° ; after rain as low as 62° ." At p. 44 of the 26th volume, Mr. Skinner writes of *Oncidium leucociliolum*:—"This plant inhabits the higher temperatures. I should recommend for its cultivation that it should not be kept in a temperature colder than 55° to 70° , though he says that for three days the average in the morning was 55° to 36° , yet it continued to shoot its young stems." These extracts lead me to think that the cool days are few, and the hot days many; therefore, we should be very unwise in prolonging the cool temperatures any longer than necessity requires, and that the risk run is in proportion to the ripeness or maturity previously obtained, which maturity cannot be obtained by any cool treatment. For these reasons I do not pretend to follow such plans, and think that when writers who do set up such claims, only give us a few minutes of no maxima, their proceedings are about as cool as the treatment they recommend. Heat is, no doubt, a most important agent in the development of vegetable life, but without a sufficient rainfall it is powerless, and the earth remains unable to reward the patient toil of man. I was much impressed with this fact while reading in the *Field* newspaper a letter from the desert of Sinai, in which the writer said, that if you had to shiver at six o'clock in the morning, you might always comfort yourself with thinking that at nine you would be glad of any friendly shade. Now and then there was a rain storm, after which three weeks of the most perfect weather might be counted upon, and thus, in the writer's eyes, the most perfect weather produces a desert. Orchids come from the wettest parts of the earth alone, and supplying them with this moisture is always a very difficult difficulty. It is a point that has occupied much more of my attention than giving them 10° of heat more or less. G. H.

Orchid Cultivation.—I see in your paper of February 18 a notice of Orchid culture by "G. H.," which has some quotations from papers of mine, the tone of which I sincerely thank the contributor. I know nothing of Orchid culture in England, and very little of tropical Orchids; but if the facts which I can give are of any use, I give them gladly. The mean temperature of Trinidad is about 81.50° , the maximum about 90° , the minimum about 70° . Epiphyllal Orchids, we all know, flourish there; I thence infer that a very even temperature is needed for them. The temperature of Borneo, where they flourish equally, is a few degrees higher, but similarly equable; and on the whole, I should say, that the climate for epiphytes all round the tropics is that of equable temperature and constant precipitation. The average rainfall of Trinidad is 70.30 inches (not 80, as I said in haste). But this is small compared with many parts of the tropics. At Havannah, for instance, it is 109; but, again, the amount of tropic frost, even in the dry season, are enormous, over and above the rains, so that I should not that full 80 inches of water fall on every leaf in Trinidad during the year. I therefore judge that constant precipitation is needed by the epiphyllal Orchids, at least of the West Indies. But it is possible that many Orchids may require, after flowering, a dry climate for three or four months, such as they would have in the West Indies. Next, I have to say of them, namely, constant supplies of carbonic acid. If I reared Orchids, I should keep a substratum (not close to the roots, but somewhere near) of decaying vegetable matter. This is supplied in the tropical forest by that rapid decay, proof of which your correspondent "G. H." has quoted from my papers. The same supply of carbonic acid is, I believe, required also in the case of Ferns. My friend Professor Babington pointed out to me long ago, that the probable cause of the decay of *Ferns* is that they are equal to limestone rocks, seemingly dry, and in damp places, it is this—that the decaying limestone gave out carbonic acid, just as did the decaying vegetable fibre. And my experience of the growth of *Adiantum Capillus-Veneris*, which always, I find it can, grows where a "petrifying" limestone spring issues from rock, as well as my experience of tropical Ferns, whether ground, tree, or climbing Ferns, leads me to believe his theory right. An equal supply of carbonic acid, and, as Ferns grow on trees) the most complete drainage for the roots—these three conditions seem to me to fulfil all that I have seen Nature require. C. Kingsley, *Everley Rectory, Winchfield*.

Gardeners' Balance-Sheets.—I think it will be admitted by most gardeners who have to supply vegetables for a large family that a balance-sheet would be to them of the greatest importance. I know it is the practice of many gardeners to keep a paper and vegetable book for their own satisfaction, but I go further and keep a separate book against both cook, butler, and housekeeper. I do not supply either of them with the smallest leaf with an order, each being supplied with an order-book for that purpose. I charge every thing to them the same as if they bought it from a market gardener. I find this an excellent plan for my own protection, being, as I am, backed by the

controller of the household, and it has given the greatest satisfaction to my worthy employer; it also enables my man to supply the kitchen in half the usual time, as Monsieur Cook does not like writing more than one order each day, and when his vegetable-book like his butcher's, has to appear before the controller every month I find that he is a little more economical. I charge the butler with all salad and Cucumbers, &c., and the housekeeper with all fruit, which enables me to show what return my employer has for money expended at the end of each year. I am confident that if gentlemen had ocular demonstration of the actual produce of their gardens they would take more interest in them. It is well known that many a fine dinner is sent in by the poor gardener never reaches his employer's table. Some years ago I had to do with a crusty old housekeeper, who made it a practice to huddle my Grapes for days in a cupboard before they were sent to table, to the utter destruction of both flavour and bloom. F. Hickson, *Gr. to Col. Towneley, Towneley Park, Burnley, Lancashire*.

Muscat Champion Vine.—It is only fair to the introducers of this fine Grape to mention a fact which has recently come under my notice, because a prejudice exists against this variety on account of its colour, which is generally that of the Grizzly Frontgate, though at times it may be a little darker. This Grizzly Frontgate has the credit of first bringing this Grapes on in its best character; he had it at Leicester and Manchester, I believe, and many have seen it very fine at Sandringham in 1869 and 1870. The fact I allude to is this. In Dewsbury, in Yorkshire, in August last, a handsome prize was offered for the best dish of Grapes; there were 55 lots staged, and Mr. Milner, nurseryman, Bradford, won with two fine bunches of Muscat of Portugal, fine and dark in colour, and in flavour, which, combined with its rich flavour, carried the day. Dewsbury is near to Leeds, and to a host of places where Grapes are grown plentifully and well. W. D.

The Dracena as a Bedding Plant.—I have been taking notice of a plant of *Dracena terminalis* that has been upon the window-sill of a room this winter from the time of the first snow in the month of March, without showing any perceptible symptoms of injury. There has been a fire in the room but seldom during the winter, and the temperature must have been below 40° for long intervals at a time during the frosty weather, [as the sun never shines in at the window in question. Why should such a plant as this be not therefore used more extensively for flower garden decoration during the summer and autumn months? I thought the climate there forbade anything like an attempt at subtropical gardening, so-called, I propose, if all's well, to use as many plants as I can afford to spare of *Dracena terminalis* and grandis for outdoor work this summer. They are easily propagated. The rhizome-like roots of old plants, if chopped up into pieces about half an inch long, laid thickly together in pots, covered slightly with soil, and plunged in a bottom-heat of 90° , some time in February, March, or April, will every year make fine plants by autumn, and large plants the following year. F. Simpson, *Worley*.

Asphalte for Garden Walks.—In accordance with the request of "C. F. P.," I beg to give the following statement of our *modus operandi*. Take a quantity of hard asphaltum or chips of asphaltum, which have been passed through a 14-inch riddle, grate it into two heaps by riddling it with a 3-inch riddle. Four some coal-tar (which, if thick, must be heated in an old iron boiler) over the limestone scraps, turning them over again and again until thoroughly coated with the tar, so that every particle is blackened by it, but not rendered so wet as to admit of any tar running away from the bottom of the heaps. If this should be the case, add more scraps to the surface, and stir for if the asphaltum is too wet, it becomes soft when rolled, and is a long time in setting hard. The asphaltum being prepared, lay on the path 3 inches of the coarser heap, spreading it evenly with a rake to make it as level as possible; and upon it spread 1 inch of the finer heap, levelling it carefully with a straight-edge, taking care not to trample on it until it is ready for rolling. Then pass a heavy iron garden-roller over it, three or four times, pushing it before you, and when the asphaltum adheres to the roller water it with a watering-pot, then send it well with coarse river sand, applied through a sieve, rolling it as often as may be required to consolidate it, and dusting the roller frequently with sand to prevent it from adhering to the asphaltum, and tearing it up. After a few days it will be set sufficiently hard to allow a dressing of hot tar to be applied with a brush over the whole surface, dry sand being dusted over it, and brushed lightly and evenly with a new birch-broom after the application of the tar. In a day or two sand it again, and roll it until it gets a smooth hard surface, which will not require anything more doing to it for four or five years, then it may be well to give it a dressing of hot tar and sand, to make and keep it adhesive and tough. The colour of the surface becomes an iron-grey, and is not unpleasant to the eye. When care can be obtained, the asphaltum shire is far, from lead mines, is generally applied, and does the walks a pretty mottled appearance; but it does not set so hard as river sand from the Trent, which we use, and which neither the heaviest rain nor

the hardest frost affects. The unpleasant aroma of the coal-tar gradually evaporates, and in a year or so is imperceptible. I need not say that the walks or roads must have a solid foundation, and that roots of large trees growing adjacent to the walks and passing under them are objectionable. The cost of a ton of lime scraps here is 3s., and it requires, when there is little, if any, earthy matter in it, about 16 gall. of coal-tar, which we obtain at 1d. per gall. This is sufficient to asphalt 12 square yards super. Two men at 3s. each per day will mix and lay on and complete 50 yards, 4 inches thick. The cost of cartage I do not give, as it must depend upon the distance which the limestone scraps and the tar have to be carted. The success of asphaltting depends upon its manipulation, and as an ounce of experience is better than a pound of theory, I shall be happy, if "C. F. P." should ever come so far North as my neighbourhood, to show him how to do it, for which purpose I enclose my address, which you send him. I do not know what is the title of the company that has laid down the asphalt in Cheapside and Holborn, but I was told by a bystander that it is the same material as that used in Paris. The cost for street traffic was said to be 14s. per yard super., more costly than granite paving. We have found that March is the best month for asphaltting, as it sets more rapidly and firmly than in any other month of the year. *A Country Clergyman.*

Oak Galls.—Some 14 or 15 years since I was shown some specimens of a new Oak gall, which my informant said had been recently discovered in Devonshire, and I now refer to the subject to say that when shooting in Bothall (Yorks) last winter I found the Oak bushes there were abundantly furnished with galls of the same kind. I feel curious to learn whether these new galls have been observed in any or many of the intermediate districts between these two remote localities, and, if so, whether they have become general? I shall also be glad to learn how long it is since they were first observed in Devonshire, and where they were indigenous before that time? If any of your entomological readers wish for specimens I shall be glad to send them. *T. G., Clitheroe.* [Your gall is probably the same that has been so destructive in many situations of late; but if you will send a specimen we will tell you further. Eds.]

Horse Chestnuts.—The little discussion on the irregularity with which some trees put forth their leaves induces me to mention an instance with respect to the Horse Chestnut which is worth recording. At a farmhouse in this neighbourhood there was one of these trees upon the grass plot which was always ten days or a fortnight earlier in leaf than its neighbours. The cause was thus revealed:—One day the cart-horses got loose and executed a stampee on the grass plot; in one place the hoof of one of them sunk in through the turf; on examination it proved to be an unused well which was half filled with the roots of the tree. Being useless, and now discovered to be dangerous, the well was filled up with earth, and the tree ever after was no forwarder in leaf than others of the same kind in the vicinity. I believe it will be found that the time of flowering and foliage is regulated in the several species by the temperature of the soil in which they grow. This solution will, I think, commend itself as reasonable and adequate. There is a Beech tree in our woods which is regularly in leaf about ten days before the others. I believe the explanation to be, that its roots have found out fissures in the chalk, so that their temperature is more quickly raised to the necessary degree by the accession of warmth in the air at the return of spring. *J. S., Streetley Vicarage, March 27.*

Like your correspondents, we have several of the above that differ in their time of leaf expansion. Indeed, such are to be met with in most countries, but the tree alluded to at p. 348 is always so far in advance of any others, that it is looked upon as something out of the common way, and quite worthy of comment. Dr. Curtis, of Briery Hill, told me last Saturday that two years since this tree was in full foliage and flower the second week in February, when not a vestige of green was to be seen on any other tree. Last year, on my visit here in March, it caught my eye in the distance, and I thought a more lovely sight, at that early season of that year, I had never met with, being entirely clothed in its beautiful green summer garb whilst all the surrounding trees had not cast off their winter clothing. I am given to understand that this tree has been for years much in advance of any others, not only by days, but in some seasons by several weeks. *Edmond Bennett, Enville.*

Pansies and Violas.—In reply to "Inquirer," I beg to say that I prefer for bedding both Pansies and Violas, obtained from cuttings, more especially the latter. I have always found them last longer in flower, and are less liable to die away by the above method than when increased by division of the roots. When grown from seed they are generally much later in coming into blossom, otherwise I find them answer very well. *E. Bennett, Enville.*

The Golden Foxglove (Gerardia).—I have to thank you for inserting my query about this plant, and also the answer given by Mr. Robinson. Many of our most lovely native plants (and amongst them some *Scrophulariaceae*) are parasites, and therefore not amenable to cultivation, and the case may be the same with

the *Gerardia*. Nevertheless, I should like to try this particular species, it is such a beauty. Perhaps a knowledge of the particular genus or species that it feeds upon would enable us to succeed in its culture, or, if it is an indiscriminating parasite, we might succeed with it by sowing the seeds broadcast in suitable spots in woods and plantations. *Fean van Volxem, 1, Rue Zimmer, Bruxelles.*

Gunnera scabra.—This should not be so uncommon as is inferred at p. 376. It is a very good plant for shrubberies, shrubby borders, &c. In a few places in Cornwall it attains to some feet in height; I mean, it has a stem. Here it is in habit very like *Rhubarb*, but looks well when in leaf and flower. I should think it sufficiently hardy for such purposes as mentioned, in many places in the kingdom, if the crowns are protected in winter. *H. M.*

Madame Andre Leroy Pear.—The outline of this Pear (fig. 83) was taken from a fruit which grew upon a Quince stock, and is a fair sample of over a hundred specimens which were the produce of six trees. It is one of our best autumn kinds, and the trees bear abundantly; mine are four years old, and this is the second year they have borne. It was raised at Angers by the eminent pomologist M. Leroy, after whose wife it is named, and it fruited first in 1862. My description, made from fruit grown here, is as follows:—First size, first quality; October to November; unequal-sized pyriform; fruit nearly all one size

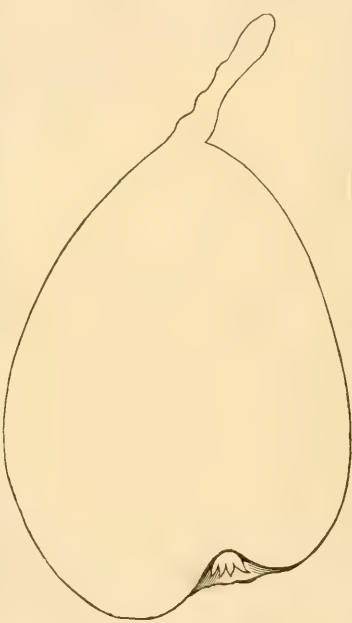


FIG. 83.—MADAME ANDRE LEROY.

and shape; skin thick, yellowish-green, thickly covered (especially at each end) with small grey dots and patches of pale russet; stalk long and strong, thinnest in the middle, fleshy at the base, and inserted obliquely in continuation of the fruit; eye medium-sized, open, unequally formed, and placed to one side in a wide, deep, unequal-sided basin; flesh rather fine-grained, very melting, and with hardly any grit at the core; juice very abundant, sugary, and acidulated, with a fine delicate flavour. The tree grows freely upon the Quince, and bears abundantly. *J. Scott, Merriott.*

Breeding Gold Fish.—A friend of mine some years ago constructed a tank about 16 feet long, and between 4 and 5 feet broad, by 3 feet deep, which he stocked with fish, but they did not breed. I suggested to him that gold fish were very fond of eating their own young, and that if he wanted to breed fish, he must have the means of separating the old from the young. I also advised him to stretch across the tank a partition of wirework, with a mesh small enough to prevent the large fish from pushing through, at the same time giving the young fry an opportunity of getting into a secure place. This answered the purpose perfectly, and they bred in numbers. *Jellypholus.*

—In a small pond in the garden here I found six gold and silver fish, about this time last year; soon after two were bitten by something and died. I at once had the pond cleaned out, having caught the remaining four. In the mud at the bottom were two eels, and these were probably the authors of the mischief. In the course of removing some Water Lilly roots and plants of *Aponogeton distachyon* which were

in the pond, there was observed on the under surface of the leaves what I think was spaw, and therefore many of the leaves as possible were taken care of and put back. In the course of two or three months afterwards many scores of small fish made their appearance, and now some of them are changing colour. During the late severe weather there was ice 5 inches in thickness on this pond, but it does not appear to have affected the fish in any way. As I know of several places where gold fish increase in open tanks in gardens, I think your correspondent at p. 382 is labouring under a mistake. *Samuel Garland, Sandhill Park, Tinsford.*

—Your correspondent, "G.," is in error in informing "A Constant Reader" that gold fish do not increase in this climate without the aid of tanks situate in warm structures. I can bear testimony to the fact that they do, a case of which I will record if your correspondents are interested in the matter. I quite agree that if they are in tanks in warm conservatories their increase is more rapid. *E. Morgan, Harrow-on-the-Hill.*

The Advantages of Growing your Own Seed cannot be Overestimated.—I was fortunate enough last season to harvest, among other garden seeds, half-a-pun of Nurella and Union, which I sowed on February 26, with several other varieties. I should say, my own seed is up full in the row, while the others are still sleeping under the soil, thus showing me the great advantage of helping oneself. *Kitchener.*

Gardeners' Discount.—I confidently believe that gardeners of all grades are, almost without exception, only too pleased to do the very best they can with plants or seeds purchased, or in any way procured, by their employers. But if some nurserymen, over anxious to do business, will assure ladies and gentlemen that tropical plants of various sorts can be grown successfully in cool greenhouses or garden frames, that *Rhododendrons* and other American plants will succeed admirably upon the chalk, &c., and thereby induce them to purchase plants which they have not the means of growing, and then, when the inevitable result takes place, will accuse the unfortunate gardener of having purposely "cooked their goose," they are acting unjustly. This over-anxiety to do business on the part of nurserymen is without doubt the origin of the discount-giving system, and rests entirely with themselves. Gardeners may ask for discount, but they cannot demand or enforce the giving of it. Indeed, I do not believe that the practice exists to anything like the extent supposed. There are many worthy, but hypocondriacal people in the world (some of them, no doubt, employers of gardeners), who throughout their lives are tormented by the idea that they are surrounded by people anxiously endeavouring to rob them: and your remarks, and that of some of your correspondents, upon this subject, must add considerably to the discomfort of this class of persons, without, perhaps, in any degree diminishing the practice complained of. For persons of this kind, I apprehend, continue to exercise the same privilege which other classes of the community enjoy, viz., to do what they like with their own. And who can say that the discount which a nurseryman may return to a gardener was not his own, or that he does not diminish his profits by doing so? A discount-giving nurseryman must square his tariff with that of a non-discounting one, and the goods of the former must also be equal as regards quality to those of the latter; so that it is immaterial to the actual purchaser as to which class of tradesmen his gardener may deal with. But there is one serious objection to the discount-giving system, viz., the inducement offered to gardeners, by the prospect of discount, to run up a larger bill than is absolutely necessary; but even this abuse can hardly be practised to any extent without detection. I am, however, no advocate of the discount-giving system, and I think it very desirable that tradesmen should one and all discontinue the practice. I also think it very desirable that the great European Powers should consent to a general disarmament, and I fear the one consummation is about as likely to be speedily realised as the other. *G. P.*

—I read your leading article on this subject, and upon the whole I think you treated the matter in a fair and impartial manner; and in pointing out the existence of this objectionary system, you have done the right nail on the head. But far different was my opinion on the "plaintive wail" of "A Young Nurseryman," who seems to attribute all the blame to "greedy gardeners." As an honest gardener I repel the charge; I believe that gardeners would never expect or ask for such a thing if nurserymen, in soliciting orders, and in trying to secure them, did not continually thrust the bribe before their eyes. "A Young Nurseryman" would do well to try to educate the class he holds to be before he descends to criminate gardeners on such a charge. I will not say that gardeners do not expect such a thing. They know very well that from the time since gardening and the nursery business commenced, it has been the rule for nurserymen to give it. It may be worth while inquiring whether, if all nurserymen should agree to desist from the practice, we should receive our nursery goods cheaper than we do at present? I apprehend not, if not, in this respect, whether the gardener kills the nurseryman, or the nurseryman the gardener, in neither case will the advantage be to him who pays the piper. I have often been annoyed by nurserymen soliciting orders, who would not take No for an answer, but would keep

haggling on for an hour together, and notably so by "young nurserymen," at least, young in the business, striving hard to effect a standing. They could not say their goods were better or cheaper than my regular tradesman's. The best argument they could use was, the amount of percentage they gave. There is no wonder, then, that gardeners, who are at best but human, should be tempted, by the bait of a few shillings into the trap. It is similar to the old question of the briber and the bribed. It is a question for judicial decision which is the worst of the two; neither can admit of any palliation, but in my opinion the former is the more culpable: if there was no briber there would be none bribed; and whether it is paid unsolicited, or paid on demand, if even grudgingly, the case is the same. There may be some men, as "A Young Nurseryman" states, slow to self-sell, but to call—after the governor has been settled—to claim a bit of the carillon; but nurserymen should be the last to fall out about a custom which they so long fostered. It is well known that of late years, in certain high circles, the system is strictly prohibited, and, indeed, the case is becoming general. Respectable nurserymen begin now to see that they are placed on the horns of a dilemma; they are either either of offending the employer or of offending the employed. Instead of casting the blame off their own shoulders, and proclaiming gardeners to be a greedy, sponging lot, let them put their heads together, and cease the practice: I'll warrant that after one or two attempts there would be no more "following the governor." If nurserymen will allow a percentage on ready-money business, which is but fair and just, it is clear that the gardener has no business whatever to put it in his own pocket. It is, according to all laws of right and justice, the employer's property. *A Lover of Justice.*

Cissus discolor.—I was rather surprised a few days ago, on turning over the leaves of the "Cottage Gardener's Dictionary," to find at p. 227 the following remarks on the *Cissus* family:—"We introduce it in order to remark that, with the exception of the Grape Vine, the plants of this order are singularly deficient in use or beauty." Has the *Cissus discolor* no claim to beauty? or had the writer never seen one growing? *E. Holliday, Castle Hill Gardens, Bletchingley.* [An oversight. E.D.s.]

Setting the Fruit of Peaches and Grapes.—I am quite convinced, so far as my experience goes, that a particularly dry atmosphere is not needful, nor even favourable, to the setting of the fruit of Peaches or Grapes. After experimenting on a small scale, I have for the last two years treated our early and late Peaches, Muscat Vines, Strawberry-houses, &c., with the fruit was setting, pretty much the same as at other times, only that I have been careful to see that our Peach trees, in particular, were thoroughly drenched every afternoon on bright days, and once or twice a week in dull weather if much fire-heat was used during the time they were in bloom, using a fine syringe, and douching the blossom thoroughly right and left with clear soft water. The result is, that for the last two seasons our Peaches have set thicker than ever. I saw them do before; in fact, in perfect clusters, as the accompanying specimens will testify. The Peach shoot, about 20 inches long, has 2 dozen fruit upon it; and the shoot of Victoria Nectarine, about 1 foot in length, has 13—all finely-developed fruit. The shoots are from our second early Peach-house, and are a pretty fair sample as regards setting from the earliest to the latest of our fruit, under the treatment. We have also at the present time about 500 Strawberry plants swelling their fruit at different stages that have been treated in the same manner, and that have set equally well. *J. Simpson, Wortley Hall.* [Nothing could be more satisfactory than the samples referred to. E.D.s.]

Cannell's Registered Boiler.—Will Mr. Cannell inform us how long he has practically tested the working of his boiler, and where we can personally examine it, and see "the immense stride this boiler has made?" From the drawing and letterpress description before me, I understand that "the return pipe, or exit pipe at the back or hottest end, and the flue, or exit pipe at the front or coldest end, are of an improvement?" The draught is, I presume, admitted under the hollow water bars, as in any other boiler; why, then, may not the draught in this registered boiler be stopped by "over-banking up the fire," as is said to be the case with the ordinary saddle boiler fitted with hollow water bars? I admit that in complicated castings it is difficult to procure "equal thickness" of metal, and from the experience I have had in moulding and casting boilers, I think that it is impossible to guarantee an equal thickness of metal in any casting having two or more sides; and this same remark would apply to the various parts of "the patent boiler." I am not aware that "nearly all new boilers of late years have been cast in one piece," perhaps Mr. Cannell will kindly quote his authorities, and at the same time inform us the cost of one of his boilers, the depth required to set them, and that will heat 1000 feet of 4-inch pipe, and the average consumption in 24 hours of coke or other fuel to maintain an inside temperature of 45° with 15° of frost outside. Mr. Cannell says "it is a well known fact that a boiler that contains a large

quantity of water is indispensable;" how does he reconcile with this statement the fact that a boiler containing a very small quantity does heat efficiently some thousands of feet of pipe? What is the difference between this so-called large fire-place and that under a good saddle boiler properly set? The great difficulty is "to carefully work the damper with constant personal attention." Mr. Cannell says that "a person can feel in the dark the exact draught that is left on." Of what avail would this be when, if, say at 9 o'clock, there is little or no frost, but in a few hours a sharp frost sets in, and the fire burns with greater rapidity, and there is no one by to reset the damper? What is the superior advantage of this over any other damper? I question very much if the boiler can be so easily taken to pieces, without injury to any material portion, after having been at work say 12 months. In my time (I am only a youngster at hot-water work) I have worked incessantly with dampers, with various kinds of boilers, with all sorts of fuel, have personally attended to the stoking of different forms of boilers, and have seen at least 1000 boilers at work in various parts of the country. I have seen the phenomenon of a boiler in one place heating, say 1000 feet of 4-inch pipe most satisfactorily to the person in charge, and I have seen precisely the same kind of boiler, the same arrangement, and same quantity of pipes, in another place, reported as doing its work most unsatisfactorily. I am afraid that Mr. Cannell will not be able in practice to carry out his glowing description of the patent boiler. There is plenty of room still left for an improved hot-water boiler, combining simplicity of construction, large heating surface, strength, and durability, with a low cost. *K. S. Dunbar, Wimbledon.*

Cryptomeria elegans.—After the experience of the past winter, this exceedingly handsome shrub must occupy a foremost rank amongst our hardy Conifers. I have recently seen it in various places both North and South, and in every case in the "quintessential" form. At Garmouth, near Sandingham, here a noble plant, nearly 5 feet high, planted against the ornamental water, and it has stood the winter uninjured, and is now in great beauty. Large Laurels, *Arbutus*, *Laurostictus*, and Double Furze, and all large bushes planted around the ornamental water, are killed to the ground. *W. H.*

Ringling of Ash Trees by Hornets.—At p. 376 you mention the ringing of young Ash trees by hornets as not having been often observed; perhaps a note of another instance which I remarked last summer, and which was very similar to the account which you give in detail, may be of interest. The Ash trees in this case were rather larger than those you mention—from 12 to 16 feet high—and grew almost in the water by the side of a pond. The injured trees, where the bark was being removed by the hornets, was about 5 or 6 feet from the ground, where the branches were scarcely thicker than a finger, and the rings were of many widths, varying from those just begun, to the width of 3 or 4 inches. I watched the hornets carefully, to see whether they might be collecting building materials, but could not see that in any case they were forming pellets of wood; they seemed simply to be making holes, and descending, and ascending, from the "ringing" edges of the bark at the uppermost parts of the ring, and, as in the case you mention, were very quiet, as if full fed. About the same time I noticed three hornets feeding on sap which was exuding from the lowest part of the trunk of an Oak, but I could not be certain in this case whether the moisture was furnished by the diseased bark of the tree itself, or by a large woody Fungus in progress of growth. In this case also, the insects were so inactive as to admit of being caught without difficulty. I have never (save on the occasion mentioned above) seen the Ash attacked by hornets; and as this was during the severe drought of last summer, when almost all the ponds and watering-places in this neighbourhood were entirely dried up, and hornets appear to require much moisture, it seemed as if the absence of their usual supply of wet food, or of water, might be the cause of the mischief. I add a few lines on the occasional formation of hornet queens in regularly formed cells? I have not seen the subject noticed in such books as I have been able to consult on the matter. Towards the end of last autumn, raising a piece of unusually thick bark from the stem of an Oak, which had fallen from old age, I found beneath it a queen hornet, nearly torpid, standing in the middle of a regularly formed oval cell, exactly suited to her size. The bottom of the cell, and part of the sides were gnawed out of the wood, and the rest of the sides neatly formed of the decayed powdery material intervening between the outer bark and the wood; the whole was protected by the bark, but the debris had been so carefully arranged by the hornet that she had left no mark of entrance into the cell. Returning to the tree about a month ago, I raised another piece of bark a few inches from where I had found her, and amongst the fragments found another queen, in what appeared to have been a similar cell, but unfortunately the pieces were so much broken that I could only secure one characteristic fragment. *E. A. O.*

Fruit Prospects in North-East Yorkshire.—Seldom indeed have I seen the fruit trees in this locality look better than they do this season, and especially such as Apricots, Nectarines, Peaches, Cherries, and Plums, on walls. My Apricot trees in pots have all set their

fruit well, and look remarkably healthy. I cannot recommend this fruit for pot culture, any more than I can Cherries; but Peaches, Nectarines, Plums, Pears, and Apples can be so grown profitably—at least, such is my experience with them. I have some pyramidal Pears in the open quarters here, which are a complete mass blossom-buds, and which are all worked upon the Quince stock. Apple trees in general are well set with fruit-buds. Although it is early yet to make any prediction, the present appearance is very favourable indeed. *John Burns, Gr., Tollybry Hall, Middleborough-on-Tees.*

Foreign Correspondence.

BRUSSELS: Cool Orchids.—I have read with much interest the letters which have of late appeared in your columns on the subject of cool Orchids, and from personal observations I can affirm that many of your correspondents' surmises are perfectly correct. None of the beautiful *Odontoglossums* brought over from Bogota are to be found on the savannah of Bogota (8200 English feet above the level of the sea), nor yet above it on the slopes of the mountainous girdle. Above ground I found many terrestrial *Epipendra* (rather an Irish bulb as far as etymology goes), with bulbs sometimes as large as goose-sized Onions, and with erect branching flower-stems, from 2 to 3 feet in height. Of their ornamental value I cannot speak, because the flowers were not open at the season of the year in which I saw them (May 1). On the plain itself I did not see any Orchids—a fact which is not to be wondered at, seeing that, excepting a kind of pyramidal Willow, there is not to be found on it a tree or woody shrub as large as our Weigels.

The first *Odontoglossum* which I found in its vicinity were *O. Schlumieri*, another species nearly related to *O. nevium*, as well as many other species, on the descent to the fall of Tequendama, amongst the most splendid grove of Tree Ferns I ever beheld (at a rough guess, 7500 feet above the sea). On my road to Susagaga I began to find examples of the same habit as *O. serratum* and *O. triumphans*, at an elevation, I should think, of more than 6000 feet above the sea; then just above Susagaga, I should say at an elevation of about 5500 feet, I found *Odontoglossum Alexandre*, and other species, in their full glory, in the month of April. On the plain of Susagaga, some 500 feet lower down, are to be found plentifully all the splendid varieties of *Cattleya Mossii* (quadricolor, Wagneri, Trianae, &c. no two clusters of plants being identical); *Comparettia rosea* or *falcata*, &c., growing in very thin woods, on the limbs of trees the size of our Apple trees, and the *Comparettia* on shrubs the size of our Lilac. To give some idea of the climate of Susagaga, I may mention that *Brugmansia suaveolens* grows there luxuriantly in its wild state.

The *Odontoglossa* grow in places where they receive plenty of light, such as on trees along the margins of forests. The climbing species, as *O. serratum* and other species of the same habit, grow along the trunks of the large trees, and *O. Alexandre* is generally found on the protruding limbs of the trees from 6 to 20 feet above the ground. I think perhaps they grow on the tops of the trees, in the dense forest, as I sometimes found them where the natives were making clearings for cultivation, but not in the gloom of the virgin forest. The bark of the trees and branches is covered with a coat of living moss, half an inch thick at the most, and this is always wet, either from the rain or the dew. In this moss the *Odontoglossums* extend their roots, but they seldom, if ever, stick to the bark itself. I used to bring the plants down very easily by merely throwing my lass over them, when they came down with the moss and roots entire. They live in the moss, and it is the moss, not the plants, that adheres to the bark.

Cattleyas grow generally from 5 to 15 feet above the ground, first on the forks of thick trees, from whence they extend to the branches, preferring those that are more horizontal than vertical. Between and around the bulbs rich vegetable mould accumulates, in which they luxuriate. Sometimes, however, I found them growing on dry grass (quadricolor) on bare rocks, in the full blaze of the sun; but in this position they were of a very stunted growth, although flowering freely.

Schomburgkias grow in the same ways as the *Cattleyas*, but they are more partial to flat rocks where vegetable mould, sometimes an inch thick, accumulates around and under them; they want still more light than *Cattleyas*. *Catasetes*, and allied genera, grow on the forks of isolated trees, even at high elevations, and in the full blaze of the sun; they shed their leaves during the hot and dry seasons, being literally cooked by the light and heat, and they begin to grow again in the rainy season.

A correspondent in *Land and Water*, March 11, p. 179, inquires about the use of Pitcher-plants as a remedy against small-pox. In Canada it is said that the *Sarracenia* is an antidote to small-pox, and the name *Sarracenia* is an ancient name for the plant, hence the *Sarracenia* is an antidote to small-pox. *S. rubra* is also used, I believe, but how I do not know. *Yean van Volxem*, 1, Rue Zinner, Bruxelles, March 19, [Sarracenia has been tried by our physicians, and found quite inert. E.D.s.]

STATE OF THE WEATHER AT BLACKHEATH, LONDON,
FOR THE WEEK ENDING WEDNESDAY, MARCH 29, 1871.

1871. MONTH AND DAY.	At 9 A.M.		Hygrometrical Deduction from Glaisher's Tables, 5th Edition.		Dew Point.		Degree of Humidity.		Weight of Vapour in a Cubic Foot of Air.	
	Barometer reduced to 32° Fahr.	Reading of Thermometer.	Barometer reduced to 32° Fahr.	Reading of Thermometer.	Barometer reduced to 32° Fahr.	Reading of Thermometer.	Barometer reduced to 32° Fahr.	Reading of Thermometer.	Barometer reduced to 32° Fahr.	Reading of Thermometer.
March.										
23. Thurs.	29.85	51.0	29.85	51.0	29.85	51.0	29.85	51.0	29.85	51.0
24. Friday.	29.85	51.0	29.85	51.0	29.85	51.0	29.85	51.0	29.85	51.0
25. Satur.	29.85	51.0	29.85	51.0	29.85	51.0	29.85	51.0	29.85	51.0
26. Sunday.	29.85	51.0	29.85	51.0	29.85	51.0	29.85	51.0	29.85	51.0
27. Monday.	29.85	51.0	29.85	51.0	29.85	51.0	29.85	51.0	29.85	51.0
28. Tues.	29.85	51.0	29.85	51.0	29.85	51.0	29.85	51.0	29.85	51.0
29. Wednes.	29.85	51.0	29.85	51.0	29.85	51.0	29.85	51.0	29.85	51.0

1871. MONTH AND DAY.	TEMPERATURE OF THE AIR.				WIND.		RAIN.	
	Highest.	Lowest.	Range.	Mean.	Direction.	Horizontal Movement.	Inches.	Feet.
March.								
23. Thurs.	66.1	31.9	34.2	49.0	E	160	0.00	0.00
24. Friday.	70.9	36.3	34.6	53.6	E	125	0.00	0.00
25. Satur.	67.0	36.0	31.0	51.5	E	175	0.02	0.02
26. Sunday.	67.4	34.1	33.3	50.8	E	175	0.00	0.00
27. Monday.	55.0	39.5	15.5	47.3	E	350	0.00	0.00
28. Tues.	45.0	31.4	13.6	38.2	E	350	0.00	0.00
29. Wednes.	45.3	31.4	13.9	38.4	E	350	0.01	0.01

March 23.—The sky was covered with thin cloud in the morning; clouds afterwards; fog, dew.
 — 24.—Generally cloudy.
 — 25.—Cloudy in the morning; fine and cloudless till the evening, then overcast. A shower of rain fell a little before midnight.
 — 26.—Light clouds increased throughout the day.
 — 27.—Cloudy in the morning; overcast afterwards.
 — 28.—The amount of cloud was generally large throughout the day.
 — 29.—Generally cloudy throughout. Rain fell between 8 and 9 a.m.

Miscellaneous.

MARCH SONG.

'Twas in the month of March,
There were tassels on the Larch,
And all the pretty birds were fair
To pair, pair, pair.

The lowly Violet ran,
As we trod it under foot,
Protested by a sweetness which
Was rare, rare, rare.

The leaves were crowded up
All about the Buttercup,
But the little Daisy winked with
One eye, eye, eye.

The creatures all deferred,
Every flower and every bird,
To what the sun was doing in
The sky, sky, sky.

Come out, come out, O Sun!
For the Spring time is begun,
And we're all of us of one mind with
The mouse, mouse, mouse.

If we can but get good weather,
We'll be jolly altogether,
For we're very tired of living in
The house, house, house.

B. R. P. Belloc, in "St. Paul's Magazine."

HOW TO GET RID OF RATS AND MICE.—A gentleman of large experience, and fully as humane as most of us, says he gets rid of rats by putting potash in their holes and runs. The poor wretches get it on their feet, and over their fur, then they lick it, and don't like the taste of it; it burns them somewhat, and the more they see of it, the less they like it; so they clear out almost as soon as the application is made. To get rid of mice, the same person uses tartaric, mingled with any favourite food; they take it, take sick, and take their leave. *American Agriculturist.*

Garden Operations.

(FOR THE ENSUING WEEK.)

PLANT HOUSES.

Indian Azaleas, which have been forced into flowering early, should not be permitted to rest after their season of flowering is past, a temperature of not less than 60° should be maintained, and they should be in abundance. Where longevity, and great robustness are considered secondary objects to an excessive redundancy of bloom, these plants may be grown quickly—pinching back the young shoots as they form, in a mean temperature of from 85° to 90°, with such a supply of atmospheric humidity as the high temperature necessitates. When the young shoots are pinched back, of course it is desirable that the lateral growths forming should be grown on to their limit in a like amount of heat. The beautiful *Leucaria*, as well as the *Cape Jasmine* (*Gardenia*) may now be much benefited by being plunged in a genial bottom-heat. That which is afforded by fermenting materials, moderately sweetened only, is the best for them, though any other method may be adopted rather than none at all. In regard to the elegant *Humea elegans*, the necessary

preparations should now be made for finally shifting them into their blooming pots. Large pots are not desirable, but they require the best of fibrous yellow loam, with a small portion of good decomposed manure in admixture. Seeds of this plant may likewise now be sown, to be grown on as greenhouse annuals, and be treated as such. Give to such plants as *Lilium*, especially of the lancifolium and auratum type, and tuberous-rooted *Tropaeolum*, all the air possible; in the former case to afford the growing roots ample time to aid the increasing vigour of the growth, and in the latter to give a brighter colouring to the peculiarly beautiful blooms. Plants of *Pentas carnea*, propagated at this time and potted on, form useful stuff for blooming in the conservatory during the mildness of autumn and the autumn months. *Tuliparia* and *Echinus* may now be propagated by means of the young side shoots which have not yet bloomed, by potting them firmly and singly in small pots. It should be the aim of the grower to bloom each of these without fail in the late autumn and mid-winter months, when such bright coloured showy flowers, so well adapted for indoor decoration, are scarce. Amongst the many stove and other plants which require potting about this time is *Salicaria*, a curious, which, if growing in a small pot, and has not been potted lately, will be much benefited by the operation. An admixture of chopped sphagnum, the fibre from peat, with crocks, charcoal, &c., well incorporated, will be necessary to grow this plant well. Proceed with the propagation of stove and greenhouse plants if the time and attention requisite can be afforded. I say afforded, because it would often be very much cheaper to buy the few young plants required than to unduly burying them, by pressing and even by ramming the soil firmly around them. In all instances, where shading is now actually in use, and especially in those cases where miscellaneous plants are grown, great attention should be given to the matter, so that the covering, of whatever kind it be, may not be kept on one moment longer than is absolutely necessary to attain the end in view. Negligence in this respect will greatly injure such plants as are actively engaged in forming young wood. Indeed, it should be considered as a necessary evil in connection with such structures, and to multiply its injurious tendency by wanton negligence is, I need not assert, anything but desirable. The quaint and beautiful *Streptolias* will now bloom somewhat freely, and will last a long time in beauty in ordinary conservatories. As soon as the blooms are past, put them forthwith into a compost of equal parts of fibrous peat and loam, and take off any suckers that may exist if an increase of stock is desirable.

FORCING HOUSES.

Persist in the maintenance of a moderate amount of warmth only in all *Vineries* now starting. Vines break freely at this date, and during the occasional fine days that occur we are apt to forget that a change may suddenly happen; hence somewhat excessive heat is attained, simply through the want of affording air freely commensurate with the natural warmth. This the Vines feel severely in their young growths when the change comes. In all instances where the young shoots were only brought down from the glass moderately, through the fear of snapping them off when so young and tender, it would be well to go over them now that they are stronger, and to bend them down a little further. Be particularly careful to keep too close, too moist an atmosphere whilst the Vines are in flower; as sometimes this causes many blooms to become abortive. Give to *Fig trees* in an advanced state of activity a copious root watering, and to those growing in pots occasional soakings with liquid manure. Cool *Pach* and *Nectarine houses*, or such as have no aid from artificial heat, will now have set their blooms, and should be closed early in the day, so as to box up a little of the natural warmth to them to assist them on colder nights, without falling to too low a minimum. Late, or successional pot-grown *Strawberries*, now introduced, though it may aid them simply to place the pots upon some kind of bottom-heat, will do better if not plunged wholly therein. The flavour of such as are ripe is generally better if picked from plants with their roots in a moderately dry state, than when they are in a wet, or over-moist condition. *Strawberry* plants, being forced at winter stage, which is also the case with back shelves or in similar positions exposed to the full sun and air, will now dry very quickly, and in consequence will require watering frequently. These must not, on any account, be permitted to become too dry; and, should such an error occur, two, or even three, good drenchings should be given in succession, to thoroughly moisten the roots.

HARDY FLOWER GARDEN.

Proceed with the transplanting of *Calceolarias*, *Verbena*, *Salvia*, *Scarlet Paeoniums*, *Lobelia*, &c., out of store pots, pans, or boxes, into cold frames or pits; and if these latter possess a little bottom-heat under the soil they are dibbled out into, so much the better.

Continue to propagate *Dahlias*, *Hollyhocks*, &c., by division of the roots, so soon as practicable. Transplant permanently *Cerastium* where edgings of it are intended. The young shoots, knocked off from the old plants in the same way that *Watercress* are cut for market, and dibbled into rows thickly and firmly, make the best of edgings for a future summer display. A good watering should be given shortly after the operation.

KITCHEN GARDEN.

A correspondent informed lately the cause of his *Sor-kale*, when cooked, being hard and bitter. This frequently occurs at this late season of the year, as well as at other times, and is attributable in the main to two causes. Fluctuations of temperature, sufficient during its growing season to check it, invariably cause it to become tough; and, again, if grown on quickly in heat and it has become so tended in growth—until, in fact, it has reached the top of the pots, and is then permitted to stand unused whilst the heat decreases—both the evils complained of will ensue. Give to all forced vegetables in pits or frames, such as *Potatoes*, *Carrots*, *Radishes*, *Asparagus*, &c., copious waterings during fine sunny weather. When *Tomatoes*, *Capicums*, &c., are at a proper stage, not having been sown earlier for potting-off, let it be done forthwith. Stir the soil between the rows of *Cauliflowers*, and endeavour to counteract by every possible means the destructive intrigues of the feathered tribe in connection with all sown seeds. If the weather is favourable (as it is whilst I write) bring up all arrears in regard to sowing the seeds of vegetables, to the major part of which I have previously referred. Sow a few *Dwarf French Beans* in a warm sheltered corner, and a few in pots to turn out by and by. *W. E.*

Notices to Correspondents.

ANGLE FOR A STRAWBERRY HOUSE: M. A. K. If you have a stage fixed pretty close to the glass, an angle of 45° will answer very well. The length of rafter depends altogether upon the width of the house, and the form of the roof.

ASPHALTING GARDEN WALKS: T. S. M. Yes. See letter of "A Country Clergyman" in another column.

AUCUBAS: W. M. G. C. The seeds will grow, and you may get seedling varieties; but it will be impossible to tell if the plants are male or female before the flowers open. The produce may be grafted, as they are like most other evergreens, at any time when the wood is firm. The early spring is perhaps the best time.

BOOKS: T. S. M. We have no knowledge of the book you mention on fumigation.—J. C. M. Hoopes' "Book of the Garden" is the one you refer to. It should be had of Tribner & Co., will answer your purpose.

BRITISH GUIANA: A Subscriber wishes to know if the prospects for a settler in British Guiana are good, and what are the duties of an overseer in a sugar plantation? "Subscriber" has had twelve years' experience in farming in Jersey.

FORCING PEACH TREES: W. M. We can scarcely fix a limit as to "how many years" Peach trees may be forced, having the fruits ripe in May. A fast life is generally a short one with plants, as well as with animals. Probably in this case, very few indeed.

INDIA SOY: Maria. This sauce should be made of the seeds of *Dolichos Soja*, but as generally found in the shops it consists almost entirely of treacle and salt. We do not know whether the plant is in cultivation or not. In Redwood's "Sui Phenomena," the following recipe is given for Soy:—"Boil 4 lb. of the seeds of *Dolichos Soja* with water till they become soft; then add 4 lb. of bruised Wheat; keep the mixture in a warm place for 24 hours, then add 4 lb. of common salt and 2 lb. of water; put the mixture into a stone jar and cork it out for two or three months; then press out the liquor." We very much doubt if such a thing as genuine Soy is to be had in this country.

INSECTS: H. H. The black grubs found about and within the stem of your Cauliflower plants are not the one usually called Leather-coated Jack, they are the larvae of *Bibio Marci* or *B. hortulanus*, a two-winged fly, which appears in gardens in the winged state in the spring, the male being of a brown colour, and the female of a blackish green. These larvae are generally found in decaying manure and other vegetable matters, and we do not believe that they attack healthy plants. Watering round the roots of the plants with lime or gas-water would probably drive them away. I. O. W.—The insects which are the cause of the Aphid persica; you do not state what trees are attacked. Fumigation with tobacco smoke, or repeated washings with methylated spirits, properly and carefully applied, will destroy them. I. O. W.—V. H. The grub seen in connection with *Cabbages* and *Turpins* in gardens, the caterpillar of a moth, *Noctua (Agrotis) sepioides*, which has survived the winter. It is the same species which, under the name of the Surface Grub, is so numerous and destructive in certain summers. Watering the plants carefully with water will drive them away, and root laid round the plants an inch thick will deter the caterpillars from approaching them. I. O. W.—I. H. Your Apricot buds and bloom are infested with the minute caterpillars of a tiny moth, which we believe to be *Anaparsis* or *Anthrenus*, the eggs of which were deposited during the preceding summer on the young shoots; the moths will appear about June. We know of no more available remedy than carefully destroying the infested bloom, and watching for the little moths when they appear in the winged state.

LEMON TREE: A Constant Subscriber. Your case is an uncommon one, but you do not give us any data as to the state of health of your Citrus, neither do you mention whether the injury to the bark was caused by an

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GRASS SEEDS FOR ALL SOILS, CARRIAGE FREE.

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FOR PERMANENT PASTURES,

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STIFF CLAYS	LIGHT SANDY SOILS
HEAVY LOAMS	SHARP GRAVELS
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GOOD BLACK PEATY SOILS.	

BEST QUALITY, 28s. to 32s. per acre. Carriage Free. Two Bushels of Grass Seeds and 12 lb. of Clovers supplied per acre.

SECOND QUALITY (good), 20s. to 26s. per acre. Special Estimates given for large quantities.

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February 5.—"Your Grass Seeds are so pure and well selected that I have often spoken of them to those who required them."

From J. L. WILLIAMS, Esq., *Boyn Vico, Nawan, Meath, Ireland.*

March 30.—"Last year I got from you Permanent Pasture Grass Seeds for 10 acres, with which I laid down one-half of a 20-acre field (Irish). I am very much pleased with the way the Grass Seeds have answered, and I now want to lay down the other half of the field in the same manner."

From J. WARD, Esq., *Round Oak, Grenham, Newbury.*

July 6.—"The Permanent Grass Seeds for about 20 acres, supplied by you last year (the greater part sown with Hardy), have given me great satisfaction, and produced a crop this dry season of about 45 tons of good hay, 45 acres of which have fed five head of cattle during the spring."

FOR PARK GROUNDS, &c.

18s. per bushel (2½ bushels per acre), carriage free.

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For improving those already in Turf, 20 lb. should be sown per acre.

March, April, and May, are the best months for sowing.

1s. per lb. : 2s. 6d. per gallon : 20s. per bushel.

Carriage Free.

From Mr. J. MESSICK, *Gardener to S. FOSTER, Esq., Le Court.* January 21, 1868.—"The seed you sent me has turned out uncommonly well. Several gentlemen who came to Le Court could scarcely credit, from the appearance of the lawn, that it was only sown in May. In August it was as fine and thick as I have seen since it was that had been laid down for three years."

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Second quality, 20s. to 24s. per acre.

For Heavy Soils—Best quality, 28s. to 31s. 6d. per acre.

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Reduced rates for quantities of more than Five Acres.

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"Lady Carbery is glad to say Messrs. Carter's Seeds (Grass and Green Crops) have proved excellent, and been much admired in her results."

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Samples and prices sent on application. Gold Medals, 1851, for Wheat; 1862, for "Excellent Seed Corn and Seeds."

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H. and F. SHARPE are now prepared to make special offer of the above Seeds, comprising TURNIP, CABBAGE, CARROT, MANGEL WURZEL, GARDEN PEAS, and BEANS, &c., grown from the finest selected stocks, and free from adulteration of any kind. They are harvested in splendid condition. Seed Growing Establishment, Wisbech.

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FOR SALE, Pure-bred PIGS, of the small White Suffolk and improved large breeds, in good condition. Mr. WATERMAN, Watlington, near Maidstone.

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HANDSOME FITTINGS, nearly new and well made, together with all the UTENSILS and STOCK in TRADE of a Seedsmen and Florist, to be SOLD cheap to an immediate purchaser, either separately or together. This is an important matter to be met with. Mr. CRANE, 9, Cross Lane, Eastcheap, E.C.

LAND to LET, on Lease, immediately: favourable aspect, and very suitable for Glass Exercises: Stabling. SMART, Hendon.

FOR SALE, an old established NURSERY and SEED BUSINESS, within a few miles of London, containing about 14 Acres of General Nursery Stock, numerous Glass Structures, Seed Shop, Dwelling House, &c.
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SALES BY AUCTION.

Periodical Sale of Poultry and Pigeons.

MR. J. C. STEVENS will SELL BY AUCTION, at his Great Rooms, 38, King Street, Covent Garden, W.C., on TUESDAY, April 4, at half-past 12 o'clock precisely, First-class DARK BRAHMA, from JAMES COCHRAN, from Rev. G. Gilbert; valuable CARRIERS, from Mr. Ord; and a variety of other CHOICE POULTRY and PIGEONS, from the yards and flocks of well-known Breeders and Exhibitors.
On view the morning of Sale, and Catalogues had.

Turnham Green, near to Brentford Road Station.

STOCK of a HORTICULTURAL BUILDING, comprising Two Ornamental Conservatories, Fine Leads and Span-roof Greenhouses, and a Portable Greenhouse, of superior construction and fitted with the most approved system of ventilation. 100 ft. long, 40 ft. single, Double, and Four-light Frames; 14 Box Barrows, Garden Seats, Rollers, &c.

MR. JAMES H. GREEN is instructed by Mr. Smith to SELL BY AUCTION, on the Premises, as above, on THURSDAY, April 13, at 1 o'clock, the whole stock of GREENHOUSES, FIT LIGHTS, and JARVES.
On view three days prior and morning of Sale, Catalogues on the Premises, and of the Auctioneer, 72, King Street, Hammesmith, W.

MESSRS. HEPPER AND SONS have pleasure in informing Gentlemen, Nurserymen, and Gardeners, that they have received instructions from the Rev. W. Richmond, of Moorfield House, Mortworth, Leeds, to SELL BY AUCTION, without reserve, the FIRST WEEK, in MAY, his Valuable COLLECTION of ORCHIDS and STOVE and GREENHOUSE PLANTS, formed without reference to expense, and specimens from which have taken First Honours at Leeds, York, and other great Shows.
Dates of Sale, and further particulars, will be given shortly in the *Leeds Mercury* and *Yorkshire Post*.

East Parade, Leeds, Feb. 20.

Wickon Park, Stony Stratford, Bucks.

IMPORTANT SALE OF SHORTHORNS.

MR. STAFFORD is honoured with instructions from the Right Hon. Lord Penrhyn to SELL BY AUCTION, without reserve, at Wickon Park, on TUESDAY, May 2, FIFTY HEAD of Valuable SHORTHORNS from the Penrhyn Cattle and Wickon Park Herd; prominent amongst them will be found several descendants of Duchess Nancy, Duchess of Lancaster, Queen of Hearts, Garland, and Victoria tribes. The Bulls include Cherry Dukes, Oxford, Wadhwa, and other famous sires of the purest Kirkcubright blood have been used, and the young stock are chiefly by Duke of Wharfedale (21,058), 11th Grand Duke (21,849), and Cherry Duke (25,752).

Catalogues, with Pedigrees and other particulars, may be had on application to Mr. STAFFORD, 13, Euston Square, London, or Mr. DOIG, Lillingstone Hall, Buckingham; and of Mr. SMITH, Penrhyn Farm, Bangor, North Wales.

Haivering Park, Essex.

IMPORTANT SALE OF SHORTHORNS.

MR. STAFFORD begs to announce for SALE BY AUCTION, without reserve, on WEDNESDAY, May 3, next, at the Haivering Park Farm, near Romford, a choice selection of about FORTY HEAD of SHORTHORNS, bred by, and the property of, D. McIntosh, Esq., of the Bays of Kent, the younger portion of which are by his superb Bull, 3d Duke of Gwent (25,723). Catalogues, with Pedigrees and further particulars, will shortly be issued.—London, 13, Euston Square, March 30, 1871.

CENTRAL CHAMBER OF AGRICULTURE.—A MEETING of the CENTRAL CHAMBER OF AGRICULTURE, at the SALISBURY HOTEL, FLEET STREET, on TUESDAY, April 4, at 10 o'clock in the forenoon, when Deputed Members from Provincial Chambers and other Members of the Council are requested to attend.

Members of the Legislature who may be interested in the subjects for consideration are also invited to be present; and Members of the Central and of Provincial Chambers, who are not deputed or on the Council, are welcome to be privileged to vote.

AGENDA.

To transact General Business.
To receive the Monthly Report of the Local Taxation Committee.
To consider "The mode of Assessing Property and Income Tax." To consider "The various Game Bills before Parliament."

On TUESDAY, May 2, the Council will consider "The Government Licensing Bill," and "The Government Bill on Local Taxation" (if introduced); also the subject of "Poor Law Medical Relief."

On TUESDAY, May 6, the Council will take further action upon the "Turnpike Trust" question, and will also consider "The Harpshires and Anomalies of the Harpshires." The Harpshires will be discussed on further particulars, will shortly be issued.—London, 13, Euston Square, March 30, 1871.

Central Chamber of Agriculture, The Salisbury Hotel, Fleet Street.

BATH AND WEST OF ENGLAND SOCIETY

(ESTABLISHED 1777),
and SOUTHERN COUNTIES ASSOCIATION.

GUILDFOOT MEETING, 1871.

ENTRIES CLOSE APRIL 12.

Forms for the Entry of Stock, Poultry, Implements, &c., forwarded on application to the Secretary.

JOSIAH GOODWIN, Secretary.

4, Terrace Walk, Bath.

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

WOLVERHAMPTON MEETING, 1871.

STOCK and IMPLEMENT PRIZE

SHEETS are now ready, and will be forwarded on application to

H. M. JENKINS, Secretary,

12, Hanover Square, London, W.

Notice

GARDENERS' CHRONICLE and AGRICULTURAL GAZETTE.

The VOLUME for 1871 is now ready. Price, 1s. cloth, 6s. 6d.

W. RICHARDS, 43, Wellington Street, Strand, W.C.

NOTICE TO ADVERTISERS.—FRIDAY,

April 7, being GOOD FRIDAY, the "GARDENERS' CHRONICLE and AGRICULTURAL GAZETTE" for that week will be published on TUESDAY, April 11, at 10 a.m.

ADVERTISEMENTS for that week must reach the Office on WEDNESDAY MORNING.

The Agricultural Gazette.

SATURDAY, APRIL 1, 1871.

MEETINGS FOR THE ENSUING WEEK.

MONDAY, April 3 { London Farmers' Club (Mr. Clement Cade on the Growth of Cabbage and Kindred Crops.)

TUESDAY, — 4 { Royal Chamber of Agriculture, at Salisbury

WEDNESDAY, — 5 { Agricultural Society of England.—Noon.

THE SEWAGE QUESTION has made a very hopeful step, when it leaves the domain of the engineer for discussion by the land surveyor.

Mr. H. J. MORGAN, the secretary of the Metropolitan Sewage Company, read a paper before the Surveyors' Institute last Monday—given in another page—which describes the management of the Barking Sewage Farm from its outset, and especially records the experience realised upon it during the last year of its management by himself.

The enormous returns which in particular instances he records are numerous enough, and over areas large enough, to justify the confident hope that we shall one day achieve, as a uniform experience, this full valuation of the chemist puts upon town refuse. If indeed we can realise for "man" only the value, as a fertiliser, which the farmer puts upon a sheep, the financial success of all the sewage utilisation schemes in progress is assured. And reporting, as

Mr. MORGAN does, crops varying in value from £20 to £70 and upwards per acre, of which the history is complete from seed-time up to sale, he at any rate may be excused his confident belief that his Company, to whom North London sewage is conceded, hold a valuable property in their hands.

Mr. MORGAN has now had several years' experience, first as constant visitor, and latterly as responsible manager, of the Lodge Farm, Barking, where from 300,000 to 500,000 tons of London sewage have been annually applied. His experience is, therefore, one of the most trustworthy guides to sewage management and distribution that exists, and his paper on Monday last well deserves perusal. Perhaps the points on which it will be read with greatest interest are the mode of laying out the land which it recommends, the policy of using other manures along with sewage to which it refers, and the actual returns from the use of sewage alone which it records. The experience of Lodge Farm indicates that large and comparatively flat beds, even on its loose, light soil, are workable with as little waste of sewage as smaller, steeper ones. It also shows that where a drained subsoil exists there is no chance of picking up tail surface-water for re-use. It has, however, led the present manager, notwithstanding the enormous crops which he records from sewage only, to believe that the best policy for the sewage farmer, as for every other, is to do the best he knows for the land he holds, whether by the aid of other manures or not.

If we had 500,000 tons of sewage annually to use, paying probably between £2000 and £3000 a year for it, we would take care to grow the heaviest crops that could *anyhow* be got. And if the application of heavy dressings of farmyard dung would more than pay themselves (as they certainly would when followed by the sewage), no considerations, almost Quixotic as they seem to us, of the "great importance" of being able to say that this great crop was produced by sewage only, should hinder us from applying them. Some of the greatest results of Mr. MORGAN'S management have been no doubt owing to the drought of last year, which placed him, with his command of water, at an immense advantage over the market gardeners in his neighbourhood. Even if sewage were only water—and did not carry also ammonia, nitrates, phosphates, alkalies, and other fertilising substances in its midst—it would grow great crops on land in good condition. Let us always have the land in good condition, whether independently of the sewage or not, and the full use of that immense portion of its value, which consists in its being the mere carrier and distributor of vegetable food, will be always realised.

The debate on Mr. MORGAN'S paper before the Institute of Surveyors was postponed till their next meeting, when no doubt many of his points will be discussed, perhaps disputed. Let us hope that the discussion will turn on matters of practical importance, and thus be helpful to those who are seeking guidance on the sewage question. They may be sure at any rate of this—that the farm at Barking, under its successive managers, has provided more definite information for their use than any other under sewage in the country. The Metropolitan Sewage Company, whether it has taken the best way to convince the public of the value of its property or not, has at any rate, through its successive farm managers, spared no pains to collect and publish trustworthy statistics on sewage utilisation—the subject to which their secretary and farm manager, Mr. MORGAN, once more called attention on Monday last.

LAND DRAINAGE WORKS are rapidly coming to an end for the season, and it already seems almost unseasonable to refer to it. There is, however, sufficient that is uncertain, unexplained, and even anomalous about its practice and results, to make any season fit for the discussion of it. There is, on the face of it, something so surprising in the power of an empty 2-inch pipe to drain and fertilise a clay soil and subsoil 3 to 3 yards from it, that the exceptions one has witnessed to the general rules of drainage practice are well worth consideration.

So long as practical men advocate opposite systems of draining, which have been equally successful in their respective cases, it may be concluded that there are two or more best systems of draining, each adapted to particular soils and subsoils. We have recently met with several examples of effective draining,

by methods as distinct as possible. In one case the depth and width were 30 inches, and 1 rod; and in another 5 feet, and 2 rods; both systems were equally successful, and well adapted to the respective soils, and the cost was about the same in each case.

Another case of drainage which has lately come under our notice was the tapping of a well during the sinking of another distant well at a higher level. While sinking the latter, the well-diggers, at 60 feet, came upon a porous seam of shale, full of water. On tapping this reservoir the well at the somewhat higher level was drained. It had been fed, no doubt, by a pressure of water from distant and, of course, higher ground. If the stratum above the shale had been porous, the pressure which carried the water to the upper well would have forced it through the subsoil, and the land above would have been saturated in wet weather by the rising of the water from below, as well as by the rainfall on the immediate surface. Drains laid in such a subsoil at 5 feet would draw off the water to that depth, and draining at 4 feet would have a proportionate effect. The proper depth must here be determined by outfall and other considerations, but at any rate it is a case for deep draining only, for drains at 30 inches would leave the water level too near the surface, and would not prevent its rising mischievously, in a wet season, under pressure from the subterranean feeders. On a smaller scale the pressure of water causes its outbreak from those gravelly and porous beds which sometimes run across the line of fall, and hold the water, when they are separated by seams of clay. And in this instance also the drains should be deep, and they should run in the line of greatest incline.

Feeders, diffusing water through an open subsoil, by pressure, cannot exist in chalk rocks, which are the seat of the free passage of water through their cracks. Hence we have observed the most successful examples of shallow drainage on tough, tenacious clays overlying the chalk, where only the water falling on the immediate surface had to be removed. At 30 inches the soil became exceedingly hard and apparently quite impervious, preventing the escape of the top water, and converting the surface, in wet seasons, into a mud-bed. On this floor the pipes were laid and covered with a little brushwood, to let the water down more readily. If the pipes had been laid under the floor instead of on it, not a drop of water would have flowed from them, as we have proved by experiment. Deep draining would be as inoperative as the insertion of a tap in the floor below a water-barrel, instead of in the barrel itself. We have seen the whole cost of a Government drainage loan wasted, owing to the hard-and-fast rule as to depth compelling the laying of the pipes where the water never reached them.

An experienced farmer and deep drainer hired a farm recently, having a subsoil, in some parts, of hard stone covered by clay. The land was sodden merely by top water, for there could be no subterranean source through the rock. The circumstances made it a case for shallow drainage, and the 4-foot drains that were laid turned out to be of no use, and every penny of the cost was thrown away. The farm is now equally well drained in every part, but not on the same plan, for there are 4-foot drains in some fields, and in others the mole-plough has been used at 24 inches, and half-rod intervals. Trial holes, dug in different fields on this farm, in dry weather, remained empty in some cases, while in others the water rose in them to within 2 feet of the surface.

Another index of underground and distant sources of water occurred in a well dug in the solid white rock of the upper greensand, which crops out in this instance beneath a lofty and wide chalk range. Usually the water level is at a depth of 70 feet from the surface of the well, but in wet seasons it rises to within 20 feet of the surface. The fields lying on the narrow belt of greensand above the farm-house, where this well is situated, are deeply drained, and usually these deep drains keep the water level at a proper distance, but occasionally a flood from below occurs, and water bursts up to the surface from between the drains, and sometimes close to them.

The practical conclusion from these instances seems to be, that there is no golden rule for depth in draining. It must depend on the character of the soil and subsoil, and on the source of the water which is to be removed. *H. E.*

— THERE were short supplies of English Wheat at Mark Lane both on Monday and Wednesday, and selected parcels went up 1s. per qr. on the previous week's prices—the remainder at those of the Monday previous.—At the Metropolitan Cattle Market there was a dull trade in beasts, and prices fell; choice kinds held their ground.

— We see it announced that the YORKSHIRE AGRICULTURAL SOCIETY are to follow the example of the Royal Agricultural Society—set them by Mr. MASON, late High Sheriff of Oxfordshire—and offer prizes for the best managed farm within their province. The prizes are to be of great value, and the period during which the excellence they are to mark is to be maintained will be at least two years.

— The Council have announced their intention to give three premiums for the three best examples of profitable farming in the county, each farm not to be of less than 100 acres. The best will secure for its occupier £300, and a silver cup of £50; the second, £200 and a cup of £20; and the third, £100 and a cup of £10. The entire fee to be paid by the winner will not be less than 10 competitors; or, if this number of entries is not made by August 1 next, the Council do not bind themselves to go on with the scheme. Six gentlemen will be nominated as judges by the Council, but only three will be required to select from the votes of the competitors. The judges are to make their first inspection in October, 1871, and the last in March, 1874, and the decision will be given during the great Yorkshire Show in 1874. The judges will be desirous to discourage high cultivation without definite results, the object being to show that by a wise and liberal application of capital and skill to cultivation of land a profit will result.

— We were the other day in conversation with a gentleman who has recently purchased an estate in the Highlands, which pays him probably not more than 2 per cent. upon its purchase money. What is the reason that land is not worth more, agriculturally, in some of the Highland districts? It is not that grass will not grow—that Oats will not grow and ripen satisfactorily—but that harvest time is so late, and therefore so precarious; so that saving the crop, whether it be grass or hay, is hazardous, and oftentimes a failure. "If" the artificial and artificial means of drying grass or sheaves, crops would be more valuable, and land would yield more rent." Of course we told him of Mr. GIBBS' artificial drying machine, of which he can see an example already transported to the North by his Grace the Duke of SUTHERLAND. And we could also tell him, that if the work of harvesting can be half done naturally, so as to leave only a portion of the sap as moisture to be driven out by fuel, there is little doubt but that it would answer his purpose well to buy one of Mr. GIBBS' sets of machinery. We extract in another page a passage from a recent prize essay, giving an account of the machine, which, we are glad to see, points out fairly, that while the drying of a given weight of water at the same temperature always takes the same weight of coal, the earlier portions of the water that must be driven off from grass to make it hay go off so much more easily than the later, that the economy of the work of harvest depends a good deal upon getting rid of the earlier portions naturally, leaving to be dealt with by the artificial heat of burning fuel only the later and more tedious and obstinate remainder. We are glad to hear that Mr. GIBBS' offer in our last week's paper has been already accepted, and that his drying-machine will be in increased use next summer.

— Lyttelton news (New Zealand) state that a large farmer in the Courtenay district, who sent to England some 2000 bushels of Wheat in one of the early ships last season, had received his account sales, and he said that the entire cost of shipping, including loss on bags, interest on advances, and every charge reckoned, was 2s. 1d. per bushel from Christchurch. The Wheat was sold at 52s. a quarter, and netted 4s. 5d. a bushel to the exporter.

OUR LIVE STOCK.

THE following valuable remarks upon "Pedigrees of Shortorns," from the pen of the late and much regretted Mr. Barnes, of Westland, Moynalty, Ireland, are worthy of the attention of stock breeders. They are the result of long observation and practical experience, and are interesting both historically and as bearing on the art of breeding. These remarks were suggested by an article upon the investigation of Shortorn pedigrees, which appeared in the *Agricultural Gazette* of December 9, 1854, and are as follows:—

"There are few Shortorned breeders who have not studied the Herd Book more or less; but though that source of information on the important subject of pedigrees is as perfect as it well can be expected to be, it will afford to the general investigator very little assistance as a practical breeder, and he must apply to other sources for the information he wants, and which is essential to his success. The fact is that certain tribes of Shortorns, or families, have established characters as good breeders, which has raised them in public estimation and made them valuable; but though in an old-established family a strong cross may sometimes answer, yet the case in which it does is the exception, and no Shortorned breeder would attempt it if he could possibly avoid the risk. Now with regard to the instance which you produce of Mr. Bates' CLEVELAND RAB, it would be a dangerous precedent, for two reasons: first, the *Metropolitan Cattle* was

best, where practicable, to choose a piece of ground drained by Nature than one that needs draining by art, as Nature's modes of draining are not only the cheapest but by far the most perfect. A deep tilth is the second thing essential to the best gardening. Horticulturists have long been familiar with the advantages of deep cultivation. While agriculturists have often been content with surface cultivation, horticulturists have been pegging away at the lower farms. They have dugged deep to find the gold, and they have found it. I do not say that good crops may not be gathered from a garden with a tilth of 18 inches or 2 feet in depth; but I do say that better will be gathered from one with a tilth of 3 feet. Onions, Cauliflowers, Broccoli, and Parsnips will run down even 4 feet. There are two simple modes of deepening the shallow tilths of gardens. One is to break up and enrich the subsoil, another is to apply fresh soil to the top of the existing tilth. The first is by far the cheapest. The second, unless good soil is close at hand, is a most expensive operation: every inch in depth would require 120 cubic yards or cartloads per acre.

The most general mode of deepening the tilth of gardens is to begin at both ends. This lightens the work, and provides a better admixture of earths. Where no surface earth is available the deepening must proceed gradually. If too much subsoil is brought up at one time it swamps the surface soil with an irruption of ungenial barrenness. The ground may be trenched every alternate year, breaking up the subsoil in the bottom of the trench at each operation, and having a layer of manure with it to ameliorate and enrich a little more of it before the next turning. All this may seem very tedious and expensive; but it is much easier done than described. Such deep tilths are not needed over the whole garden, and if a little is done every winter, the entire space devoted to vegetable growing may soon be made to average 3 or 3½ feet in depth, without any great sacrifice of money. Such works warm the labourers in winter when work is scarce, ease the rates, and improve the productive powers of farm gardens simultaneously. But my business here and now is not with the cost but the necessity of a deep tilth in farm gardens.

The last characteristic that I shall notice is a rich soil. Over the whole garden a good soil, but for vegetable growing a rich soil. The quality of vegetables is nearly altogether dependent upon the rapidity with which they grow. Tenderness, crispness, sweetness, are the products of swift production. A rich soil is the foundation of such qualities. It is a sheer loss of money, seed, time, and labour to keep the garden poor. It may have cost much to enclose, make,

will grow garden produce in perfection. The most thorough drained land retains moisture the longest, and deep tilths, like deep wells, are the longest of becoming dry. During intense droughts gardens can be watered, but those distinguished by these characteristics will seldom need it, and are fitted to make the best use of it when it is given. Having thus selected the site of the garden of the farm, limited its area, and defined a few of its chief characteristics, I purpose giving a few examples, or plans for the same, in my next paper. *D. T. Fish, F.R.H.S.*

ARTIFICIAL GRASS DRYER.

1. *To Dry Wet Wheat Sheaves.*—It will be seen that the engine is the ordinary portable engine of 6 or 8-horse power, run in general use for threshing and other farm work; the smoke-pipe has been taken off at the hinge, and a short lead pipe fastened on to the

being worked by horses in lieu of steam-power, and is shown in the accompanying fig. 85.

It will be observed that the same hot-blast and drying-house are employed, but an ordinary horse-gear has replaced the steam-engine to give the requisite motive power; a sunk furnace supplies the heat; an old cart wheel has been adjusted to form an eccentric, which gives movement to a set of levers. The advantage of this up-and-down movement in the making of hay is very great, because it enables the men to use large hay-forks, and to lift up heavy masses of the wet "clinging" hay, and shake them out before the hot air without being exposed to it themselves. For hay drying I have hitherto found it best to remove the false floor, the central partition, and the valve, and expose the hay to the direct action of the air as it issues from the fan mouth; with this simple arrangement I obtained the following results, which are taken from my rough note book:—

Experiment 1st on Upland Meadow Grass, estimated at 1½ load to the Acre: June, 1869.—Grass cut by scythe on Friday morning, once shaken out by the hay tedder; winnowed up by evening; weather fair and occasionally sunny, but the air somewhat moist.

Shaken out by hand on Saturday by noon time, and put into small grass cocks by evening; weather as yesterday.

Left in cocks all Sunday, weather fine and drying.

On Monday morning from half-past 2 o'clock to half-past 9 very heavy rain fell; remainder of day dull and moist; left the hay untouched.

Tuesday morning. Three hours heavy rain before 8 o'clock; between 8 and 10 o'clock no rain, shook out two rows of cocks; by half-past 12 o'clock a torrent of thunder rain for three-quarters of an hour, which drenched both the spread and the unsprung hay, so that the centres of the cocks were as wet as the outsides; by half-past 3 o'clock the sun came out and a wind sprung up; shook out the two rows and dried them partially by 5 o'clock; then carted up to the drying-house two heavy loads (which weighed when dried rather more than 37 cwt. of hay fit for stacking) and dried them in three hours; coke consumed, 320 lb.

This work was performed in one half of the drying-house only (before the partition was taken down), and it is recorded chiefly to form a first basis for the estimate of cost of the process, not as any fair indication of the time taken by it. If for the convenience of calculation we call the 37 cwt. 36, i. e., equal to two loads of truss-bound hay, the cost of finishing it in this manner stands at 3s. 3d. per load, as the following estimate will indicate:—

Estimate of extra Labour per Dum.			
Two horses and boy to drive	50	5	6
One boy to pull hay from cart	0	0	6
One man to feed wet hay into house	0	0	6
One man to guide lever fork	0	0	6
One lad to throw dry hay out of house	0	0	6
			£0 14 0

14s. for twelve hours equals 3s. 6d. for three loads; add to this the 3 cwt. coke, at 1s. = 3s., and we obtain 6s. 6d. as the cost of drying the two loads of wet hay, or 3s. 3d. per load.

Now, on the same field from which these two loads were taken there remained three other loads in precisely the same condition of wetness. As the afternoon turned fine we had the opportunity of testing the comparative labour—cost of finishing it by natural means, and in the ordinary way; this required the constant labour for six hours of eight men, which amounted, therefore, in money cost, to 12s. on the three loads, or 4s. per load. Hence the use of the drying-house resulted in rather less cost than the trusting to Nature;

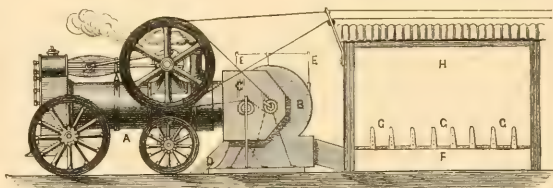


FIG. 84.—MR. W. A. GIBBS' SHEAF-CORN DRYER.

REFERENCES:—A, Engine; B, Hot-blast fan; C, Casing of fan through which the heat from the engine is drawn; D, Air-duct from a sunk furnace (not shown); E, Valve-rods to regulate the supply of hot or cold air; F, Space between the ground and iron floor; G, G, G, Perforated conical tubes, up which the hot air from F rises into the centre of the sheaves; H, Iron Wheat house with its side walls and doors removed to show the tubes; this house is divided into two compartments by an iron partition down its centre, and the mouth of the hot-blast is provided with a valve by which the air can be directed into either compartment alternately.

"exhaust," to carry off the steam. The back plate of the smoke-box having been removed, the engine has then been drawn up and "budded up" against a corresponding opening in the back casing of the hot-blast; a screen of maling wire, interposed between the two openings, intercepts any large sparks that might otherwise be drawn through the fan. A 5-inch driving band is carried from one wheel of the engine on to a small rigger on the flyer-shaft of the fan, whilst another band can be carried from the other wheel over the roof of the iron shed, so as to work an elevator or a threshing-machine simultaneously with the drying process. The fan absorbs only about one-fourth of the power of an 8-horse engine, so that the remaining three-fourths are available for other work. With this arrangement (as shown and described in the drawing (fig. 84)) we were able, last season, to render drenched Wheat fit for threshing, out in 15 minutes. The drying shed which was used

ters of an hour, which drenched both the spread and the unsprung hay, so that the centres of the cocks were as wet as the outsides; by half-past 3 o'clock the sun came out and a wind sprung up; shook out the two rows and dried them partially by 5 o'clock; then carted up to the drying-house two heavy loads (which weighed when dried rather more than 37 cwt. of hay fit for stacking) and dried them in three hours; coke consumed, 320 lb.

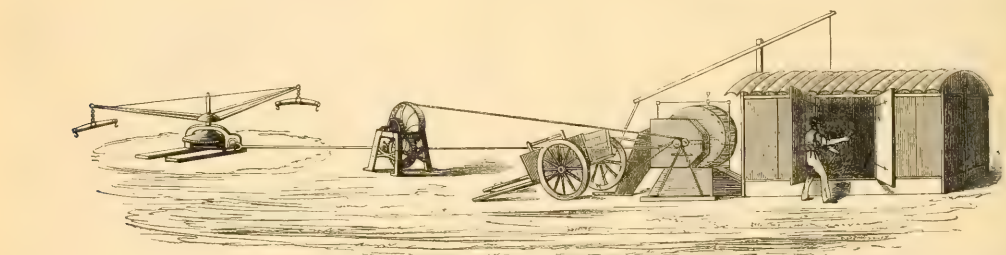


FIG. 85.—MR. W. A. GIBBS' HORSE-POWER GRASS DRYER.

furnish, and the interest of all such capital is lost if the soil is naturally poor, or if it is starved in the matter of manure. In gardening, even more than in farming, the maxim holds good, "What is worth doing at all is worth doing well." Scarcely any crops on the farm draw land so much, unless, indeed, it be Kohl Rabi or Cabbage, as the ordinary run of garden vegetables, and such flowers as Verbenas, Pelargoniums, Petunias, &c. The garden must have rich soil to start with, and be yearly replenished with some of the sweetest, strongest dung from the compost heap. Provided the soil is rich, deep, and dry, its other qualities are of less moment. Calcareous loams and rich black earths are the best for garden purposes. But, as already hinted, the moving of earth is expensive, and 99 times in 100 the earth on the spot is either fit, or can be made so, for gardening purposes. If it is sheer clay or sand, of course it must be removed or modified by the various expedients of burning, admixture, and additions with which farmers are familiar. Any land that will grow splendid Mangels

in these experiments was only 12 feet square, and held 32 sheaves in each compartment; but, with a shed of 12 by 24 feet, which is the size best suited to large farms, 64 sheaves could be dried off in a quarter of an hour—256 per hour. These 256 sheaves represent about the average produce of half an acre of land; and hence, by dividing the harvestmen into two gangs, and working on through the night, between 10 and 12 acres might be cleared in the day and night, at an average cost of 2s. per quarter on the Wheat thus dried. As a full description of these experiments, and close calculations of costs have already been published, I pass on to the more immediate subject-matter of this report, viz., the work done by a still simpler arrangement of this machinery during the past hay season.

2. *To Dry wet Grass.*—This re-arrangement of it was put to the test in order to show its capability of

* In the Essay on Harvesting in Wet Seasons, to which the Society of Arts awarded their Gold Medal and a prize of Fifty Guineas.

besides which, it is still more important to consider, that had rain come on during the field working of the hay, all the foregone labour of opening out the cocks, shaking out the hay, forming it into beds, and turning it over, would have been wasted, and worse than wasted, inasmuch as the spreading out would have exposed it to the damaging action of such rain; moreover, if the hay had not dried sufficiently for the carting during that afternoon, it would have had to take the risk of rain in the night, and more labour would have had to be expended on it on the following day.

I know that after two such seasons as this and the last, these old risks and difficulties have been well-nigh forgotten; but when the cycle of bad and baffling harvest weather once more comes round, they may perhaps obtain some attention. Mr. W. A. Gibbs, *Prize Essay on Harvesting Hay in Wet Seasons, in Transactions of the Highland and Agricultural Society.*

ON SEWAGE UTILISATION.

[On Monday evening last Mr. H. J. Morgan, Secretary to the Metropolitan Sewage Company, read the following paper on this subject, before the Institute of Surveyors, at their monthly meeting in Great Brunswick Street.]

THE utilisation of sewage being a matter of so much importance to the country generally, it becomes the duty of those who have any experience of it to afford information which may serve to extend its adoption, and I, therefore, willingly embrace the opportunity of reporting the progress we have made upon the Metropolitan Sewage Company's farm, near Barking, where for the last five years I have had the advantage of an uninterrupted study of the irrigation system.

Before, however, entering into the details of the experiments, which were in the first instance conducted by Mr. J. C. Morton, and subsequently by the Hon. Henry Petre, my predecessors in its management, I would briefly put before you the objects for which the Lodge Farm was taken. When the company offered the public an interest in their scheme, there was no positive proof of the intrinsic value of town sewage, because there was little or no practical knowledge of its capability.

The theoretic opinions of chemists and others, together with the large yields of grass which resulted from the getting rid of large quantities of the Edinburgh sewage, although sufficient to procure a concession from the Metropolitan Board of Works, failed to satisfy the public, from whom subscription was sought; and it therefore became necessary to establish a system of experiments to develop the powers of town sewage, and to bring conviction to all classes of men.

These experiments were commenced upon a farm in a most impoverished state, much of it being of very poor soil, situate in the neighbourhood of others worked by wealthy men, who never spare expense, manure, or labour, to secure the heaviest crops; but with whom we have successfully competed.

Nevertheless, strange as it may appear, notwithstanding the large crops which have been obtained, and the very good noses of our immediate neighbours, to whom a limited supply of sewage was offered, they continue to tread in their old footsteps, as if, seemingly, ignorant of the greater fruitfulness of a farm inferior by Nature to their own, but rendered more highly productive by the application of sewage.

The company at the outset had the co-operation of Mr. J. C. Morton, into whose hands the management of the farm was passed, and the Italian Rye-grass was then believed to be the crop to which sewage was best adapted, that gentleman caused the land to be laid out for its growth in large quantities, and for its consumption by a large herd of cows. Circumstances have dictated deviation from the original plan, and Italian Rye-grass has given way to other crops, experiments in the cultivation of which Mr. Morton commenced and Mr. Petre extended, and land at first destined to be worked with farmyard manure, and constant to sewage, neighbouring plots has been gradually placed under irrigation.

The alterations and extensions which have necessarily accompanied our farming operations instead of having preceded them, have caused them to be much more expensive and less complete than if the whole work had been the result of an original conception, and I now advert to them, because, independently of the interest they offer to the public, the amount of the cost of the amount of capital expended has been increased much beyond that which would suffice for a similar sewage farm better organised.

The results which we have from time to time obtained have been laid before you, and the power of sewage to raise all descriptions of crops in abundance has been proved, but the price which farmers will be able to afford will vary much according to the circumstances and locality, as to become a matter of bargain necessarily regulated by the facilities which the authorities give to the company, and by the extent of the demand.

Irrigation Works.—I now proceed to the general questions affecting sewage farming, and, firstly, as to the laying out of the land.

The beds which Mr. Morton caused to be made and the roads which he placed at right angles to them, were, as I have already stated, for the growth and removal of large quantities of grass, and therefore, although at somewhat greater cost, he made the beds large.

Provided that the consumption of grass is sufficiently rapid to allow the beds to be cleared and sowed without delay, large beds have many advantages, in my opinion, over small beds. Circumstances may make it convenient, as it has with us in many instances, to throw up small beds, but it would be incorrect to attribute to the large beds a greater proportionate expenditure of sewage. A few facts will make this clear. The largest beds on the farm are 50 yards over all, with a fall of 1 in 69, in 25 yards on either side of the supply carrier, the fall in which is about 1 in 500. The small beds vary in size; some are 12 yards over, all others 16 yards over, all. They have an average fall from ridge to furrow of 1 in 30, whilst the greater fall in the supply carriers varies from 1 in 110 to 1 in 617.

I have carefully taken out the average quantity of sewage used in dressing an acre of grass on the small beds, and I find that it reached last year 500 tons, whilst on the large beds, also in grass, it did not exceed 500 tons. I have also taken out the quantity required to dress Onions growing in the large beds, and it also contrasts favourably with the above quantity applied to the small beds in grass, although their surfaces were protected from scouring, which the Onion beds were not. Mr. Morton, irrigating grass in full vigour on large beds, consumed 5000 tons of sewage an acre. Mr. Petre followed on the same ground, but, with a falling crop, he reduced the consumption of sewage to 2000 tons an acre. If during the last exceptionally dry summer I have been obliged to apply sewage to the new grass, which was cut through the season and grown principally upon small beds, I have not exceeded, over the whole of the grass in its various stages of growth, Mr. Morton's average.

The cost of labour to apply the sewage to the large beds is also less than to the small, being .0128, or about 1-80th of a penny per ton in the case of the former to .0147, or about 1-70th of a penny in the latter.

Experience, therefore, shows that besides the expense of making and maintaining extra gutters, less sewage, less trouble, and less cost is needed in dressing large beds, and confirms what I stated in the pamphlet on this subject which I published in August, 1869. Should necessity seem to require it, there is no difficulty in cutting one or more small gutters upon the "panes" of the large beds when grass crops have given way to small seeds, or of striking it up, as we have sometimes done to allow the seed to drop into the spaces between the rows of plants. This will not interfere with the restitution of the bed to its original form when the ploughing follows the removal of the crop; but in the case of small beds, the fall from the ridge to the furrow is every varying.

Whilst upon this question I would draw attention to the distribution of water over land having a tolerably steep slope, and which is generally laid out on the catch-water principle, because some objections which this subject resulted in an article in the *Agricultural Gazette* on November 19, 1870, to which I cannot do better than refer you, and with which I entirely agree. The mode usually adopted, as being the best and most economical, is that of cutting gutters on the contour of the hill-side at such distances apart as may be deemed best, having reference to the nature of the ground and the crop. These gutters may be separately supplied with farm sewage for the irrigation of the beds immediately below them, or the whole slope may be irrigated by the highest carrier, the water being caught and redistributed by the lower ones in succession as it reaches them. In both cases the word catch-water is proper, for as the carriers cut on this principle cannot be equidistant, the water which has passed over the narrowest part of the bed will run into and continue to feed the carrier below it, whilst the remainder of the bed is receiving its dressing. Any inaccuracy or accident in the upper carrier is corrected by the catch-water gutter below it, by collecting for redistribution any escaping sewage. The objections to this mode are as to the waste of sewage which it causes; but when the gutters are separately supplied with sewage as each "pane" is dressed, there can be no more waste when adopting this plan than attends any mode of applying sewage to the land. Irrigation and water all should waste follow on want of care in laying out, and the waste then arise of the comparative value of the commodity wasted, and of the expense in preventing it. As regards the state of the crops at the top and bottom of the hill, in all cases where we have had any experience we have not seen any difference whatever. When our farm was laid out, the beds were so arranged that any water which escaped from one set of beds was caught and conveyed along supply carriers for re-distribution over some lower part of the farm, the possibility of a fifth use of the water being afforded, the object being partly to utilise the whole of the sewage put upon the land, and partly to obviate the possibility of the collection and stagnation of sewage at any point; but this precaution proved in practice to be unnecessary, for, even when some water escaped for use in the second level, it became so reduced by absorption to be quite inadequate for a third dressing, whilst it induced carelessness on the part of the watermen, and a greater flow of sewage to be put on the beds under irrigation than was due to their dressing. I, therefore, as I stated in my report, cut off communication between the beds, and limited the sewage to the land to which it was directly applied. I

may here repeat that, whether the sewage has been applied to beds in ridge-and-furrow, on the flat, or by means of catch-water gutters, none has ever passed from the surface of the land into the stream which flows through our farm, but has been absorbed by the land or carried away by the subsoil drains.

The cost of laying out a farm to receive sewage is a question always put, but very difficult of reply, since much must depend on ever varying conditions of soil, site, &c.; it can therefore only be met by a guess made under very wide limits. I think, that when we include the cost of levelling beds, filling in of ditches, felling trees and making roads, all which must be considered in the work of laying out the land, that between £5 and £10 per acre, exclusive of draining, will, over small farms, be found to be necessary.

The cost of sewage farming, in its forgetfulness that he is about to establish a factory, and not a mere farm, and that his profits are to be those of the former instead of the latter, is often daunted at the outlay which he may have to make; and it is this feeling which I fear will cause farmers to lay out only small portions of their land at a time, in place of at first entering on a general and satisfactory plan.

The question of subsoil drainage is one of great importance to the sewer farmer, and although Mr. Morton was induced to believe that the drain he had caused to be put in our light soil were a useless addition to the general expenditure, they have been not only very useful but scarcely sufficient. The enormous growth of top in our Carrots last season, without a corresponding growth in the roots themselves, was, I am satisfied, attributable to the continued moist state of the ground in which they grew, and to the hot soil which forced them. The quantity of sewage so applied was not large, and the land is very porous, but when on the removal of the crop, and long after sewage had ceased to be applied, we commenced draining it, we found it full of water, mainly from land springs and partly from surface water.

Mr. Bailey Denton, in his very exhaustive paper lately read at Maidstone, is quite at home upon this point, and from the authority with which he speaks of sewer work, he has read the satisfaction by all who take an interest in the subject of sewage, unhesitatingly promises to adapt clay soils to receive large dressings of sewage, and thus removes difficulties which have hitherto been feared, by many, to exist. We have applied sewage to good strong land on the Lodge Farm with success, but only lately have we drained some which has undeniable clay within less than 3 feet of the surface. I hope on a future occasion to be able to give favourable results regarding its cultivation under sewage, but with a fair depth of mould to protect it we shall avoid the cracks which the sun brings to clay, and which have hitherto operated against its suitability for irrigation purposes. Before quitting this subject, I submit, with every deference to his opinion, that Mr. Bailey Denton rather underlimits the cleansing properties of free soil when he limits its power of reception to the sewage of 20 persons per acre. Taking his standard of 324 tons of sewage as the annual contribution of each head of population, and the number of tons of sewage which we last year put upon many acres of grass, without being able to maintain an average growth, it will be seen that the sewage of 335 persons was consumed on one acre of land. Had our object been to get rid of sewage, instead of confining the dressings to the quantity we considered absolutely necessary, I have no doubt that the land would have taken and have cleaned very much larger quantities than we put upon it.

The mode of conveying sewage about the farm for distribution is a matter which will require the consideration of those entrusted with its laying out, and I only draw attention to the subject in order to point to the objections which exist to the troughs upon wooden stilts, both in wood and iron, which we have in use. They are both objectionable from being unsightly and objectionable from being inefficient. The iron troughs, owing to their flexibility allowing a change of form, and are expensive to repair, besides being costly; of the two, the wooden troughs are less expensive and more efficient, cause less trouble, and are more readily constructed and repaired.

Another point to which I would briefly refer is as to the state in which the sewage should be when applied to the land. Of course, all sewage is not alike, and therefore in the remainder of my remarks you have understood that I speak of that which we take from the main outfall sewer at Barking Creek. The sewage flows to the pumps in the state in which it travels in the main sewer, a screen being generally used to prevent sticks, &c., from entering and hindering the action of the valves.

The sewage on reaching the farm is at once applied to the land without dilution or settlement, and during the five years we have pursued this course we have never felt the slightest ill effect from it on any of the various crops irrigated.

It will, therefore, follow that it is perfectly unnecessary to embarrass the question of the irrigation of land by North London sewage with any contemplation of the heavy expense which would attend on a dilution of it by pumping Thames or other water for such purpose.

As to the cropping of the ground, I can add but

little to what has been already said in the reports of our proceedings, but there can be no difficulty in selecting crops which will repay the producer, since we have tried almost every description of crop, and found all equally benefited by sewage.

During the last 18 months I have endeavoured to keep most of the land full, and so arranged the crops as to leave as little land as possible in fallow, in order to see whether this system permits of the proper cultivation of the land for following crops, or whether it is desirable, on the contrary, to adhere to the general plan of following the land. The result was not unpromising, but we are now pursuing the opposite course with a portion of the land, so as to obtain a desirable contrast between the two systems.

I wish, however, to say that I am of opinion that it will be found advantageous, if not absolutely necessary, occasionally to use farmyard manure jointly in the production of crops, and at times also independently altogether of sewage dressing. I am quite aware that I have been accused of spoiling sewage experiments by manuring land, subsequently dressed with sewage, and have been told that the world already knows what dung will do in producing crops, and that what it now wanted to be instructed in the power of sewage alone.

I readily admit that the world does know what dung will do, but it also knows when the power of dung fails, and it requires to learn from practice what dung and sewage jointly will be able to accomplish over an average of years. I have no hope that because a heavy dressing of farmyard manure will produce 50 tons of Mangel per acre, and that liberal dressings of sewage will, on an adjoining piece of land, produce 60 tons of Mangel per acre, that the union of the dressings will

As an instance of the value of added dressings of sewage to ground previously dressed with farmyard manure, I can refer to a portion of the Onion-sown land, which had been originally reserved for dung alone, for the purpose of contrasting its produce with the beds otherwise treated. The dressing of dung upon this piece of land was equal to that which our neighbours would have applied. The crop, owing to the drought, threatened to be a failure, but I resisted all efforts to have the sewage put upon it until towards the end of July, when the contrast between the beds was complete.

The sewage was then, at the eleventh hour, applied, and the manner in which the Onions responded to the treatment was quite astonishing, and an average crop was ultimately secured.

The reduction in the area of land in grass cultivation made by Mr. Petre, when Mr. Morton's appointment under the Royal Rivers' Pollution Commission caused him to relinquish the management of the farm, and the extension of experiments with other crops, was rendered necessary owing to the loss of our cows, and became desirable on account of the greater profit to be obtained by the disposal of market garden crops in the London markets.

The extension of the sewage to more land was rendered also desirable by reason of the diminution in the quantity of dung at our disposal. I would only refer, however, to the previous management to show how irregular the returns of the grass and sewage for the years 1867 to 1870 have been, owing partly to the different stages in which it was cut, and partly from the failure of the late-sown grass in 1869, and of the spring-sown grass of 1870.

The average yield of grass per acre during Mr.

maton, but I propose to detain you whilst I refer to such of the returns of crops which, when my report was issued, were incomplete from not having been removed from the land and realised, which has now mostly been done, and in almost all cases the amounts received by the recent sale of crops have exceeded the valuation affixed to them in the report.

As regards grass I have already said that B. No. 1 and H. were the best samples of our last year's grass. Both were well established in the autumn of 1869. The average yield over both plots amounted to 36.4 tons of grass per acre, produced by the application of 11,481 tons of sewage = 259 tons of sewage to 1 ton of grass. The general expenses due to the crop amounted to £12 an acre, plus the labour of applying sewage, which was £1 9s. an acre.

The average of the dressing was 500 tons, and the cost of applying each dressing was about 1s. 8d. per acre. Upon plot A, the Mangel Wurzel weighed 50 tons an acre over all, but upon the portion where a single crop occupied the land, the yield was 62 tons per acre, ascertained by passing the whole crop over the weigh-bridge. The quantity of sewage was 5684 tons per acre.

The Sugar-Beet upon this plot yielded 42 tons 15 cwt. an acre, after deducting 10 per cent. for mould adhering to the roots. The quantity of sewage applied was 1120 tons an acre, at a cost for labour of 10s. 6d.; the other labour due to the crop amounting to £9 14s. 8d. The price at which it is now sold out of the clamp is 23s. 6d. per ton, equal to £50 13s. 4d. per acre. The analysis of the roots tested by Mr. Duncan gave a yield of no more than 8.64 per cent. of sugar, being much less than we had previously obtained by the use of sewage. Nevertheless, owing to the

LODGE FARM, BARKING, FEBRUARY, 1871.

PARTICULARS OF SELECTED CROPS (FROM 112 ACRES UNDER SEWAGE) REALISED DURING THE YEAR 1870, AND UP TO THE PRESENT DATE.

Plot.	Acres.	Description of Crop.	Previous Crop.	Length of Time Occupying Ground.	Gross Value of Produce per Acre.		Cost of General Labour, Seed, &c., per Acre.		Cost of Putting on Sewage, per Acre.		Tons of Sewage per Acre.	Balance for Superintendence, General Expenses, Repairs, Rent, Tithes, and Taxes, &c., and to pay for Sewage after paying increased Rent to Landlord.
					£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.		
A. . . .	1 30	Collards.	After grass	Months.	7 13 1	7 13 1	0 8 4	3 500	51 15 7	51 15 7	5 384	Cleared by end of Oct., 1870. Now being sold on the farm.
	4 12	Mangel	Do.	7	44 17 5	12 3 6	0 17 11	5 384	31 16 2	31 16 2		
	0 35	Sugar-Beet	{ After Greens, after grass	7	50 13 4	9 14 8	0 10 6	1 536	40 8 2	40 8 2	11 337	Sold.
B. 1, and H. . . .	10 14	Grass	{ After Peas, Mangel, Barley	12	38 12 3	10 14 1	1 10 0	11 337	20 3 2	20 3 2		
C. . . .	8 20	Onions.	{ After Turnips, Broccoli, grass, Savoys	7 1	37 15 3	9 15 3	0 11 11	4 483	27 8 2	27 8 2	2 800	{ At the rate of 36.8 tons per acre per annum. The greater part were sold on the ground for £43 per acre.
E. . . .	11 3 31	Savoys	Grass, Peas, Cabbage	7	41 1 6	10 13 2	0 0 0	2 800	24 19 4	24 19 4		
F. . . .	6 1 0	Potatoes	Grass	5	21 15 0	14 16 5	0 9 4	2 645	6 9 3	6 9 3	1 332	{ 5 acres sold for £40 an acre on the ground. Marketed.
	0 1 9	Turnips	Potatoes	2 1	11 10 0	4 8 8	0 4 10	1 332	6 16 6	6 16 6		
G. . . .	3 0 10	Parsnips	{ Mangel, Cabbage, and Potatoes	12	57 3 1	15 8 10	0 9 3	2 192	41 5 0	41 5 0	1 211	{ 6 acres sold for £11 an acre on the ground. Part sold on ground for £50 an acre.
H. . . .	5 0 34	Wheat	Wheat	10	1 1 5 8	5 15 3	0 5 9	1 211	13 4 8	13 4 8		
K. . . .	6 0 0	Do.	{ Broccoli, Canary seed, Red Beet, Mangel	Half 9	19 17 5	4 16 7	0 5 9	..	15 0 10	15 0 10	1 798	{ Sold for 55s. per quarter on Nov. 21, 1870. Sold for 64s. per quarter on December 10, 1870.
	1 1 0	Strawberries	Strawberries	12	85 2 9	18 18 10	0 4 10	1 798	48 9 0	48 9 0		
	1 1 0	Onions	Strawberries	8	62 0 0	13 4 2	0 6 10	1 798	48 9 0	48 9 0	1 136	Marketed.
	4 0 0	French Beans	Cabbage	6	55 11 10	13 18 3	0 4 3	1 136	30 1 0	30 1 0		
N. . . .	8 1 7	Cabbage	Potatoes	5	18 10 0	4 10 10	0 4 4	1 136	13 17 4	13 17 4	{ Part sold for £50 an acre on the ground.	

therefore produce 110 tons per acre; but I do expect material benefit to result from assisting moderately dunged land with sewage dressing as the seasons may dictate. Had some of the lands in our vicinity, which are so admirably farmed by thoroughly practical men, been treated last season with sewage, my own experience entitles me to assert that the returns would have been extraordinary.

In other countries, where, as I am informed, irrigation with both sewage and water is practised, this course is adopted with great results, and its introduction here will conveniently extend the area for sewage distribution by throwing open large tracts of market garden farms, which will always be well supplied with London dung by means of the returning waggons, which have delivered the produce to the markets. I have hitherto only spoken of dung as an advantage, but whether a good working in of farmyard manure will become advisable, if not necessary, in order to break up the land after continued dressings of sewage, is a question remaining for decision. My impression is, that if there is to be a rapid succession of satisfactory following crops this course must be adopted. Mr. Morton had no doubt good reason for advocating its occasional use when preparing land for crops to be afterwards treated with sewage, and Mr. Petre has spoken of an occasional difficulty in starting a good plant with sewage alone.

The result of our experience last year with partial and light dressings of farmyard dung upon land to be sown with Onions, was perfectly satisfactory; and it is no argument to urge that the great difference which at first existed between the parts both manured and sewage-d, and those under sewage alone, finally became scarcely distinguishable; because the season was one eminently in favour of sewage, and there is no opening for a dictum as to what might have been the case had the summer been of an ordinary character.

Petre's first year was 21.6 tons of grass per acre for 3650 tons of sewage. In his second year it was 34 tons per acre for 3600 tons of sewage, and during the last year the average was but 20.4 tons per acre (and I must refer you to my report for some of the reasons of these short returns) for 5000 tons of sewage. It must be remembered that Mr. Morton irrigated land freshly sown and having, therefore, the advantage of grass all in full vigour; he made a return of some 443 tons per acre by the application of 5000 tons of sewage. Taking the two plots which I refer to in my report, B. No 1 and H., which were sown in the autumn of 1869, and were sewage-d and cut through the season of 1870, we find a return of 36.4 tons of grass per acre for 11,481.2 tons of sewage.

The yield of grass from these two plots approaches that obtained by Mr. Morton, and the additional quantity of sewage which was required to produce it must be attributed to the exceptionally hot season.

The general results attendant on our cultivation of this plant show that it is less hardy than it was supposed to be, and that it cannot be counted upon for more than one season. The yield also does not ensure its being as profitable as many other crops, whilst it requires the maximum quantity of sewage.

By an unlimited supply of sewage the Edinburgh meadows yield large crops of strong grass, but the cultivation of Italian Kye-grass has been in most part abandoned; and it may be that the Metropolitan Sewage Company is to be congratulated in not having rested their expectation of full returns from the reclamation of the Maplin Sands, and the establishment there of large dairy farms supplied from large tracts of land in Italian Kye-grass.

Returns of 1870.—As my report on last year's operations on the Lodge Farm is replete with full details, I cannot do better than refer you to it for general infor-

weight of the Beet that percentage gives a yield of about 34 tons of sugar per acre.

The Collards, again, upon this plot, which were planted towards the end of June, were four months in the ground. The expenses due to the crop, including marketing, &c., amounted to £21 13s. 11d., and the cost of applying 3500 tons of sewage was 8s. 4d. The gross receipts per cwt. amounted to £73 per acre.

I will now also correct my estimate given in the account of plot A., at p. 18 of my report, by the following contrast of the estimated figures in the report with the sums actually realised.

Plot A.—Total acreage, 99.2 1/2 p. 13 p.

	Acres.	Valuation.	Realised.
Cabbage ..	9 1 13	258 14 3	361 11 11
Grass ..	8 2 17	100 0 0	90 0 0
Mangel ..	4 7 28	118 0 0	233 0 0
Sugar-Beet ..	0 3 28	20 0 0	47 6 0
Turnips ..	0 2 2	10 0 0	.. ..
Total acreage ..	24 1 8	£487 4 3	£719 17 11

These items are correct, with the exception of the Mangel, which, not being all disposed of, I have taken as worth 18s. per ton, though we are now receiving £1 per ton.

This gross return of say £720 obtained from 99.2 1/2 p. 11p. gives a return of £75 10s. per acre within 14 months, the quantity of sewage (= 8676 tons an acre) having been applied during 12 months. No doubt this is a very large return, and the prices realised for some of the crops are exceptional, and are entirely due to the drought and the consequent failure of green crops generally.

* Total amount of valuation.
† Total amount received and being realised.

The greater part of the Onions in plot C. was sold, on the ground, for £43 per acre. The labour due to the crop amounted to £10 an acre, and the cost of applying 4485 tons of sewage was 12s. an acre.

Of the Savoy Cabbages in plot E., there was nearly 12 acres, of which 5 acres were sold for £40 an acre on the ground. The cost of labour over the whole crop up to the time when they were sold, or were ready for market, was £5 5s. per acre, the cost of applying 2833 tons of sewage was 9s. an acre. The expenses attending the marketing of the 7 acres amounted to £9 per acre. The amount, therefore, to be deducted from the crop sold at £40 is £5 14s., leaving £34 6s. per acre, and the amount to be deducted from the crop marketed, which produced £42 13s. 3d., £14 14s., which leaves an average over the 7 acres of £27 10s. 3d.

The Parsnips on plot G. have proved very successful, part of them were sold on the ground for £50 an acre; 2192 tons of sewage were applied, at a cost of 9s. 3d. per acre.

The return, after deducting labour to crop and marketing, amounts to £43 6s. 8d. for crop sold, and £40 6s. 8d. for crop marketed.

It is here remarkable that none of our crops are grown for exhibition, but are merely farm crops, tolerably uniform throughout; but nevertheless I measured some of these roots, which were very large. One was as much as 20 inches in circumference at the head, and 28 inches in length, weighing 44 lb. when washed. There were others of less size and weight, but of much greater length.

With reference to our sewage Wheat crop in plot H., I had estimated in my reports that when the wheat would yield 5 qrs. per acre. This was long straw Wheat, grown from similar seed as that sown in plot I, both crops have been threshed out and sold. The sewage plot H. produced 5 qrs. 6 bush., with three loads of straw per acre, whilst the unsweaged plot I. yielded but 3 qrs. 2 bush. and 24 loads of straw per acre. Both lots were sold together on Nov. 21 last in Mark Lane for 55s. the quarter, being the top price of the year. The plot H. is a poor stony land, which has borne four Wheat crops in succession, thereby which have been under sewage, whilst the land on I. is excellent land, and has been well cultivated with good dressings of farmyard dung. The difference in the yield must be attributed chiefly to the exceptional season.

Plot K. had autumn and spring-sown Talavera Wheat, a part of which was tolerably dressed with sewage. The land upon this plot is very good. When the Wheat was threshed the sample was excellent, and the yield was 6.84 qrs. per acre, 34 loads of straw. It was sold on December 30 last in Mark Lane at 64s. per qr., its natural weight being 604 lb.

The remaining crop is that described in my report as Tauton Dean from plot M. It has not been all threshed, but 40 qrs. were sold in Mark Lane on February 6th last for 60s., the weight of the bushel being 624 lb. No sewage was applied to the crop, except on a very small portion, but the Wheat followed Manure Cabbages and Potatoes, to all of which sewage was directly applied.

As it may be interesting to compare the cost of some of the most successful sewage crops with the returns obtained from their sale, I have had a Table drawn up, showing the cost of labour upon each, with the number of tons of sewage appended.

As I have already said, these returns are exceptionally large, and therefore it would not be safe to base calculations upon the price, a farmer could usually afford to pay for the sewage upon the amounts which have been realised by us at a time when drought had deprived the market gardeners round London of their crops. As regards the prospects for the coming year, I may say that the severe winter has not forgotten to leave its mark on the Lodge Farm.

The grass has been a good deal damaged, and that which was sown late in September, or early in October, when the plating of the land was in progress, has been nearly all killed, and must be resown. The Broccoli has been cut down, and nearly all destroyed. The late planted Cabbages have also suffered, and will have to remain in the ground longer than was intended, and an alteration in the following crops become necessary. The Oats have suffered more than the Wheat, and a bed of Tares has been ploughed up for Potatoes.

Permit me, in conclusion, to express a hope that if the directors of the Sewage Company were compelled to abandon the idea of spending between two and three millions to permit of the institution of sewage farms on the Maplin Sands, they will have deserved well of the public by their persistent endeavours to develop the value of sewage in a national point of view, by establishing its applicability to every description of crop with the power of competing successfully, in all weather, with farmyard manure, and with unquestioned advantage in time of drought. It is through their endeavours, as well as those of others, that it has been shown that town sewage in no wise affects health injuriously, but that it contains a power of reclaiming hot poor soils, to which nourishing properties, unaccompanied by moisture, would be manure wasted.

The sale of our sewage crops at the highest rates in the London market is an established fact, and both horse- and cow-keepers readily purchase our grass and roots.

The agricultural mind travels slowly, and reluctantly admits that its old courses can be improved upon, closing itself against even palpable conviction.

It is gregarious, and will only travel in numbers, and hence the benefit which the free use of sewage is capable of conferring is withheld alike from the farmer and the nation, and will continue to be deferred until the eyes of the landowners interest themselves in the increase of income which will attend the adoption of sewage irrigation.

ARTIFICIAL MANURES.

YOUR extract from Mr. Lawes' recent lecture at Maidstone is not good evidence in support of their use. Take Barley first. The profit per acre is shown to be £4 18s. 6d., in this is included £1 8s. for straw, at 1s. per cwt. Straw, as a rule, cannot be sold, and every farmer is obliged to give the eating value of it to help pay his cake bill, therefore its manure value is all that can be placed on the side of sale. Mr. Lawes tells us, at p. 511, 1870, that the manure value of a ton of barley-straw is 10s. 9d., therefore the value of the 28 cwt. must be placed at 15s. This reduces the profit to £4 3s. 6d. Mr. Lawes continues to "torture" his trial plots with the old roll-over plough, and horses, and it may be that he can, year after year, "torture" all the Twitch, &c., out of it for a seed-bed for Barley with a single ploughing at 10s. and scuffling at 3s. an acre; but if he can do so, the clay lands of England cannot be farmed and kept clean, under horse-culture, under a continuous cropping of Barley, at that cost. Neither can it be for a continuous cropping of Wheat. In each case at least 10s. an acre must be added to Mr. Lawes' figures. This will reduce the £4 3s. 6d. as profit on Barley to £2 13s. 6d. Now, let us look to the Wheat crop: the profit per acre is shown to be £1 15s. 4d., in this is included £3 10s. 10d. for sale of straw, at 1s. per cwt., at 20s. per load. Here, again straw, as a rule, cannot be sold, and the eating value of it must help pay the cake bill; therefore its manure value is all that can be placed on the side of sale. Mr. Lawes tells us, at p. 511, 1870, that the manure value of a ton of wheat-straw is 12s. 6d., therefore the value of the 41 cwt. must be placed at 25s. 6d. This pulls £2 5s. 6d. from the £3 10s. 10d. for straw sold. So this only knocks off the £1 15s. 4d. as profit per acre, but fixes it with a loss of 10s. 2d. Now let us put these two cases together, to see what a farmer would get for a living upon such a system of farming:—

Profit on the acre of Barley	£3 13 6
Loss on the acre of Wheat	10 2

Gross profit on the two acres £3 3 4

Interest on tenant's capital would pull 22s. from this; therefore the tenant's profit would stand at £2 1s. 4d. for the 2 acres. Such facts as these explained are not very tempting to the farmer to spend his money in artificial manure. Mr. Lawes' "torturing" mode of culture is too costly to keep land clean under a continuous cropping with the same kind of corn. Take his operations as they stand, with the 10s. per acre that I have added:—

Barley—Ploughing	£6 10 0	£ 4 s. d.
Scuffling	0 4 0	
Harrowing	0 4 0	
Rolling	0 2 0	
Drilling	0 2 0	
Hoing and weeding	0 7 0	
Given to the clay land farmer to make seed-bed	0 10 0	
Wheat—Ploughing	£6 10 0	
Scuffling	0 4 0	
Harrowing	0 4 0	
Rolling	0 2 0	
Drilling	0 2 0	
Hoing and weeding	0 7 0	
Given to the clay land farmer to make seed-bed	0 10 0	2 11 0
Total for the 2 acres	£4 9 0	

Now let us look to my own continuous cropping with Barley, under steam-power work.

Ridging and subsoiling	6s. 3d.
Harrowing	2 0
Drilling	2 0
Hoing	3 0
Total	13 3

This, for two years, makes a total of £1 6s. 6d. to be deducted from Mr. Lawes' £4 9s. for the two years' cost, gives a gain of £3 2s. 9d. to be added to the £3 4s. 4d. for the two years; for two years; this makes £3 4s. 4d. for the two years; for the farmer for making his 2 acres by steam-power. The seed-beds by steam-power are vastly superior to anything that Mr. Lawes can do by horses. Let him come to Woolston, and he shall see a quality of seed-bed that he has never witnessed before on any land at a like cost. It may be new to him to hear that my Wheat and Barley hoeing cost by hand from 1s. to 1s. 6d. an acre only, and that the condition of my land, after that a boy 12 years old can hoe an acre of Wheat in a day; therefore, such sums pay such boys well. Mr. Lawes' experiments are very valuable to show us the value of various kinds of manures on different kinds of cropping, but his costs upon his "torturing" system of farming will not do to be relied upon; and from what I learn from his experiments and my own practice, a mixed system of manuring and cropping is

the best to be relied upon, the straw may then go into manure without the appearance of shoving up profits with the sale of it. Farmers do not always make 6s. per bushel of their Wheat, therefore Mr. Lawes' trial for Wheat is a very bad one. Mr. Lawes' item of 5s. for chicken corn is a very suspicious one, for there is nothing in the Table or lecture to show it. According to the evidence of Mr. Lawes, Wheat growing with artificial manures is quite out of the question. It will be well for us to look a bit at plots 5 and 6 (Wheat crops) as to cost and produce, taking Mr. Lawes' figures in plot 9 as a guide, with some trifling variations:—

No. 5. Salts of potash, soda and magnesia ..	£2 10 0
2½ cwt. superphosphate of lime, at 5s. ..	0 13 9
Sowing manure, plot 9, 12, 6d. ..	0 0 1
Reel, tines, and rates	1 15 0
Ploughing	0 10 0
Scuffling	0 0 3
Harrowing	0 0 2
Rolling	0 0 2
Drilling	0 0 2
10 bushels seed, at 6s. 6d. ..	0 0 0
Hoing and weeding	0 0 0
Harvesting (plot 9, 20s.) ..	0 15 0
Threshing (plot 9, 9s. 3d.) ..	0 0 5

Now for the other side of the account, and we will take Mr. Lawes' value of straw:—

17 bushels of Wheat, at 6s. ..	£5 2 0
15 cwt. of straw, at 20s. per load ..	1 5 0
	£6 7 0

This has been worked at a loss of £2 5s. 9d. a year, without any interest for money, with the straw sold at Mr. Lawes' value; and without questioning Mr. Lawes' acts of husbandry, I thought of going into No. 6, but Mr. Lawes does not give us the cost of the 200 lbs. of ammoniac salts, therefore I cannot but take it that the pay for them would pretty well swallow up his extra 10 bush. of Wheat, with the additional straw. If it did not, the £2 5s. 9d. loss on No. 5, with the *et cetera* that are needed, would not all be wanted; therefore it is quite clear that Mr. Lawes' sample farming will never do for regular practice. It is only the very highly manured ones that can pay their way, and there the tenant could get but little or nothing, and worse than nothing, with Wheat at from 5s. to 5s. 6d. per bush. It is sometimes *is*, William Smith, Woolston, Bleckley Station, Bucks, March.

Home Correspondence.

The "Fairly Dell" and Howard's Tubular Boiler.—I have been much interested in reading an article in your paper copied from the *Times* on this boiler, and as the subject is of so many important subjects, both to agriculture and commerce, I beg to ask, through the medium of your columns, a few questions suggested to me by this article, with the object of eliciting information. How long was the "Fairly Dell" on her passage from Sunderland to London? Who took the "notes" recording that the "Fairly Dell" made a run of "about 18 miles in 80 minutes, and that the coal consumed was 320 lb.?" How much canvas was she under while this "run" was made? Was not the wind strong and fair? Was she not at the time running with the tide? Was the captain (who is part owner) cognisant of these "notes" being taken? How long was the "Fairly Dell" on the whole of the passage from London to Yarmouth? Did not the owner of the cargo of flour for France lose a heavy sum of money in consequence of the "Fairly Dell" not arriving in France in time, as per contract? Was not the "Fairly Dell" lying in the Tyne about a month since with the boiler burst? Did the explosion take place on her way to or from France? Does she not carry a cargo of about 450 tons? Is not her greatest speed six miles per hour? *A Shipowner, March 30.*

Use of Horses on a Steam-Cultivated Farm.—Although "self praise is no commendation," Mr. Smith has a well-merited right to plead the exception, from the clearness with which he brings out his facts to speak for themselves,—facts which prove that every farmer farming 166 acres ought to have steam tackle. But when the ploughing, harrowing, and drilling are done by horses, is he justified in holding up Woolston as an example of steam cultivation? For the thousands of farms cultivated on the four and five course shifts, half the area of the former and two-fifths of the latter are in Clover lea and land after roots, so that were such ploughed by horses there would only be half the area remaining to be cultivated by steam, thus leaving the balance in favour of horses. Is horse-culture steam-culture? Ought not my much esteemed friend, Smith, to have one of Fowler's steam-ploughs to do his ploughing? When he says he has abandoned "the old manure drill, I am tempted to ask—What's the matter? Did not the turn-bow answer? Facts speak for themselves, for Fowler's drills are in successful use. Long ago I have sown artificial manure by hand, but is not the practice out of date? The Suffolk drill, with four horses up to the knees, at this season is preferable to hand-sowing; and when told, in a season like this, that horses' feet in ploughing, drilling, and harrowing do no harm to the land, I am tempted to conclude

that my noteworthy friend is either "daft or talking without practice." When the fertilisers are applied in autumn, as they should be, with the steam seed and manure drill, to supply the young Wheat plants with proper food in the first stage of life, the expense of hand-sowing in spring is saved, whilst the Wheat plant is in a more healthy state for the formation of the ear, and so on. Even when neglected to be drilled in with the seed in autumn, broadcast steam manure-distributors make cheaper and better work than the hand, all things considered. I did not advise my old friend to work his heavy loamland at this season by direct sowing; although something this way may one day be done on light land which I have rolled with a heavy roller to adapt it for a Bean crop. We have steam road-rollers. Why not adapt them for light land? and when we get this length what is to hinder the Beans being dibbled in at the same time by steam? It will be time to talk of direct traction when he gets one of Kansom's rubber-engines, and he would take the wholesome advice in this direction, good would be done, for no one is better qualified to solve the problem of steam cartage than the father of steam culture. In short, so long as there is not a Thomson traction-engine, a steam-plough, a steam-harrow, an improved steam seed and manure drill at Woolston, Mr. Smith's steam practice is worth less as an example than it otherwise would be. Even his "turn-bow," such a mighty triumph for a time, has been superseded by the more efficient improvements of Fowler & Co., so that the latter only can be honestly commended. *W. B.*

Facts relating to the Metropolitan Cattle Trade.—This market appeared in July, 1865, and continued until September, 1866, when it was suddenly and completely discontinued. The epidemic had almost disappeared. This "dog-in-the-manger" policy enables the foreign trade to monopolise the London trade, by virtually excluding a large portion of the English trade from its best and central market. A trade that deals with a perishable and deteriorating article requires perfect freedom to prevent loss and expenses, which must otherwise fall on the consumer. The whole of the trade is so absolutely necessary to have one perfectly free and open market, to enable buyers from the southern and home counties to obtain their supplies of cattle (those counties being sheep-producing ones), and there is no other market, on which they can depend, to go to. Contagion, or the communication of disease by contact, it is evident, cannot be prevented by Act of Parliament; and restrictions confined when there is no epidemic must be injudicious. The whole trade is opposed to the present cordon being continued around the metropolis, and are unanimous that the proposed market at the waterside should be for all foreign animals, and that the Islington market be the free and open market for all English stock as formerly. Active measures are now being taken to obtain freedom for the English trade at the Metropolitan Cattle Market. Contributions towards defraying expenses are solicited and requested to be paid to Messrs. Stride, Bankers, 41, West Smithfield, London. *Cor.*

How to Make a Cheap Manure.—In reference to an article under this head in last week's paper, I can tell the amateur who goes in for farming, "on retiring from the amateur life," he cannot make a cheap manure. And if he thinks that farming can pay without continuing that "active life," he is again mistaken. He may, however, buy a cheap manure without its being nasty. I have used for some time a Turpin manure, supplied by Messrs. Stickney & Tiffen, of Hull, guaranteed 62 per cent. of soluble phosphate, price £4 2s. 6d., which Dr. Augustus Voelcker has analysed for me, and given me his opinion that it is well worth the money. Your amateur farmer correspondent has in these days no right to complain of buying "cheap" manure, or manure. For either he may obtain a guaranteed analysis, and would be foolish to pay his bill without a well-known agricultural chemist certifying the fact as to its correctness. For linseed cake, I consider that sold either by the Driffield or Stockton Companies as good as can be made. Peter Lawson's guano, or Rest's bi-phosphate of guano, all guaranteed, are excellent manures. I would, however, never trust to a guarantee. I always test the truth. Last year Dr. Voelcker's analysis saved me paying £7 10s. per ton for Turpin manure, made by a well-known firm, which fell short, by its analysis, by at least one-half of its guaranteed value. I placed my case in the hands of the Council of the Royal Agricultural Society, it ended by the parties withdrawing all claim to any payment, and an offer to pay further any award made by Dr. Voelcker and the chemical board of the Society—anything, in fact, to escape exposure. As to a muckheep, your amateur farmer will find the best under covered sheds or boxes, made by cake-eating animals, and taken hence, not to a "midden," but straight to his fields, and then spread where required. *A. Sussex Milbank, Barningham Park.*

Further Double-furrow Plough Trials.—By the invitation of Mr. Tindall of Heslerton I attended, on the 14th inst., a test of Howard's double-furrow plough, marked O. B., a light implement, weighing only 3 cwt., on a field of Clover

lea, soil sandy—fence upon sandy subsoil. The work done was all that could be desired, both by the double and single plough. The sort of work required was flat well turned furrows, 4½ by 8½ inches. Two horses did this with ease, the draught being 4 cwt., while that of the native single plough was 3 cwt. This gave great satisfaction, as economy of horse labour is of great importance in a land like ours, where meat is so scarce; and what keeps a horse will feed two bullocks per annum. Mr. Fox, of West Luton-on-the-Wold, bought Howard's plough, and as it was to perform at Driffield on the 16th inst., and Luton is on the road, hence it was arranged for a trial there upon high wold, where the soil is from 2 to 5 inches deep, upon hard chalk rock, so as to satisfy a number of sceptical farmers. The draught, at an average of 44 × 9 inches, was under 4 cwt.; while a native single plough, at 3½ × 8 inches, was 2½ cwt.; and one of Ransomes' was 2½ cwt. at 3½ × 8 inches, again proving the great saving in horse and animal labour, and the efficiency of the double-furrow plough. This double plough was then taken to a field of first-rate barley land, where a capital crop of Swedes had been eaten off by sheep, having a liberal supply of cake, corn, and chaff; the soil was very solid and wet, the sheep's treading having made almost puddle of it, and now it was set like a plaster floor. On this some capital work was done; the ridge made by opening first was fit to be compared with any champion work done on the Wold, and the company present, comprising occupying over 3000 acres) expressed themselves determined to speedily adopt these light double ploughs; indeed, I overheard one of these farmers instructing his blacksmith to see if he could not learn enough to be able to make him some like it. In this field the draught at 4 × 8½ inches was 4½ cwt., at 3 × 8½ inches 3½ cwt., and at 2 × 8½ inches 2½ cwt., the 5 inches being the depth where the trampled soil was broken up by the mowing. From below, the soil went on to Driffield, through one of the very best farmed districts in this or any other country,—the clean, abundant Turpin crops, with liberal supplies of oil-cake, corn, and chaff, producing more mutton and wool than any part I have ever visited, and the Wheat looks healthy, full of plant; soot and other light manure seem to be now almost universally applied. When one sees such spirited farming, it is not surprising that such men are so much crippled in their development of notions. The power of production by regulations and agreements written out by shortsighted agents and lawyers. At Driffield I had the pleasure of meeting many of the large occupiers who on the afternoon of the 16th witnessed the working of this same double-furrow plough. A farmer who had just a few weeks been in possession of one of Howard's 4½ cwt. ploughs, was excited with the Bedford manner, who offered, if it drew so little, he would give him a pound of exchange it. Being close by, it was fetched to the field, and both ploughs were set at 5 inches deep, by 8 inches wide, on a Wheat stubble, soil light gravel; the draught of both was the same, viz., 3½ cwt., and light for two horses. [This proves one of two things, either that the single plough were extremely wasteful of force, or the other extremely economical.] I had determined to go on to Bridlington to witness a friendly trial between the agents of the Swedish and Bedford farms, and Mr. Dale's single-furrow plough, but, having a day to spare, I took a tour through the carse or fens adjoining Driffield; these are not so perfectly drained as they might be, and in very wet seasons much damage is done. The farmers, however, are untiring in their industry, energetically liberal in their farming, doing everything to obtain maximum produce from the soil. It was delightful to see the care used to seize every opportunity to roll their Wheats with either the Crosskill or Cambridge roller, and so prevent the loss of plant as usual after so much frost as we have had this season; and, more than all, it is truly gratifying to see their well-timed efforts crowned with such fair promise of success. On the 18th, at Bridlington, the plough trials took place in a field close to the old town, where a heavy crop of Swedes had been drawn off by sheep, and the soil was the wettest meant test frustrated by Messrs. Ransomes' having had the ploughs in the field bright and well-conditioned as that brought by Mr. Dale on the part of the Howards, and which, to his credit, he had in as good condition as his own single-furrow, which was to prove the folly of double-furrow ploughs for this highly cultivated district. I was pleased to see a few of the best men, to whom this is a matter of great importance, join together to test the proceedings, so that truthful results might be obtained. All the three ploughs were set to work and ordered to prepare for 5 by 8½ inches furrow work. The work by both was first-rate; in fact, the spectators declared it was all that could be desired. Howard's two-furrow drew 3½ cwt. and Dale's wold single-wheel plough drew 2½ cwt. *L. P. B., March.* [The above figures are no doubt perfectly satisfactory for the purposes of comparison with one another to which they are put; but the draught stated is so light that we doubt the accuracy of the dynamometer. *Ed.*]

The Growth of Flax in Ireland.—At the meeting, on the 16th inst., in Belfast, of the Flax Extension Association, the secretary's report showed that the

prizes given by the Society in February, in Munster and the southern parts of Leinster, were awarded to growers in Maybrough, Waterford, Ballina, Cork, and Limerick. The samples brought forward possessed much merit, both as to handling by the farmer, and dressing at the scutch mills. Owing to the inclement weather, the supply of Flax to the southern markets during the current month has been less than was expected. A County Kilkenny farmer writes: "From my experience of the Flax crop, I would advise every farmer to sow some, as I have found it pay on an average, since I began, seven years ago, nearly double as much as corn. If I had land as good as some farmers in this locality, and were to get the same price as I have for the last three years, it would shortly pay as much as would purchase the fee simple of the land." *P., March.*

The Swedish Turnip.—I have at various times seen the question asked—What was the origin of the Swede Turnip? but I have not yet seen a satisfactory reply. The following account may perhaps throw some light on it. About ten years since I happened to dig up a plant of the Asparagus Kale, and seeing it had a large fleshy (but misshapen) root, it occurred to me that I might perhaps get a hybrid Turnip from it, and the season after I planted a common white Turnip in close proximity to three or four plants of the Asparagus Kale. All the plants flowered at the same time, and when the seed was ripe I sowed some of that from the white Turnips, and found there were some of the young plants with purple tops; and I have propagated from the descendants of these purple tops every year since, and have now established a new race of Swedes. It is true, I have not got a true fixity of character yet, as, although some of the Turnips are handsome, well scaled roots, some of the others from the same parcel of seed are rough and misshapen. I have, however, always selected the best formed roots for seed, and hope, if my life be spared, to get the fixity of character which is now wanted; they may be no better nor so good as many of the varieties now grown, but at all events the experiments serve to show how a Swede may be propagated. It seems singular that whilst the white Turnip was readily affected by the proximity of the Kale, not a single plant from the seed of the Kale was able to establish itself in the plot of the white Turnip. If any of your readers would like to continue the experiment, I shall be glad to send them parcels of the seed of last year. I see by my memoranda that I had seed of the second year's crossing in 1865. *T. G., Clitheroe, March 21.*

Sewage Utilisation.—A week or two since your correspondent, Mr. George Burdett, stated that, through all the large cities of Europe and America, we find chiefly only the old barbarous mode of cesspools, and all over three-fourths of the globe there is very little that can throw light upon this apparently difficult and unsolvable scientific problem. I think Mr. Burdett must have overlooked a letter in your journal of October 29 last, from George Paston (of whatsworth?) Zschopau, Saxony, in which the writer says that he has seen a town in Germany that pneumatic sewage cart is used with perfect success, and when emptying cesspools, drains, &c., passes-by do not perceive the slightest effluvia. Again, in your journal for December 3, Edgar de Müller, Hermannstadt, Transylvania, wonders why this system has never been mentioned in your journal, it is so simple and expedient, and he testifies to its success. *R. B.*

Manure Sown Broadcast.—"G. A. H." at p. 392, appears regularly stout at the cost of my manure sowing, indeed, doubts as to whether I did not make a mistake. These are my words—"8 tons of which was taken at once to my 53 acres of heavy land Wheat. The three men sowed it broadcast within the day." The three men had 20-day each. That is in all 22 pence. Fifty-three acres at 1½d. per acre comes to 79½d., therefore, my manure sowing did not cost me quite 1½d. an acre. "G. A. H." will understand it now, I hope. He questions the use of superphosphate on my heavy clay land for Wheat. Never mind. I will try it on for some years to come, and the public shall have the benefit of the trial as to results. *William Smith, of Woolston, Blackley Station, Leeds, March 25.* [Mr. Lawes' bill charges, to which "G. A. H." refers, was incurred by the need of sowing the quantity at several times, and to fro, so as to insure absolutely even distribution.]

Farmers' Clubs.

LA'ENHAM.

Foreign Farming.—At the last meeting of this Club this subject was introduced by Mr. William Biddell, the President of the Club.

Mr. BIDEELL said he commenced his tour last July. Upon getting well out of Antwerp, the first thing that strikes an English farmer is the extreme smallness of the plots into which the land is divided. The farms in Belgium average 1½ acres each, according to Howard's book "Continental Farming," a word which interested in the subject should read. It is full of information, especially as regards cropping and wages; from it I have drawn somewhat largely in getting up this paper. Until I reached France, where I observed much bolder

farming, I should think two-thirds of the arable land I saw was cultivated in plots not averaging more than 1 acre. I suppose the divisions of ownership are well delineated on official maps, as I could perceive no posts—balks, or fences to indicate the divisions. This extreme division of land effectually prevents any costly or expensive machinery or implements being used. Steam machinery is, of course, entirely out of the question. It, I might say, in every way impedes good farming. As nearly half the land is farmed by its owners, this style of farming is not likely to be altered.

To make it worse, these small plots are often a long way from the homestead, leading to what a former reader at this Club would call a "waste of force," it taking the farmer ten times as long to walk to get the cows a bushel or two of grass as it did to cut it. From there being no fences (in many parts not even to fence the railway in), and but rarely water, grazing the land is quite out of the question. What necessity compels to be done there it might be useful for us to follow here, viz, soil our green crops under cover in the summer time. We take great pains to obtain manure by winter grazing our roots, very often greatly injuring the land by carting them off. The fact that summer-made beef (coming at a scarce period) sells at from 1s. to 1s. 6d. per stone more than winter-fed, is a weighty reason for making it in summer.

A stranger would be apt to conclude no stock were kept; but, though there is very little grazing going on, a good many cows are fed, the only means of which you see, when riding, is their stem ends visible through the doors of the homestead, which is generally included under one large wood building, embracing the house (generally on the second storey, approached by an earth incline), wagon-shed, cow-house, piggeries, &c. This construction is favourable for the collection of the liquid manure into one cesspool, which, with the heap of manure, is usually placed on a few feet from the door of the house. The contents are carted to the land in a long box, placed on the railled wagon, when any produce requires to be brought home, as back carriage. This invisibility of live stock I noticed especially in the valley of Grindewald, where Murray, in his guide-book, says thousands of cows are fed. Probably some of them were grazing on the mountain sides high up. At Thum we were gratified to hear the peculiar hum and dingle kept up late at night and early in the morning by the bells on the ends of the cows forming a large dairy which were not turned out at all mid-day. Indoot feeding is sometimes pursued too far. At the University model farm at Bonn the sheep were huddled together in a barn-like building with other stock. Observing some Southdowns of some pretensions, I found they came from England. I could but think if the ghost of Tom Crisp were there, how he would shrug his shoulders at the pig-like treatment of his favourite Southdowns. Everywhere, where the English farmer has been successfully copied, I was surprised to notice a gang of harrows with wooden teeth.

The variety of crops grown in some parts of Germany renders a ride through it very interesting. For instance, within a few miles of Heidelberg (where women sold the railway tickets) I saw, with the exception of Beans, nearly every crop required to clothe, feed, and amuse mankind, embracing the Vine, the corn, and the cereals, whether sown or not (I could not discern), Maize, Rye, Tobacco, the universal Lucerne, Hops, Clover, Lupins, Poppies, Coleseed, Kohl Rabi, and frequently Flax and Hemp.

In Switzerland, where money is decidedly scarce, the aim is evidently to render the occupier independent by growing all he requires. Economy pervades all their doings; as, for specimen, the naves of the wheels were in some instances done up in hay, to prevent the sun's acting upon them. In Heidenburg I was amused at the agricultural carriages. A cart or any two-wheeled vehicle was rarely seen. The light railled wagon, whose buck here cost about 30r., answered every purpose. When earth was to be conveyed a long bullock-like trough was placed in it; when liquid manure, the long cask I before named.

Most of them had brakes attached, as the cows or cattle by which they were drawn are, I apprehend, never used at down-hill work. The pole, instead of shafts, did very well except, as was frequently the case, when only one ox was used, then the whole set-out looked very awkward. Frequently cows in full milk were drawing them. This seems somewhat cruel, but I have no doubt the cow was much happier, and its produce more wholesome than the London cow and its produce. Indeed, comparing its lot with many of those in this country, it appears in no way inferior. These were used very occasionally, but I have no doubt they were used very well and cared for, both in kind usage and in having their food prepared for them, and living in well sheltered homes, whereas we here frequently see cows whose whole day is taken up in searching over meagre pastures in a hot broiling sun for a necessary supply of food. Drawing wagons, I observed some good wide half-fat bullocks, which were evidently well satisfied with their portion in life. I think it is quite open to doubt whether we have not too much displaced cattle as beasts of burden. To be sure where ploughing was best done by cows the soil was of a tender, pliable nature. Indeed, I saw no land, excepting in France, compared to our heavy clay

lands, in the difficulty of cultivation. Were I a small farmer of light land I should certainly consider whether the cow should not help the horse in ploughing it.

The cattle were far better than the estimates I had previously formed of them. Upon the top of the Righi, one of the best known mountains in Switzerland, I saw a large dairy of very superior cows, fawn coloured, with dark points, wide and short-legged, with apparently a good disposition to fatten. The management of the mountain dairies is as follows:—In spring they eat the grass from the low and frequently irrigated valley grounds, which produce three crops in a year. In summer they access the cow pastures, and, as it is up, so that in the hottest period the highest grounds are fed, approached only by horse and cattle paths. For a few months the dairy itself, in many cases, is moved to near the top, and the cheese and butter is brought down by horse or hand, chiefly by the latter. As autumn advances the cows occupy a lower level. In the winter they are shedded in the valleys below, when I expect they have a hard time of it, for the extent of arable land is small, as well as of moorish grass; therefore the supply of roots, hay, and straw is very limited. For litter, leaves are collected and preserved. Hay is much thought of, collected by considerable labour, and is frequently carried a long distance down the mountain sides in nets, on the backs of men. Where there is much of it you see numerous wood sheds for its reception, very like the cottages or chalets, with boards for roof, kept on by large pieces of rock placed upon them. The sledges laid up, ready to be brought out in winter for conveyance of hay and fuel, &c. The scarcity of hay, and the difficulty of its carriage, have, I suppose, led to the plan of baiting horses upon slices of coarse Rye bread. Our coachman carried his with him, and very quickly baited his horses with it. It appeared to differ in appearance very little from the loaves strapped upon the backs of the Swiss soldiers when assembled at Zurich. It is extremely dry, and in high winds, which the cages are dispensed with. It seems surprising how hotel, like that on the Righi, capable of accommodating 300 people, can be carried on when all its supplies, including, I think, the water, have to arrive from far below on the backs of men and horses.

In passing through the Black Forest we saw agriculture in its primitive state, still the splendid roads kept up by the Government had done a good deal to modernise the parts we passed through. In some districts the roads, I believe, are self-supporting; as there were no tollgates there, it seems paradoxical. It is by the fruit trees which grow upon the narrow ways by the sides, and which, from there being no hedges, seem to thrive, and they were carefully kept and renewed when necessary. Assuming an Apple tree to be worth to rent 6d. a year, and that one was planted on each side every 2 rods, there would be 320 to a mile, which, at 6d. each, would yield £8 a year per acre. The material is formed from the rocks adjoining, and labour is very cheap. Still the boring and blasting of the rock is expensive. This paper is much too long for an introductory one; I will, therefore, terminate it by stating that on looking again in Old England I was satisfied that, generally speaking, neither foreign farmer nor crops were equal to our own. At the same time it is but fair to state that I observed no greater state of things anywhere. I saw, in fact, in ten or four good horses in a rough, ploughing up, failed plant of Turnips when the land was very dry. In conclusion, I hope to hear the following points discussed:—The propriety of summer soiling your own green crops—of working cattle—of growing a greater variety of crops—depending less upon Wheat and Barley, also the desirability of growing fruit on a more commercial scale than hitherto.

DISCUSSION.

Mr. R. EDGAR said he did not go so far as Mr. Biddell, he (Mr. Edgar) only going to Hamburg. He did not call what he saw farming at all. As to the state of the land, he felt that an old hen would have scratched, and hardly had he got on his feet, when he saw the description was more like gardening than anything else, and he certainly saw nothing equal to English farming. It might be said that he was rather prejudiced, being a British farmer himself. He believed the best farming was in Belgium, and he had been on a farm of 300 acres, and there were many acres of Sugar-Beet. His opinion, however, was that better Sugar-Beet could be grown in England than abroad, but as to whether it was a paying crop, the seasons had not yet been sufficiently favourable to enable them to determine. He saw no grazing. He observed a few sheep under cover on the farm he had spoken of, but they were nasty things, such as he would not have killed. They were a cross between a good and a bad bred sheep, and as for the mutton it was not worth eating, which was hardly to be considered as considering the description of sheep. He saw about 60 of them in a shed not much bigger than the room in which the members of that Club were assembled, and they did not look fit to eat, or as if they ever would be.

Mr. MANSFIELD said he thought he had seen some good farming as good as that in England, and he had seen some at it. In Belgium he noticed that as they were cutting they were carting, and ploughing the land at the same time; and it was quite evident that there was no intention of allowing the land to remain idle. He observed that the women did the work of the work. The horses were much better than he expected to see; they were not chestruts, but he believed that they would

do quite as much work as the Suffolk horses of that colour. His observations in France did not lead him to suppose that agriculture there was in a worse condition than in Belgium. As to the several points on which Mr. Biddell had invited discussion, he (Mr. Mansfield) might say that he thought that although the use of oxen was going off in this country, there were instances in which they might be useful with advantage. In regard to the diversity of crops, it should be remembered that there were much more labour and more hazard, and he thought they were much better left alone. And then in reference to fruit, his experience was, that if he grew a large crop of Apples they would just about pay for themselves.

The CHAIRMAN addressed the meeting at considerable length, explanatory of his observations in foreign countries. He observed that the holdings were generally small, and the system of agriculture was adapted to small farms. The pigs, poultry, and the eggs would almost make up the farm. These small farmers, however, it should be remembered, sold everything they did not eat the eggs, &c., but they lived very badly. There was a district bordering on the sea, in Flanders, where the people lived very much worse than the peasantry in England. As to the use of green crops in the sheds, there were certain large farms where the sheds were the chief object being made to make butter to be sent to London. He had been in a shed where there were 200 cows, and there were 220 days in the year when they had to be fed artificially. They were then put on corn or cake, or what might happen to be any kind of food, the most that they could get. He went on to speak of the large farms in some parts of Germany, remarking that the large proportion of the male population were soldiers, and a great deal of the work was done by women, who might be seen carting and emptying their wheelbarrows, which was a thing we wanted to emulate in this country. The Chairman also spoke of the farming in the north of France, making a passing allusion to the growth of Sugar-Beet, which, he said, was a great source of prosperity. Other parts of the Continent also he referred to, but he did not go into any more details. He thought that a farm was not sold, as sometimes in England, of 1000 or 2000 acres, but in little pieces of ten acres, the desire of every man being to be a landowner, and the price paid for the land was sometimes almost fabulous. The competition was very great, and he thought that the best way of to acquire the land was to purchase it, and if he could not get one of them, there were others of one acre, and this accounted for the state of things existing on the Continent. In conclusion, Mr. Hitchcock alluded to the question of the use of cattle, and he argued that in the future it was not so much a question of whether an animal worked faster than another, but they should be treated as an auxiliary to a farm and used when wanted. Instead of keeping so many horses, if cattle were kept to come in for use just when they were wanted they might be found very convenient.

Mr. BIDDILL replied to the various observations that had been made, and in answer to the question as to whether he saw Barley growing, he might say that he saw it everywhere, but he thought the sample was rather indifferent. Rye was the main white straw crop, and that did not appear to be better than that which was grown in this country on much poorer land. With reference to the use of cattle, he did not think he should recommend it unless it was in certain cases where a man occupied twenty or thirty acres, and he might find it to his advantage to use cattle, as he would have to keep a horse for the farm, he had referred to were too poor to keep a horse, and they kept a cow because they got a profit another way. In conclusion, Mr. Biddell said he should like to have heard a little more discussion on the subject of getting manure out of the green crops in the summer time. He thought it was a good point, and manure in the summer time by following the example of foreigners, that was, by mowing green crops off and feeding the cattle in sheds? Animals wanted less food in the summer than they did in the winter, and if they could be kept in a shed, and fed with the manure which they had in the summer as in the winter? It was certainly an open question whether the farmers of this country might not do more in this direction than they did at the present time. Green crops would not be half so expensive as the Turnips which farmers were growing in the summer, and it was rather than the winter-fed. Taking the last 12 years, the summer-fed beef had sold 1s. per stone more than the winter-fed, and he questioned whether it would not answer their purpose to consider if they could not do something towards saving manure in the summer. The manure had been made to the propriety of introducing a greater variety of crops. He did not mean to say that this should be done when corn was high, but on the Continent within a few miles you can see nearly every conceivable plant grown. He did not look upon it as a bad thing, because it did not do any harm, and it might. He thought it possible that the time might come when we in England should think it advisable to grow a greater variety of crops.

Notices of Books.

The Journal of the Royal Agricultural Society of England. 21 series, Vol. VII., Part I. John Murray, Albemarle Street.

American dairy factories, and the cheese factory system in Derbyshire, are the two opening subjects of the volume. Sir G. Jenkinson will, we think, be unable to stem the progress of co-operation in our dairy districts. His compliments lavished on farmers' wives will not hinder their acceptance of that relief from great personal labour which is thus offered to them. After these papers, interesting especially to the dairy farmer, Dr. Voelcker treats, with that elaborate and exhaustive fulness which characterises all his writings, of the chemistry of Beet sugar; also of the chemistry of straw chaff as prepared for food on

the plan of Mr. Samuel Jonas. All these are old subjects, though the latter claim repeated attention to them which is thus claimed for them. Messrs. Lawes and Gilbert then describe the effects of the drought of 1870 on some of the experimental crops at Rothamstead. Mr. Turner gives an account of time burning and improved kilns for that purpose. A report on some features of Scottish agriculture, by Mr. H. M. Jenkins, occupies 75 pages. Mr. W. C. Spooner treats of the agricultural capabilities of the New Forest; and Mr. W. Topley, F.G.S., contributes a short paper on the comparative agriculture of England and Wales. The volume is fully illustrated—there are plenty of woodcuts—it looks readable, and, so far as we have yet tried, it is so.

There is a great deal of descriptive writing,—farms, factories, districts, are thus brought under the eye. Pictures of Scotch, English, Welsh, American management are given: and these graphic sketches, with the rapid generalisations which they contain, whether so instructive or so trustworthy as the accounts of a plodding practical man would be or not, at any rate are readable, and the localities described are well read, and elsewhere rivalry or jealousy may also bring readers to them, and if an Editor can get his journal read he may be pronounced to have succeeded.

We are inclined to doubt, however, the wisdom of the Editor of the *Agricultural Society's Journal* in contributing so largely to these pages of his own. His pictures of farm practice, and even his inferences on questions of general policy in estate management, can hardly be so exact or just as those of a man accustomed to his subject. Mr. Mechi used to carry on his learning and his teaching together, and bore good naturedly the brunt of much consequent rivalry. He had one good service nevertheless; and Mr. Jenkins will no doubt also earn the status of a trusted teacher. To his account of Scottish agriculture, however, which occupies so large a portion of the new volume of this Journal, we must return. Meanwhile we are glad to have another lively specimen of his handiwork as Editor. There is a second part of vol. vi. to appear, and it will no doubt contain reports and information on the live and dead stock of the farm, cattle, sheep, and implements, as shown at Wolverhampton, and worked and kept on Staffordshire and Shropshire farms, to make up for the comparative absence of these subjects in the pages of Part I.

Farm Memoranda.

ABERDEENSHIRE: *Live Stock*.—The number of cattle and sheep in the counties in 1868 was as follows:—

	Cattle		Under Two Years Old.	Total.	Sheep.	Pigs.
	Other Holders.	Cattle to Ais.				
Aberdeen- shire ..	46,775	36,575	77,142	160,392	103,433	16,768
Banffshire ..	1,56	72,188	22,012	44,336	65,349	13,51

In 1865, 13,589 live cattle and 10,135 tons of dead meat were forwarded from Aberdeen to the London markets. The counties are celebrated for the large numbers of fine cattle reared and fed in them. In no other part of the kingdom do cattle grow and feed so well without artificial food as in Aberdeen and Banffshires. This is due to the fine crops of nutritious Turnips, grown on the light soils, and to the care bestowed on the selection and tending of the animals. On almost every farm the cattle kept are superior animals, and great care is bestowed on their feeding and comfort. One hundred years ago, the cattle kept were of the Aberdeen Blackhorned breed; they are now almost extinct. About 70 years ago they were displaced by the Friesian breed. These, again, have been mostly given place to the Shorthorn. There are still a few first-class Polled herds in the district, some of them of world-wide reputation. Those of Mr. McCombie, M.P., Tillyfour; Mr. McCombie, of Easter Skene; Mr. Walker, Montbleton; and Mr. Paterson, Mulben, are the most widely known; while several others possess herds of great merit. If proper attention is bestowed on the selection, the Polled is an excellent breed, harder than the Shorthorn, and well suited for the district; but when care in selection and attention to feeding are neglected they seem to degenerate very fast. The Highland breed is kept on some farms in the upper straths, and is better adapted for such situations than any other breed of cattle. The Shorthorn breed was introduced into the district about 1821, became general after 1835, and has gone on extending ever since. At present four-fifths of the cattle of the district are Shorthorn or Shorthorn crosses. Some of the best Shorthorns are kept for breeding purposes; the most celebrated breeders are the Messrs. Cruickshank, Sittion; Mr. Campbell, Kinellar; Mr. Milne, of Kinaldie; Mr. Marr, Cairnbrogie; Mr. Marr, Uppermill; Mr. Cochrane, Little Haddo; Mr. Chalmers, Oldwath; Mr. Scott, Glendronach; and Mr. Bruce, Broadland, in Aberdeenshire; and Mr. Longmore, Rettie, in Banffshire. Besides these many other breeders possess herds of great excellence. The Messrs. Cruickshank, Sittion, are the most extensive breeders of Shorthorns in the world. They usually have from 300 to 400

pedigree cows. They commenced their herd in 1835, and their first annual sale of bull calves in 1842 with seven or eight animals. At their annual public sales the numbers have gradually increased to about 60, and as many are usually sold by private bargain. The highest price yet obtained for any single animal was 150 gns. in 1867 for a bull calf 11 months old; but a lot of ten heifers had previously been sold to Mr. Majoribanks at 1000 gns.; a lot of five to Earl Clarancy, at 650 gns.; and a lot of four, at 400 gns. The average prices obtained at the annual sales range from 40 to 50 gns. There is no dairy farming, except in the neighbourhood of Aberdeen, and to supply domestic wants. On the majority of farms the stock kept consists of cross cows, with a Shorthorn pedigree bull. The average number of cows and heifers in calf or in milk, by the latest agricultural returns, is one for every 12 acres arable. On some of the larger farms, the heifers are served to produce calves at two years old, by sucking them, and they are fattened and sold at three years old, except such as are reserved to keep up the permanent stock of cows. The system of serving 1-year-old heifers is on the increase, and seems to do well; the calves produced are good, and show no symptoms of deterioration from being the produce of so young animals. A large proportion of the cattle fed are reared in the district; the croft and small farm system gives facilities for rearing calves, which are afterwards purchased and fed by the larger farmers; but a number of north country and Irish cattle are brought into the district. These Irish cattle are cruelly beaten and ill-treated at trucking stations, exposed to hunger, thirst, and cold in open railway trucks and steamboats, and driven onwards from market to market, so that by the time the remains of a drove reaches the northern markets it is reduced to shots and weaklings whose strength and constitution have been so impaired by exposure and hardships that they readily catch and propagate contagious diseases, and although they escape these, several months elapse before they begin to thrive. Yet the Irish lean cattle trade seems to prosper, and is yearly extending.

Stall feeding is the general method of wintering cattle; boxes and courts are exceptional. From the number of cattle kept, oat-straw is valuable and often scarce; and to keep animals comfortably littered in boxes or open courts requires the use of more straw than can be spared for that purpose, and the preference of stall-feeding. The pulping system has been tried on a few farms, but as yet various opinions of its merits seem to be entertained.

Calves are usually dropped from January to April; they are either suckled or hand-milked for from four to eight months; when weaned they are put on good grass. As the weather gets cold they are sheltered for the night, and receive Tares or Turnips, along with, in some cases, a little oilcake. During the winter months they are used up, and fed on Turnips and straw. On some farms 1 lb. of linseed cake is given to each per day after weaning. But on not a few farms no artificial food is given to calves or older cattle; they simply receive Turnips and oat-straw in winter, and are grazed in the fields in summer. On a number of farms cattle are fed the second winter, and sold at two years old. When this is intended, great attention must be paid to their feeding and comfort; they are early put in to fatness; the Turnips are served after October, and are carefully sliced; they receive all the Turnips they can eat, and are kept quiet, regularly fed, combed, and comfortably littered. On farms having good grass land, the cattle are grazed the third summer, tied up early, and sold in November and December, being then about two years and nine months old. Cattle while grazing in the field seldom receive any artificial food, and when stall feeding, if given at all, it is generally only for a few weeks before they are finished. Thus it may be regarded by some farmers as a weakness in our agriculture; and seeing that our grazings are generally inferior, perhaps it is so. But the whole circumstances of the case must be taken into account. Stock will seldom pay the whole cost of the artificial food consumed; the manure produced must be charged with a considerable part of the price, and rich manure is not of the same value here as in some other districts. In Potatoes and Wheat growing, it is of little importance to use rich manure to produce good crops of these, and the use of cake as cattle food is known to enrich the manure heap. In this district Potatoes are not extensively grown, and the climate does not suit Wheat or even Barley, consequently the Oat is our principal grain crop, and it is less valuable than Wheat or Barley. The values of a good crop of Wheat may be from £10 to £15 per acre; the average value of a good Oat crop may be from £7 to £10 per acre. Thus it might be profitable to use cake in making a rich manure to produce a Wheat crop, which would yield a profit after expenses are met, while it might be a serious loss to manure an Oat crop in the same expensive way. *Price Report in Transactions of Highland and Agricultural Society.*

Miscellaneous.

THE COMING BILL ON LOCAL TAXATION.—Even if the proposed Bill on local taxation had coincided with the strictest principles of political economy, the prudence of raising the question of taxation was more than doubtful. Sir Massey Lopes and his clients have in

former years been more than once warned that it would be well to let a sleeping dog be. He may sometimes be in the way, or he may offend a sensitive taste, but he is better asleep than awake. It is not for the benefit of landowners to open or reopen the general question of the distribution of public burdens. Even if they could satisfy an impartial arbitrator of their claim to relief, they should remember that the appeal is to the representatives of interests adverse to their own. The borough members, and by constitutional means, would deal with the land control of the House of Commons; and when it suits the purpose of the majority to increase the burdens on real property they will not be at a loss for plausible excuses. The mode of levying the Succession Duty, and the exemption of real property from Probate Duty, afford some equivalent for the partial pressure of the rates; and there can be no doubt that the privileges of the land are much more likely to be removed than its alleged disadvantages. It is also worth considering that Mr. Mill's school of economists contend that the State and not the owner ought to profit by that portion of the constant increase in the value of land which is not due to the outlay of capital or labour. It is true that dangerous arguments may be met by arguments; but ultimately the question will be decided, not by reason, but by votes. Mr. Read's calculation seemed to show that the comparative lightness of the tax on succession would produce a more constant increase in the liability to rates; but many instances might be suggested which would produce a different result. In practice, heirs and devisees of land are more embarrassed by the Succession Duty than those who are liable to Legacy Duty, for the simple reason that it is easier to pay a part of a sum of money than to mortgage an estate, or to sell off a portion of it; but household suffrage is not likely to make allowance for similar practical details.

A slight effort of the imagination is required to detect coyness in the House of Commons, or the books of the Bank of England; and the danger of owning land is that it is a monopoly, and that it is as visible as tempting goods in a shop window. The Devil, as a Liberal Member lately observed, is looking over the wall, sometimes in the captivating shape of a minister or economical essayist, and sometimes with the unconcealed horns and tail of the Land and Labour League. Sir Massey Lopes, who had contended that the Government ought to institute an inquiry into the advantages of rates, and perhaps have felt like the Wizard's puppet, when Mr. Goschen announced that the Government had inquired already, and was prepared to introduce a Bill. It was apparently for the purpose of preparing Sir Massey Lopes and his friends for a formidable attack on the landed interest that Mr. Goschen dilated for two hours on the propriety of reserving his opinion, and that Mr. Gladstone followed with menacing hints of his intention to administer equity to the landowners in the House, probably listened with a well-founded alarm to Mr. Goschen's tabulated statements of the burdens imposed on land in Continental states. To substitute classical for medieval mythology, the complainants gods of the ministerial Olympus are ready to ruin house and land on the application of the imprudent owners. *Saturday Review.*

A NEW DANGER.—The researches of Dr. Spencer Cobbold on the entozoa that arise from sewage irrigation are calculated to excite the most anxious perplexity, as to the course which we should adopt in dealing with the sewage question. At the present stage of that experiment, irrigation seems to be the most profitable and the most practicable; but a new danger threatens us from this question, viz., the introduction into the human system of countless parasites and entozoa through the medium of cattle fed upon sewage irrigation grass. The worst of it is that cattle which is act as "bearers" of these abominable creatures actually show no signs of the disease in themselves, as they appear to have the capability of resisting the effects of the presence of the parasites, except when the sufferers are young, as in the case of calves. Again, so little outward sign of disease does the meat show, that butchers are perfectly unconscious of it; but Dr. Cobbold has microscopically demonstrated the presence of thousands of entozoa in pork which to the eye appeared perfectly healthy. And this is a deliberate statement, and now in this country thousands of cattle which are thoroughly diseased, and which cannot be said to be safe as food for man. The subject is so new, that we are at present ignorant of the effects or of the amount of damage committed by parasites; but it is worthy of the most careful study. *Food Journal.*

MILK REVELATIONS.—A very diligent and impartial investigation into the quality of milk sold by London dairymen reveals, that out of 50 farms only 23 supply genuine milk; 8 are in a doubtful list, and 19 supply their customers with skimmed, watered, or skimmed and watered instead of fresh milk. In other words, so far as our inquiry goes, it demonstrates that 26 per cent. of the milk-dealers of the metropolis sell what they profess to sell, 16 do not always adhere to the rule, and 58 per cent. deal in a deteriorated article, which, in many cases, is worth less than half the price charged. The most startling exposure refers to the supply of milk from Southwick and to the Holborn district. The system on which contracts are offered and accepted by such institutions is generally known to be very unsatisfactory; and, in our opinion, no tender should be accepted for so essential an article of

food, for both young and old, unless it be an ascertained fact that genuine milk can be supplied at the price. The Shoreditch Union pays 2½d. per quart, whereas the dairymen of London have loudly declared that it has been impossible to retail fresh milk, during the past winter, at less than 5d. We know of one undoubted instance of rich milk being sold wholesale at 3d. per quart, and this should form some criterion of what workhouse and hospital authorities should be charged. *Milk Journal.*

The Week's Work.

MARCH 25 and APRIL 1.—*Lady Day* is the principal English spring term, corresponding to Whitsunday in Scotland, when changes take place between landlord and tenant and between tenant and labourer. Such changes are less common in the South than in the North. Some say they are fast becoming as frequent in England as in Scotland, and no doubt the tendency of things is to the common standard; but experience proves in both that the fewer changes the better for all parties.

Seed Time.—The sowing of corn crops prosecute with increasing assiduity as the season advances, until all the land is seeded. Attend to the separate sowings of Vetches for the successive foldings and cuttings of summer, as formerly directed, and let no seed be sown until it has been sown in the previous week.

Potato Main Crop Planting should now be general in southern counties, the work continuing northward up to the end of April. It is best to fallow and manure in the autumn, but the greater breadth is perhaps manured at the time of planting. Manuring in 30-inch stiches or "drills" is becoming more and more common, but some prefer manuring open dry porous soils on the flat, planting in every third furrow. Farrowed manure is generally better, less rotten to this crop than to Turnips, but more depends upon getting it in with the sap, thoroughly broken in the drill, so as to rot and incorporate with the land, the land being worked in a fine season. A mixture of guano and superphosphate, about 1½ cwt. each, does much to prevent dry rotting of farmyard manure, and to promote its speedy incorporation with the land. Add from 5 cwt. to 15 cwt. of salt per acre, according as the land requires it, if the manure has been previously salted. It is common to leave the stiches or drills as formed by the plough, giving them a stroke of the harrows some three weeks after to let the plants out; but some prefer to rot the ridges flat at the time of planting, the better to keep in the sap in the lighter descriptions of soils—to obviate the harm done by the harrows, and to let out the plants more freely to cover the ground. In Ireland it is common to break up old furrows by the land by the use of the heavy-bed plan. The land is laid out in narrow beds; the sets are then planted on the grassy sward and lightly covered with earth from the alleys between the beds. As the young plants rise, a greater depth of earth from the alleys is thrown over the beds. The moist climate of Ireland is favourable to the practice, and heavy crops are grown. Heavier crops would no doubt be grown were 5 cwt. of artificial manure applied to the grassy sward before planting.

Seed Potatoes select with the greatest care, to avoid disease, degeneracy, and mixture of kinds. Examine a second time when cutting, throwing aside for the pigs tubers showing the slightest degree of rotteness or mouldiness. Small Potatoes that have not attained maturity of growth, and abnormally shaped large ones, are also objectionable for seed. Thin slices inadvertently made give also to the pigs, as they do not supply sufficient nourishment to the young plants in starting. Spread the newly cut sets thinly over the floor, lime, and turn two or three times, as directed for early Potatoes, and when the fresh cut is covered with a skin the sets are ready for planting. Newly cut sets are very liable to heat if thrown into heaps, or put into sacks, and thus to become useless.

Wheat Hoing commence as soon as the plants will stand the hoe. Fresh air to the roots will this year be greatly needed to promote the work of tillering and the timely formation of the ear. Much can be done this way to bring up the past.

Seaweed Farming and Irrigated Meadows exhibit, with the lengthening day, signs of accelerated life. It is possible with a little doctoring to force forward early cuttings, which will this year be in great request, and the first cutting should always be short.

Breeding Sows are generally timed to farrow their first litter about this time. Dairy farmers time them to suit the consumption of their buttermilk, skimmed milk, and whey all the year round. The pigstye should be kept dry, warm, and clean, and the dietary should be not only nourishing but cooling at the same time. In dairies where the whole milk is churned the buttermilk will supply a sufficiency of sour food, but otherwise a daily allowance of soured food will be necessary both for sows and pigs; and this, also, applies to smut-porkers and large hogs. Considerable attention is being paid just now to the utilising of the waste of these factories by means of pigs, and the loss of pig manure to the land experienced by those who sell their milk. Pigs kept in the ordinary way no doubt work up a large quantity of straw into

manure. Cannot that straw be converted into rich manure without the pigs? It can, and at the pigstyes of the factory all the droppings of the pigs may be used by the earth-closet system, so that very little straw will be needed for beds. All the bogs of Ireland and England may thus be converted into rich manure, so that instead of cheese factories robbing the land they will enrich it by an increased supply of pig manure. It will thus gain by the subdivision of labour into four branches, viz., 1, the production of milk; 2, the manufacture of cheese; 3, the production of pig-manure; and 4, the preparation of peat and other dry earths, for utilising the pig droppings.

Milk, Butter, and Cheese Dairies are now in full operation, as in the summer time of old. Cheese factories are opening a new market for milk, which will have a tendency to increase the production for sale. Cheese factories, too, are turning out a better quality of cheese, which will increase the consumption of home-made cheese. The improvements thus taking place are fast extending to the management of milch cows in butter dairies, and the production of a finer quality of butter, with an increased consumption and demand. The progress made during last year under each of those heads is very remarkable, and taken in connexion with the extension of sewage farming and irrigated meadows, there is much promise in the future for this branch of farm practice.

Highland Shepherding differs little from last month: breeding flocks from the more elevated sheepwalks continue in the low lands on Turnips and rough pasture. In less elevated places, where flocks remain at home all winter, March is often a very changeable and trying month, there being hardly a vestige of spring life in the pastures, save where the cotton grasses grow until about the beginning of April. Arable and the lengthening day, which is now considerably longer than in the South, with increase of light, stimulates vegetation on the sunny side of the hill. The narrow strips along the watercourses begin to look green, and also the irrigated portions of land, over which the mountain stream has been spread; much more can be done this way than has yet been done. *W. B.*

Spring Wheat sow in places adapted for it. In the northern counties it is sometimes sown as late as May. It ripens early, but in late seasons in the North it is liable to injury from frost, on which account the seed should always be carefully tested in a flower-pot to ascertain its vitality. The usual quantity of seed per acre is 2 bushels, but where the harvest of the last year 2½ bushels may be required. Whether drilled or sown broadcast it should be got into a fine seed-bed, and lightly covered.

Barley Sowing finish in southern counties with as little delay as possible. The budding of the Birch tree is considered the proper time of sowing Barley in northern Europe. In the eastern counties the old rule runs:—

"When the Oak puts on his gosling grey,
'Tis time to sow Barley night and day."

There will be less difficulty in applying these old rules this year than usual. Barley is partial to a dry climate and a comparatively dry seed-bed. So essential is this, that when the sowing was followed by a heavy rain, we have ploughed the heavier class of soils, and sown a second time, to secure a proper seed-bed and state of the land at branding. The usual quantity of seed per acre is from 10 pecks to 4 bushels, but the flower-pot test must be the rule; and in very many examples a change of seed is advisable, and more so for late sowing than early.

Spring Tares continue to sow at intervals, as previously directed, for summer mowings and foldings.

Potato Planting continue northward, as directed last month for the southern counties. Owing to the season being later than usual, and more so in some places than in others, planting will doubtless also be later, but every effort should now be made to overtake the lateness of the season. For this purpose the planting of the sets in a fine seed-bed, and harrowing early, "to let the young plants out," are old familiar rules that should be attended to. The Bovinia, or cattle-furder, Potato, promises to yield heavy crops—over 20 tons per acre; but as yet the price—10s. per bush. of 56 lb.—is too high, unless for the growth of seed Potatoes for next year. The Potato is very liable to degenerate, more so perhaps than any of the other cultivated plants; but new varieties are readily obtained, and at present a great many new kinds are being introduced from America, Scotland, and other places, and of these Bovinia and Flourball, for field culture, require favourable notice, and at 10s. per bush. should be extensively planted.

Carrots are usually sown about the beginning of April. The Belgian varieties (large white, yellow, and orange) are preferred for stock feeding. The large orange is the heaviest cropper and the more nutritious. A deep sandy loam is the best soil; very heavy crops have also been grown on peaty soils. The land should be deeply cultivated in the autumn, and manured with not less than 20 tons of farmyard manure. If manured in the spring it should be a month before sowing. The Carrot is a large consumer of potash, soda, lime, and phosphoric acid. It is also rich in flesh-forming matter, so that nitrate of potash, common salt, superphosphate and guano, are the artificial manures it

requires—3 to 4 cwt., in equal quantities, per acre. It is essential that the seed be of last year's growth and fresh. It should be well mixed in sawdust or ashes a day or two before sowing, and a peck of Barley or Rye may be added to show the line of the braird in horse-hoeing the first time. About 8 lb. of seed are sown broadcast, and 6 lb. when drilled in, per acre, either on the flat or on inclines from 18 to 25 inches apart, and the seed should be lightly covered with not more than half an inch of mould, and rolled.

Sheep Folding on Turnips should now be finished in our southern counties, and in the northern the roots should be pulled and stored on the field, to prevent their running to seed, thus wasting themselves and exhausting the land to no purpose; and besides the green tops are against fattening widders, ewes with their lambs, and store sheep. No doubt spring growth this year is later, but it will suit Turnips, for they will now either run to seed or rot, let the weather be what it may. The lateness of the season has greatly increased the consumption of hay and corn last month, and the effect of this in the first and second weeks of April will be a shorter bite of Grass than usual, and hence a continuance of more hay, cake, and corn; and as a rule, flocks must have the extra allowance without a grumble. Outdoor sheep, too, consume a greater quantity of food in late cold seasons than in warm early ones; and what is trying more the patience and skill of shepherds this spring is the sudden changes of temperature—such being very much against the general health of sheep, more especially of ewe flocks. *W. B.*

Notices to Correspondents.

SALT: *Chester.* We do not suppose that dressings of common salt will do any good in the hedges, which must have salt falling on it with every shower from the west. If, therefore, you expect 3 or 4 cwt. of salt to raise the produce of the grass, you will be mistaken. In cases where the growth of grass is gross and excessive it might, however, do good, by correcting that lopsidedness of the manure—its organic or ammoniacal dressings—to which it is possibly owing.

ERRATUM.—*Co-operative Societies:* In a letter on these societies, signed "A Member," the word "farmer's" should be "former's." The passage should read thus:—"But Mr. Spooner is so concerned for the welfare of the farmer that the interest of the latter forms too 'narrow a basis' for the former's widely expanded mind to consider."

Markets.

ENGLISH WOOL.

The demand has continued unabated; trade is good, and manufacturers complain that they do not know what to turn for supply of suitable wool; everything therefore seems in favour of a yet higher range of prices, the more so that competing grades of foreign wool are equally scarce, and that the export demand is very fair.

HAY.—Per Load of 36 Trusses.

SMITHFIELD, Thursday, March 30.	
Prime Meadow Hay, 130s. 10137s.	Clover, old cut .. 135s. 142s.
Interior do. .. 110s. 110	Prime cut do. .. 120 130
Interior do. .. 110s. 110	Prime mid cut do. .. 130 135
Interior do. .. 110s. 110	Interior do. .. 110s. 120
Straw .. 36 45	

CUMBERLAND MARKET, Thursday, March 30.	
Sup. Meadow Hay 132s. 10102s.	Interior Clover .. 120s. 120s.
Interior do. .. 110s. 114	Prime cut do. .. 120 130
New do. .. 110s. 110	New do. .. 110s. 110
Interior do. .. 110s. 110	Straw .. 44 48
Superior Clover .. 118 147	JOSHUA BAKER.

COALS.—March 29.

Hastings Hartley, 15s.; Holywell Main, 15s.; West Hartley, 15s.; Widen Main, 15s. 9d.; Walls End, Elliot, 15s. 6d.; Walls End, Walls End, 15s. 6d.; Walls End, Hartlepool, 15s. 6d.; Walls End Original Hartlepool, 15s. 9d.; Walls End South Kelloe, 16s. 9d.; Walls End Tees, 17s. 6d.—Ships at Market, 4s.; sold, 29; unsold, 12; at sea, 5.

METROPOLITAN CATTLE MARKET.

MONDAY, March 27.

We have a very short supply of Beasts, yet trade is dull, the demand being smaller, and the dead markets well supplied; prices are lower for all kinds, and a clearance cannot be effected. The number of Sheep is about the same as last week, but the demand is less; prices consequently are lower. Good Calves and Lambs are still making a high price for the first time. 600 Beasts, 675 Brasts, 80 Sheep, 65 Calves, and 15 Pigs; from Scotland there are 150 Beasts; from Ireland, 25; from Norfolk and Suffolk, 1300; and 355 from the Midland and Home Counties.

s. d. s. d.		s. d. s. d.	
Best Scots, Herefords, &c. .. 5 40s 6		Best Long-wools .. 10	
Best Short-horns .. 5 0 5 4		Do. Shorn .. 5 0 5 4	
2d quality Beasts .. 3 4 4 4		Ewes & 2d quality .. 5 0 5 4	
Best Downs and Half-breeds .. 6 0 6 4		Lambs .. 7 0 8 0	
Do. Shorn .. 5 4 5 3		Calves .. 3 8 0 0	
Beasts, 25s.; Sheep, 15s.; Lambs, 17, 16s.; Calves, 70; Pigs, 17s.			

THURSDAY, March 30.

We have again a short supply of Beasts, but trade is dull; the average quality is still middling, consequently choicest kinds are not lower in price. The number of

Sheep is small, yet it exceeds the demand, several lots being left unsold. There is not much alteration from Monday's quotations in the business transacted. Choice Lambs and Calves are in demand at high prices. Our foreign supply consists of 345 Beasts and 105 Calves.

Best Scots, Here.		Best Long-wools	
4. s. d.	5. s. d.	4. s. d.	5. s. d.
4. 0	4. 05	4. 0	4. 05
5. 0	5. 05	4. 0	4. 05
5. 0	5. 05	4. 0	4. 05
5. 0	5. 05	4. 0	4. 05
5. 0	5. 05	4. 0	4. 05
5. 0	5. 05	4. 0	4. 05
5. 0	5. 05	4. 0	4. 05
5. 0	5. 05	4. 0	4. 05
5. 0	5. 05	4. 0	4. 05

METROPOLITAN MEAT MARKET, March 30.

Best Fresh Butcher	19s. per dozen lb.
Second do.	15s.
Small Pork, 4s. 4d. to 5s. 0d.	Large Pork, 4s. 4d. to 5s. 0d.
Beasts, 8s. 6d. and Lambs, 5s. 6d.	Calves, 12s. 5d. Pigs, 10s.

MARSH LANE.

Monday, March 27.

The supply of English Wheat fresh up to this morning's market was small; the few selected parcels were sold at an advance of 1s. per qr. upon the prices of this day se'night, the remainder being disposed of at the rates of that day. There was a fair attendance, and for Russian and American a good demand, at the extreme quotations of last week. Spring Corn of all descriptions was firm, without alteration in value. Flour was steady, at late rates.

PRICE PER IMPERIAL QUARTER.		s. s.		s. s.	
WHEAT, Essex, Kent, Suffolk.	White 47	51	Red 48	51	36
fine selected runs	48	50	50	50	36
Talavera	50	51	Red 48	51	36
Norfolk	48	50	Red 48	51	36
Foreign	45	46	Red 48	51	36
Barley, grind & dist.	30s. 34s.	36s.	40s.	36	41
Foreign	30s. 34s.	36s.	40s.	36	41
OATS, Essex, and Suffolk	28s.	28s.	28s.	28s.	28s.
Scottish and Lincolshire	28s.	28s.	28s.	28s.	28s.
Irish	28s.	28s.	28s.	28s.	28s.
Foreign	28s.	28s.	28s.	28s.	28s.
RYE	30s.	30s.	30s.	30s.	30s.
RYE-MALT, Foreign	30s.	30s.	30s.	30s.	30s.
BEANS, Maraga	45s.	45s.	45s.	45s.	45s.
Foreign	45s.	45s.	45s.	45s.	45s.
PEAS, White, Essex, and Kent	38s.	38s.	38s.	38s.	38s.
Maple, 40s. to 44s.	38s.	38s.	38s.	38s.	38s.
MAIZE	30s.	30s.	30s.	30s.	30s.
Best marks, delivered	45s.	45s.	45s.	45s.	45s.
2d ditto	45s.	45s.	45s.	45s.	45s.
Foreign	45s.	45s.	45s.	45s.	45s.

WEDNESDAY, March 29.

There were only limited supplies of English grain on offer here to-day, but those from abroad were rather large. Purchases in Wheat were effected freely, and the rates current on Monday were fully maintained. Fine Barley was purchased to a fair extent, at extreme prices, but for inferior samples the demand was inactive, and prices were somewhat lower. Malt was depressed, and prices were unchanged. Oats were in moderate request, at prices tending upwards. Maize sold freely, at firm prices. Beans and Peas were purchased to a fair extent, at previous quotations. Flour experienced a steady inquiry, and full prices were realised, except for American barrels, which ruled in buyers' favour.

ARRIVALS OF GRAIN, &c., INTO LONDON BY WATER CARRIAGE.

	Wheat.	Barley.	Oats.	Flour.
English & Scotch	Qrs. 210	Qrs. 490	Qrs. 210	Sacks. 800
Irish	1230	7570	15,770	2790 bbls.
Foreign	1230	8060	15,770	

LIVERPOOL, March 28.—A fair attendance of local and country millers, who took both white and red Wheat to a tolerably good extent, the former realising the extreme prices of Tuesday last, and in the latter sellers conceded 1d. per cental, both descriptions closing firm. Flour inactive, and without change. Barley 12d. per bushel, when Beans and Peas were under 10s. Oats and Oatmeal dull of sale. Indian Corn met a retail sale, and quotations are reduced 1s. per qr. on the week for new American, but good old dry, whether American or Danubian, is hardly lower.

AVERAGES.

	Wheat.	Barley.	Oats.
Feb. 18	53s. 1d.	35s. 7d.	23s. 7d.
25	53	35	24
March 4	53	35	24
11	53	35	24
18	54	36	25
25	55	36	25
Average	54	35	24

SEED MARKET.

There is a good business now doing in agricultural seeds, both for home and foreign requirements. The export demand for Clovers, &c., continues to clear off all spring stocks, and gives great firmness generally to the trade. American red clover is freely at late rates. For Trefoil seed the sale is slow. White Clover and Alsike are without quotable change. Grass seeds are in brisk request, at the recent advance. Spring Tares are easier, in consequence of fresh arrivals. For White Mustard seed we have a strong demand from France. Sowing Rapeseed is creeping up in price. New Sainfoin is scarce and dear. Of Timothy there is now little left on hand. Linseed is firm. For Lucerne there is a lively inquiry.

JOHN SHAW & SONS, Seed Merchants,
16, WATLOW LANE, London, E.C.

LABELS, LABELS.—PARCHMENT OR CLOTH
Labels.—Free or Patent Labels, punched parchment, 1 lb. long, 4s. per 1000, or 10,000 for 35s., cash on delivery. Sample Label sent on receipt of a postage stamp. Orders delivered free in London by JOHN FISHER AND CO., 1 Abchurch Lane, London, E.C.
Retail of the principal Scotchmen. Prices on application.

PRUSSIAN WOOD GARDEN STICKS
TALLIES, recommended by the Royal Horticultural Society.
CHARLES J. BLACKTHORPE AND CO.,
Cox's Quay, Lower Thames Street, London, E.C.
Retail of the principal Scotchmen. Prices on application.

Hot-Water Pipes and Boilers.
J. JONES AND SONS deliver HOT-WATER
PIPES AND CONNECTIONS, with BOILERS of every
make, free to any Station in England, for Cash with order; or they
allow a liberal Discount for Cash at their Wharf in London.
6, Hankshead, Southwark, London, S.E.

HOT-WATER PIPES, BOILERS, &c.
superior quality. 2-inch, 3-inch, 4-inch, 5-inch, 6-inch.
HOT-WATER PIPES, Nos. 6 and 7—each 10 ft. 11 ft. 12 ft. 13 ft. 14 ft. 15 ft. 16 ft. 17 ft. 18 ft. 19 ft. 20 ft. 21 ft. 22 ft. 23 ft. 24 ft. 25 ft. 26 ft. 27 ft. 28 ft. 29 ft. 30 ft. 31 ft. 32 ft. 33 ft. 34 ft. 35 ft. 36 ft. 37 ft. 38 ft. 39 ft. 40 ft. 41 ft. 42 ft. 43 ft. 44 ft. 45 ft. 46 ft. 47 ft. 48 ft. 49 ft. 50 ft. 51 ft. 52 ft. 53 ft. 54 ft. 55 ft. 56 ft. 57 ft. 58 ft. 59 ft. 60 ft. 61 ft. 62 ft. 63 ft. 64 ft. 65 ft. 66 ft. 67 ft. 68 ft. 69 ft. 70 ft. 71 ft. 72 ft. 73 ft. 74 ft. 75 ft. 76 ft. 77 ft. 78 ft. 79 ft. 80 ft. 81 ft. 82 ft. 83 ft. 84 ft. 85 ft. 86 ft. 87 ft. 88 ft. 89 ft. 90 ft. 91 ft. 92 ft. 93 ft. 94 ft. 95 ft. 96 ft. 97 ft. 98 ft. 99 ft. 100 ft. 101 ft. 102 ft. 103 ft. 104 ft. 105 ft. 106 ft. 107 ft. 108 ft. 109 ft. 110 ft. 111 ft. 112 ft. 113 ft. 114 ft. 115 ft. 116 ft. 117 ft. 118 ft. 119 ft. 120 ft. 121 ft. 122 ft. 123 ft. 124 ft. 125 ft. 126 ft. 127 ft. 128 ft. 129 ft. 130 ft. 131 ft. 132 ft. 133 ft. 134 ft. 135 ft. 136 ft. 137 ft. 138 ft. 139 ft. 140 ft. 141 ft. 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1126 ft. 1127 ft. 1128 ft. 1129 ft. 1130 ft. 1131 ft. 1132 ft. 1133 ft. 1134 ft. 1135 ft. 1136 ft. 1137 ft. 1138 ft. 1139 ft. 1140 ft. 1141 ft. 1142 ft. 1143 ft. 1144 ft. 1145 ft. 1146 ft. 1147 ft. 1148 ft. 1149 ft. 1150 ft. 1151 ft. 1152 ft. 1153 ft. 1154 ft. 1155 ft. 1156 ft. 1157 ft. 1158 ft. 1159 ft. 1160 ft. 1161 ft. 1162 ft. 1163 ft. 1164 ft. 1165 ft. 1166 ft. 1167 ft. 1168 ft. 1169 ft. 1170 ft. 1171 ft. 1172 ft. 1173 ft. 1174 ft. 1175 ft. 1176 ft. 1177 ft. 1178 ft. 1179 ft. 1180 ft. 1181 ft. 1182 ft. 1183 ft. 1184 ft. 1185 ft. 1186 ft. 1187 ft. 1188 ft. 1189 ft. 1190 ft. 1191 ft. 1192 ft. 1193 ft. 1194 ft. 1195 ft. 1196 ft. 1197 ft. 1198 ft. 1199 ft. 1200 ft. 1201 ft. 1202 ft. 1203 ft. 1204 ft. 1205 ft. 1206 ft. 1207 ft. 1208 ft. 1209 ft. 1210 ft. 1211 ft. 1212 ft. 1213 ft. 1214 ft. 1215 ft. 1216 ft. 1217 ft. 1218 ft. 1219 ft. 1220 ft. 1221 ft. 1222 ft. 1223 ft. 1224 ft. 1225 ft. 1226 ft. 1227 ft. 1228 ft. 1229 ft. 1230 ft. 1231 ft. 1232 ft. 1233 ft. 1234 ft. 1235 ft. 1236 ft. 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GREEN'S PATENT SILENS MESSORS,

OR

NOISELESS LAWN MOWING, ROLLING, AND COLLECTING MACHINES, FOR 1871.

THOMAS GREEN AND SON, in introducing their PATENT LAWN MOWERS to the Public for the present season, take the opportunity of acknowledging the unprecedented patronage that has been accorded to them in former years, and can assure their future Patrons that nothing will be wanting on their part to maintain the confidence so long given to them.

Every Lawn Mower that is sent out by them is warranted to give entire satisfaction, otherwise it can be returned at once, free of cost to the purchaser. Our Machines have been submitted to numerous practical tests in Public Competition, and have in all cases carried off every Prize that has been given.

The following are their advantages over all others :—

- 1st. Simplicity of Construction, every part being free of access and easily managed.
- 2d. They are worked with far greater ease than any other Lawn Mower.
- 3d. They are the least liable to get out of order.
- 4th. They make little or no noise in working, as is the case with Cog-wheel Machines.
- 5th. They perform their work in a neat and smooth manner, and leave no notches or scores.

PATRONIZED BY

HER MOST GRACIOUS MAJESTY

THE QUEEN,

ON 45 DIFFERENT OCCASIONS;

H.R.H. THE PRINCE OF WALES;

THE KING OF THE BELGIANS;



THE EMPEROR OF THE FRENCH;

THE EMPEROR OF RUSSIA;

AND MOST OF THE

NOBILITY, CLERGY, and GENTRY

OF THE UNITED KINGDOM.

PRIZE MEDALS AWARDED TO GREEN'S PATENT NOISELESS LAWN MOWERS.

International Exhibition, London, 1862.

International Exhibition, Dublin, 1863.

Agricultural and Horticultural Society, Brussels, 1862.

Agricultural and Horticultural Society, Brussels, 1863.

Agricultural and Horticultural Society, Hamburg, 1863.

Agricultural and Horticultural Society, Liege, 1861.

Agricultural and Horticultural Society, Namur, 1862.

Agricultural and Horticultural Society, Laeken, 1862.

Agricultural and Horticultural Society, Gand, 1862.

Agricultural and Horticultural Society, Linneene, 1862.

Agricultural and Horticultural Society, Linneene, 1863.

The following are a few of the principal places where Green's Patent Lawn Mowers are the only Machines in constant use, and have been for a number of years giving entire satisfaction :—

THE ROYAL GARDENS, WINDSOR.
BUCKINGHAM PALACE GARDENS.
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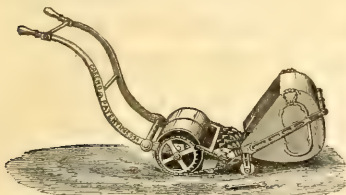
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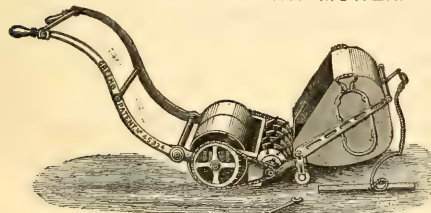
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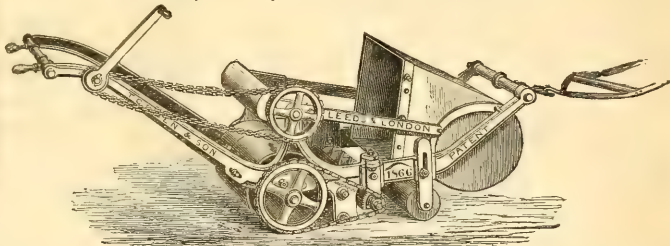
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Leather Boots for Donkey	0	18
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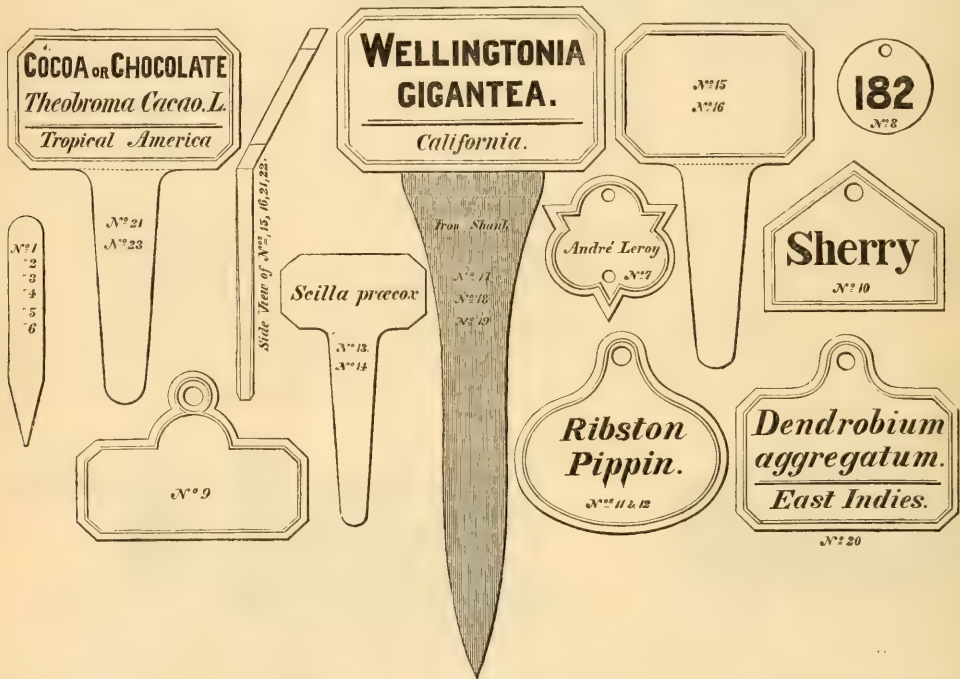
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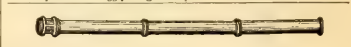
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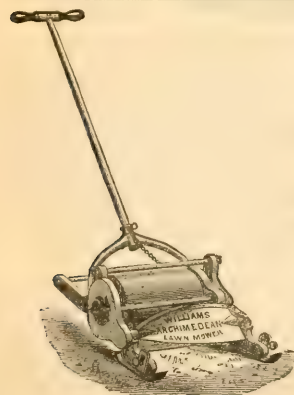
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SHANKS'S NEW PATENT LAWN MOWERS FOR 1871.

UNDER THE PATRONAGE
OF
HER MOST GRACIOUS MAJESTY
THE QUEEN,



AND MOST OF THE
PRINCIPAL NOBILITY
OF
GREAT BRITAIN.

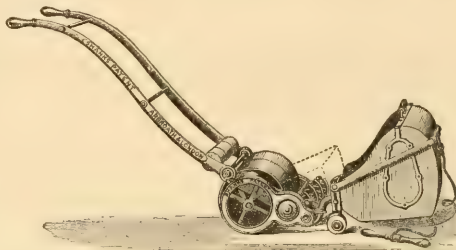
The Improvements introduced into Shanks's Lawn Mowers at different times have resulted in these machines occupying the first place in the market, to which the continued increase in the annual sale bears ample testimony.

THE MACHINE
FOR 1871

IS MADE FROM

NEW PATTERNS,

AND IS SO ARRANGED THAT IT



CAN BE USED

EITHER

WITH or WITHOUT

THE USUAL

FRONT ROLLERS

ALEXANDER SHANKS AND SON, in bringing their PATENT LAWN MOWERS under the notice of the Public for the Season of 1871, desire at once to draw attention to the various points of merit which their Machine possesses over all others. These advantages have only to be known to ensure the success and to establish more firmly than ever the position of Shanks's Machine as unquestionably the cheapest and best Lawn Mower in use.

1. SHANKS'S PATENT LAWN MOWERS have been entirely remodelled for the Season of 1871. Every conceivable alteration has been made to improvement and reducing friction to a minimum. Notwithstanding the great expense which has attended these alterations, A. S. AND SON offer THEIR NEW MACHINE AT LAST SEASON'S PRICES.
2. SHANKS'S PATENT LAWN MOWER is fitted with a double-edged Sole-Plate. This Sole-Plate enables the Cutting parts to last twice as long as those in other Lawn Mowers.
3. SHANKS'S PATENT LAWN MOWER is fitted with a self-sharpening Revolving Cutter.
4. SHANKS'S PATENT LAWN MOWER is fitted with a Wind-Guard, which prevents the Grass escaping the Box when the Machine is in use during the prevalence of wind.
5. SHANKS'S PATENT LAWN MOWER has no obstruction in front of the Cutter, a most important improvement, just introduced.
6. SHANKS'S PATENT LAWN MOWERS are made of the very best material, carefully apportioned, so that no part has more weight than is absolutely necessary, and securing at same time the greatest rigidity as a whole.
7. SHANKS'S PATENT LAWN MOWERS are more easily worked and more durable than any other Lawn Mower, and are not at all liable to get out of order.
8. SHANKS'S PATENT LAWN MOWERS are silent in working.
9. SHANKS'S PATENT LAWN MOWERS perform their work in a manner vastly superior to the Scythe. The Lawn is not "ribbed" when cut, but has a most beautiful appearance, being as smooth as a piece of velvet.
10. SHANKS'S PATENT LAWN MOWER has not only obtained more Prizes and Medals than any other, but the highest Prize that has ever been given for a Lawn Mower at an International Exhibition was awarded to A. S. AND SON, who received a First Prize Silver Medal for their Machine at the Paris Exhibition of 1867. It is significant that no other Exhibitor received a Prize, not even an "Honourable Mention" or a "Bronze Medal."
11. SHANKS'S PATENT LAWN MOWERS are warranted to give ample satisfaction, and, if not approved of, can be at once returned.
12. SHANKS'S PATENT LAWN MOWERS are delivered free at any Railway Station or Shipping Port in Great Britain. Orders are executed on the day they are received, either from the Manufactory, DENS IRON WORKS, ARBROATH, N.B., or from the London Office and Warehouse, at 27, LEADENHALL STREET, E.C.

PRICES:—SHANKS'S NEW PATENT HAND MACHINE.

		8-inch Machine..	10-inch Machine..	12-inch Machine..	14-inch Machine..
..	..	£2 10 0	3 10 0	4 10 0	5 10 0
..	..	By a Lady.	By a Boy.	By a Boy.	By a Boy.

		16-inch Machine..	19-inch Machine..	22-inch Machine..	24-inch Machine..
..	..	£6 10 0	7 15 0	8 10 0	9 0 0
..	..	By a Man.	By a Man and a Boy.	By a Man and a Boy.	By Two Men.

The Hand Machines are all with Silent Movement.

SHANKS'S NEW PATENT PONY and DONKEY MACHINE.

		25-inch Machine..	28-inch Machine..	30-inch Machine..
..	..	£12 10 0	14 10 0	15 15 0
..	..	25% extra.	30% ..	30% ..

Silent Movement, 12s. 6d. extra.

Boots for Pony, 22s. per set; Ditto for Donkey, 18s. per set.

SHANKS'S NEW PATENT HORSE MACHINE.

		30-inch Machine..	36-inch Machine..	42-inch Machine..	48-inch Machine..
..	..	£19 0 0	22 0 0	26 0 0	28 0 0
..	..	30s. extra.	40s. ..	40s. ..	40s. ..

Silent Movement, 20s. extra. Boots for Horse, 26s. per set.

ALEXANDER SHANKS AND SON,
DENS IRON WORKS, ARBROATH; and 27, LEADENHALL STREET, LONDON, E.C.
27, Leadenhall Street is the only place in London where intending purchasers of Lawn Mowers can choose from a Stock of from 150 to 200 Machines.
All sizes kept there, whether for Horse, Pony, or Hand Power.

JOHN BENNETT LAWES.
 Offices: 59, Mark Lane, London, E.C.
 Branch Offices: Market Street, Cardiff; Sheriff Place, Leith, and 34, Market Street, Aberdeen.

LAWES' PATENT TURNIP MANURE.
LAWES' DISSOLVED BONES.
LAWES' SUPERPHOSPHATE OF LIME.
LAWES' WHEAT, BARLEY, GRASS, and MANGEL MANURE.
LAWES' CONCENTRATED CORN and GRASS MANURE.
 These Manures can be obtained at any of the above addresses, or through any of the appointed Agents throughout the United Kingdom.

PERUVIAN GUANO, NITRATE OF SODA, SULPHATE OF AMMONIA, and other Chemical Manures.
AMERICAN and other Cakes at market prices.

THE LONDON MANURE COMPANY
 (ESTABLISHED 1849), have now ready for delivery, in fine dry condition:
PURE DISSOLVED BONES.
CONCENTRATED AMMONIACAL MANURE, for Top-Dressing.
PURKES' BONE TURNIP MANURE.
SUPERPHOSPHATE OF LIME.
NITROPHOSPHATE.
MANGEL, HOP, and POTATO MANURES. Also
PERUVIAN GUANO (as imported by Messrs. Thomson, Bonar & Co.), **NITRATE OF SODA, SULPHATE OF AMMONIA, &c.**
 116, Fenchurch Street, E.C. **EDWARD PURKES, Secretary.**

MILLER and JOHNSON
 (ESTABLISHED 1869)
 Manufacture the highest quality of
ARTIFICIAL MANURES for ROOT, CORN, and GRASS CROPS.
 36, Mark Lane, London.

By Royal Letters Patent.

JAMES GIBBS and COMPANY, Sole Manufacturers of the AMMONIA-FIXED PERUVIAN GUANO.
 The cheapest and best Manure in use. Guaranteed to be mixed from the finest qualities of Peruvian Government Guano as imported; weight for weight and money value, the results are superior to Peruvian Guano "Unfixed." Applicable to all crops, and which the "Fixed" Peruvian Guano is used, and many to which it is not usually applied—viz., Turnips, Manure, and Potatoes. Warm countries that none is genuine unless it bears the name of Trade Mark, and are secured with a leaden seal.

PATENT AMMONIATED PHOSPHATE specially adapted for Wheat, Barley, and Hops. Also manufacturers of **BONE, BLOOD, and SEED MANURES** of the highest quality. Particulars of
JAMES GIBBS and COMPANY—Works, Victoria Dock.
 Offices, 61, Mark Lane, London, E.C.; or their authorised Agents.

PHOSPHO GUANO.
Guaranteed Uniform Analysis.
 "I NEVER have had in my hands a Manure which, in regard to the best proportions and abundance of efficacious soluble component parts, is so well adapted to the Phospho-Guano surpasses most certainly, by its more correct and its constant composition, the best sorts of Peruvian Guano, and of its superior efficacy there can be no the slightest doubt."
"JUSTUS VON LIEBIG."
 "I am of opinion that Phospho-Guano is a uniformly prepared, highly concentrated, and most generally useful Manure than the higher-priced Peruvian Guano. For Root Crops it is, as I have before said, by the valuable results of whether natural or artificial, which yet has been offered to the Public."
"AUGUSTUS VOELCKER."
 Composed of Guano imported from islands at the equator in the Pacific Ocean, richer in phosphoric acid than any other known Guano. The ammonia is in a pure and ready formed state, immediately available for assimilation by plants.
 This Guano gives to crops a greater chance in unfavourable seasons, and in proof of its powerful fertilising qualities, has invariably produced a greater maximum weight of produce in bulk as well as in specific gravity.
 Though so entirely soluble, it is in an easy dry condition for spreading on the land, and being highly concentrated, much money and labour are saved in carriage and handling.
 The application of Phospho-Guano restores to the soil in the cheapest form the weight of fertilising properties extracted by the crops, chiefly because it contains such an excess of phosphoric acid, and because it is a true Guano, the deposit of sea birds, and a condensed equivalent to farmyard manure.
 Delivered at every Railway Station, £12 per ton, cash.

PHOSPHO-GUANO COMPANY, LIMITED.
 General Agents:—**PETER LAWSON and SON**, 20, Rudge Row, London, E.C., and Edinburgh; also of the Local Agents throughout the country, a list of whom may be had on application.
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ODAM'S DISSOLVED BONES.
ODAM'S SUPERPHOSPHATE OF LIME.
ODAM'S NITRO BI-PHOSPHATE (or prepared) GUANO.

MANUFACTURED BY THE
PATENT NITRO-PHOSPHATE or BLOOD MANURE COMPANY (Limited), consisting of Tenant-Farmers occupying upwards of 30,000 Acres of Land.
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DIRECTORS.
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Deputy Chairman—John Clayton, 155, Camden Road.
Edward Bell, 48, Marine Parade, Brighton.
Richard Hunt, Stanstead Abbott, Herts.
Robert Leeds, Wickham House, Brandon, Norfolk.
George Saville, Ingthorpe, near Stamford.
Samuel Jones, Chishill Green, Essex.
Charles Dorman, 23, Essex Street, Strand, W.C.
Thomas Webb, Aldersham, Cambridgeshire.
John Webb, Melton Road, Lincolnshire.
J. J. Lacy, 50, West Smithfield, E.C.
Managing Director—James Odams.
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This Company was originally formed by, and is under the direction of, Agriculturists, circumstances that have earned for it another title, viz., **THE TENANT-FARMERS' MANURE COMPANY.**
 Several Hundred Thousand Tons of the Manures have been supplied to the Agricultural Public, and the increasing demand that exists for them is the best proof of the appreciation in which they are held.
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THOMSON'S STYPTIC, manufactured and sold by THOMSON, YOUNG and SON, Dundee, in bottles, with directions for its application, at 3s. each; and may be had of all Nurseriesmen and Seedsmen. This is the only preventative of bleeding in the Vine.

RUSTIC TERRA COTTA.—Oak, Fir, Laurel, Root, and other designs in FERN STANDS, Flower-pots, Mignonette Boxes, Garden Seats, Brackets, and other articles in WOOD AND CO., Window Glass and Shade Merchants, 68, Aldersgate Street, nearly opposite the Railway Station.

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Rosher's Garden Edging Tiles.

THE above and many other PATTERNS are made in materials of great durability. The planter sorts are especially suited for KITCHEN GARDENS, as they harbour no Slugs or Insects, take up little room, and, once put down, incur no further labour or expense, as do "grown" Edgings, consequently being much cheaper.
GARDEN VASES, FOUNTAINS, &c. in Artificial Stone, very durable and of superior finish, and in great variety of design.
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 N.B. Orders promptly executed by Rail or to Wharves.
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For use in Gentlemen's Gardens and Grounds. The delivery valve can be worked at the outlet when filling a watering-pot. It holds 35 gallons. The Spreader for Watering Lawns, &c., can be removed at pleasure. Price with Sprayer, £5 2 0 extra.
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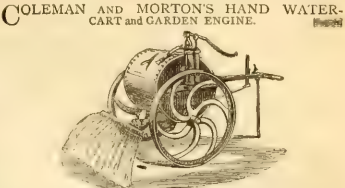
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STEAM ENGINES and BOILERS combined, "specially adapted for Contractors, Mills, Dyehouses, Workshops, Joints, Cabinet Makers, Tailors, Printing Offices, Farms, &c." No brickwork or chimney stacks required. Sent out in complete working order, ready for immediate use. All sizes kept in stock from 1 to 10-horse power.
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GALVANIZED Cable Strand Fencing.
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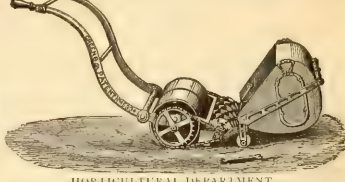
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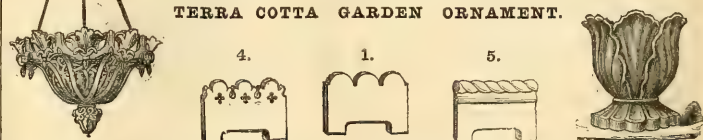
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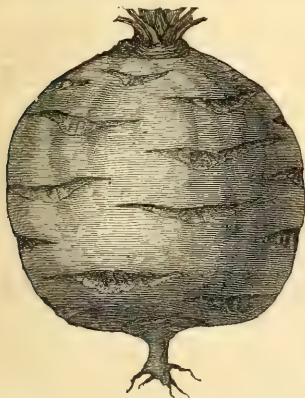
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SUTTONS' HOME-GROWN FARM SEEDS,
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All Goods Carriage Free (except very small parcels).
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 Reduced rates for quantities of more than ten acres.

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Col. LAFFAN, Commanding the Royal Engineers, reports as follows under date Feb. 4, 1871:—"Col. Laflan, R.E., presents his compliments to Messrs. Carter, and begs to inform them that all the Grass and Clover Seeds supplied by them to the War Office for use at Aldershot last year and the year before have succeeded admirably. Last year a very fair crop of excellent Hay was produced on what had previously been a barren sand."

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CARTER'S IMPROVED MAMMOTH PRIZE LONG RED LINGEL	1 4
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 IMPROVED
 MAMMOTH
 PRIZE
 MANGEL.



CARTER'S
 IMPROVED
 MAMMOTH
 PRIZE
 MANGEL.

From Mr. Steman, Esq., Kent, Sept. 26th, 1870:—"I trust the first prize with your Mammoth long Mangrove, and second with the Golden Wonder, has been won by the seedsmen of the Royal Horticultural Society. I have taken the first prize at our show. Of the Mammoth, our single root weighed 10 lb., and the best of the roots are still in the ground."

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Forest Trees, Ornamental Trees, and Shrubs.
PETER LAWSON AND SON have to intimate that CATALOGUES for the present season may be had upon application.
 The stock of Seedling and Transplanted LARCHES, SCOTS FIRS, and other FOREST TREES is both unusually extensive and superior in quality. When personal inspection is not convenient, samples and special offers will be sent by post.
 Edinburgh and London (20, Budge Row, Cannon Street, E.C.)

Novelties for 1871.
DAHLIAS—KEYNES' first-class varieties, consisting of 12 Show Flowers and 6 of wonderful improvement. The set, complete, to the Trade, for 15s. See KEYNES' CATALOGUE.
DAHLIA, MARCHIONESS OF BATH (WHEELER'S).
 J. KEYNES has purchased this beautiful flower. White-tipped purple. First-class Certificate. Price 10c. each.
 Castle Street Nursery, Salisbury.

ROYAL HORTICULTURAL SOCIETY.
SHOW OF CYCLAMENS, &c., April 8, 1871.
ARDS OF THE JUDGES.
 CLASS 1.—ODONTOPOLYTHUS, distinct. (Open.)
 1st Prize, Mr. W. Bull, Nurseryman, King's Road, Chelsea, S.W., 1st.
 CLASS 2.—CYCLAMENS, Collection of. (Open.)
 1st, Mr. G. Goddard, Gr. to H. Little, Esq., Cambridge Villa, Twickenham, 1st.
 2d, Mr. C. Edmonds, Hayes Nursery, Hayes, Middlesex, 1st.
 3d, Mr. J. James, Gr. to W. F. Watson, Esq., Redles, Isleworth, 1st.
 CLASS 3.—12 CYCLAMENS, (Open.)
 1st, Mr. J. James, 1st.
 CLASS 4.—6 CYCLAMENS, distinct. (Amateurs.)
 1st, Mr. G. Goddard, 1st.
 CLASS 5.—CINERARIAS, distinct. (Open.)
 1st, Mr. W. Lacey, Gr. to C. S. Mortimer, Esq., Wigmore Park, Dorking, 1st.
 2d, Mr. J. James, 1st.

CLASS 6.—SAMARYLLIS, distinct. (Open.)
 1st, Mr. C. Bunker, Gr. to C. Reiger, Esq., Broadbourne, Herts, 1st.
 CLASS 7.—6 HARDY PRIMROSES, distinct, in boxes 12 inches square. (Open.)
 1st, Mr. T. S. Ware, Hale Farm Nursery, Tottenham, N., 1st.
 CLASS 8.—4 BULBOUS PLANTS, in flower. (Amateurs excluded.)
 1st, Mr. T. S. Ware, 1st.
 CLASS 9.—CUCUMBERS, black spined, 1 brace. (Open.)
 1st, Mr. J. Lockie, Gr. to F. W. Berger, Esq., Court Gardens, Great Marlow, 1st.
 2d, Mr. J. Douglas, Gr. to F. Whitbourne, Esq., Loxford Hall, Hford, 1st.
 CLASS 10.—CUCUMBERS, white spined, 1 brace. (Open.)
 1st, Mr. T. Lockie, 1st.
 CLASS 11.—CUCUMBERS, smooth, 1 brace. (Open.)
 1st, Mr. T. Lockie, 1st.
 CLASS 12.—FORCED SALADING, collection of. (Open.)
 1st, Mr. J. Hepper, Gr. to C. F. Millard, Esq., The Elms, Acton, W., 1st.
 2d, Mr. Thos. Record, Gr. to the Marquis of Salisbury, Hatfield Park, Herts, 1st.

MISCELLANEOUS—EXTRA PRIZES.
 Messrs. J. Veitch & Sons, Royal Exotic Nursery, Chelsea, for group of Miscellaneous Plants, 1st.
 Messrs. W. Rollison & Sons, Nurserymen, Tooting, for group of Plants, 1st.
 Messrs. H. Lane & Son, Nurserymen, Great Berkhamstead, for collection of Roses in pots, 1st.
 Mr. W. Bull, for collection of Orchids and New and Rare Plants, 1st.
 Mr. W. Paul, Paul's Nurseries, Waltham Cross, N., for group of Roses in pots, 1st.
 Messrs. Paul & Son, Old Nurseries, Cheshunt, N., for collection of Roses in pots, 1st.
 Mr. C. Turner, Royal Nursery, Slough, for collection of Auriculas, 1st.
 Mr. Buxter, for collection of Auriculas, 1st.
 Mr. C. Noble, Sunningdale Nursery, Bagshot, for collection of Clematises, 1st.
 Mr. T. S. Ware, for 6 double Wallflowers, 1st.
 Mr. T. S. Ware, for collection of Spring Flowers, 1st.

The Gardeners' Chronicle

SATURDAY, APRIL 8, 1871.

MEETING FOR THE ENSUING WEEK.

WEDNESDAY, April 10, 11 Royal Botanic (Second Spring Show).

THURSDAY, 13 Royal Botanic (Second Spring Show).

THE letter from Mr. W. ROBINSON, relating to the condition of the GARDENS AND NURSERIES ROUND PARIS, which we print in another column, will assuredly be read with great attention, not only on account of its intrinsic interest, but also for the graphic style in which the writer has narrated what he saw. The letter is particularly well-timed, as there can be no doubt that the wicked folly of the few within the last week or two has materially checked the current of sympathy with our distressed horticultural neighbours.

That this should be so is certainly no matter for surprise, though we trust, after the perusal of Mr. ROBINSON'S letter, our gardeners will see that there is no good reason why we should cease from doing good, or at least attempting to do so, because others do ill. All accounts agree in this, that it is not the right-thinking part of the community, and specially not the class whom we horticulturists wish to help, who are responsible for the horrors of the present state of things. Mr. ROBINSON describes most vividly the awful nature of the calamity which has befallen some of the leading nurserymen, and if the loss in this case is appalling, ruin, absolute ruin, must be the lot of hundreds, nay thousands of poor nurserymen and gardeners in the invaded districts. In this affair our political sympathies should go for nothing. Grievous loss and utter ruin have overtaken a large proportion of our fellow labourers. Let us help them all we can. It may be that, had the conditions been reversed, and Germany had been overrun, equal, or, if possible, worse horrors might have been inflicted by the French. What is that to us? It may be that the French as a nation, in years gone, by have sowed the wind, and that they are now reaping the whirlwind. It may be that they themselves laid up

the combustibles and themselves fired the match. This may or may not be the case—what is that to us? If we see a house on fire, we do not wait to inquire what were the causes of the fire, or whether the proprietor himself set it alight; but we act for the best on the moment, and do what we can to relieve the sufferers. It is clear that is our duty now. We may execrate and despise the incendiary, but we ought to help the unoffending and the innocent, overwhelmed in a common calamity with the authors of the disaster.

Very characteristic is the account given by Mr. ROBINSON of the bearing of the Parisians during the outbreak of the civil commotion—war we can hardly call it,—hopeful, too, that a great city can resume so speedily its gladsome aspect. Talk of turning swords into pruning hooks, read what Mr. ROBINSON says of the attendance on M. RIVIÈRE's lectures on the cultivation of fruit trees, and say is it not an accomplished fact? It is satisfactory, too, to learn that many of the squares and boulevards, which contribute so much to the adornment of the bright, lively capital, are not materially injured. In other instances the destruction may bring about good: for instance, the Avenue de l'Impératrice, spoken of so eulogistically by Mr. ROBINSON, had clearly been carried out on too costly a scale for the finances of the city to keep up properly. Beautiful it certainly was just before the siege, but showing too evident signs of neglect, as if the cost of keeping it as it ought to be kept up had proved too much even for M. HAUSMANN. Lavish expenditure for town gardens, as Mr. ROBINSON himself has often averred, is a mistake. Let us hope when Paris finds leisure and means to repair the damages, prudent economy will obviate the possibility of the occurrence of that very sad spectacle—a magnificent garden ill-kept.

As to the Jardin des Plantes, we concur in the main with Mr. ROBINSON's opinion. There was a rumour, a year or two ago, that the garden was to be removed to some better situation and re-modelled. Perhaps this may yet be done. At any rate, it is satisfactory to know that no material damage has been done to the museums and herbaria; had they been destroyed, the loss would have been far more serious than that of the plants in the old-fashioned, ill-constructed stoves. By the way, we must not omit, while expressing our general agreement with Mr. ROBINSON's strictures on the garden, to allude to the excellence of the arrangements for educational purposes; in this respect, at least, it bears favourable comparison with any of our own botanic gardens.

It will be interesting also in the future to note the effects of the disasters on such of the plants as may have survived. Orange trees will bear almost any amount of ill-treatment, will any of those mentioned by Mr. ROBINSON manage to survive the rigours they have been subjected to, and astonish us by-and-by by manifesting symptoms of returning vitality? What will be the fate of the shell-diddled Ailanthus?—will it live as a memento of the siege, as impressive as the fragments of shells preserved in the Jardin des Plantes?

English readers have already had to thank Mr. ROBINSON for his account of the Parks, Promenades, and Gardens of Paris as they were; let us hope French gardeners may have occasion to thank him for his account of them as they are.

—DR. HOOKER, in company with Mr. JOHN BALL, a former President of the Alpine Club, and Mr. MAW, a well-known plant amateur, left London on Saturday last for MOROCCO. A gardener from Kew forms one of the party, and it is to be expected, if the travellers succeed in penetrating beyond the coast, that valuable results, scientifically and horticulturally, will be forthcoming.

—We are glad to find that DR. SEEMANN has once more returned from Central America, bringing with him a large collection of rare and interesting plants, which, we are, we believe, placed in the hands of Mr. W. BULL for distribution.

—It is reported that, last week, 100 acres of plantation the property of the Marquis of HUNTER, in the neighbourhood of Abney, were destroyed by fire. A young man, named EDWARD HAVILLAX, a farm-tenant in the parish of Abney, is charged with the offence.

—The following gentlemen have recently been elected members of the METROPOLITAN FLORAL SOCIETY:—Messrs. W. Wilson Saunders, Wheeler, St. Pierre, Harris, N. Norman, Hopkins, R. Dean, W. F. Chapman, W. Essie, Edward Cooling, Thomas Ware, Richard Heady, J. James, John Standish,

H. Flowers, J. Butcher, H. Little, J. Pizy, Rev. Chas. F. Groom, Rev. T. Cox Hales.

—From the schedule of prizes for the NOTTINGHAM SHOW of the ROYAL HORTICULTURAL SOCIETY, which has just reached us, we learn that the local prizes are distributed over the classes, the CARDINAL schedule of the Society containing 74 classes. We miss this year the cottagers' schedule, which, having in view the extent to which gardening is carried amongst artisans in the neighbourhood of Nottingham, and having also in recollection the splendid show of cottagers' productions at Manchester, we cannot but regret. The local prize money seems to be judiciously distributed over a variety of subjects, as, indeed, might have been expected with such a local body as the managing committee, as amongst others, Mr. HOLZ, Mr. POCHIN, MR. PEARSON, Mr. W. INGRAM, MR. SPEED, and Mr. LAMB, all names well known in the world of horticulture, and, which is of more consequence, carrying with them the respect and confidence of horticulturists. The schedule is too lengthy to allow us to do more than refer to the fact, that in many of the original classes the liberal prizes at first offered have been supplemented by medals for the winners of the first prizes; and that there are certain supplemental prizes, chiefly for cut Roses, to be competed for on the second, third, fourth, and last days of the show respectively, which will have the effect of bringing in numerous fresh flowers, to the manifest improvement of the general effect. The same principle might be advantageously carried out amongst fruits. In any case it would be well, as suggested by some of our correspondents, if some arrangement were made by which to relieve the exhibitor, before its close, of all unsightly decaying fruit, and, in fact, to make the prize fruit removable while yet in a state fit for the table.

—MR. DRECHSLER, whose Seminar we noticed last week, has also submitted to our notice a very ingenious contrivance, which he calls a PATENT MOVING SPRING, for improving the cutting of grass by SHEARS. Its effect is to press the cutting edges of the shears together as one does usually when using this implement by a strain of the muscles; only when the spring is used, the hands and arms, being relieved from this particular action, have more freedom of motion. It consists of a peculiarly bent iron rod, one end of which is fitted into the handle on one side, while on the other handle is a stout india-rubber ring, which, when the shears are in use, is pulled over the opposite end of the hook (see fig. 86). It can be applied to any shears, and removed again in a few seconds, and very much facilitates the working of them, its special object being to press the blades together so as to ensure a cleaner cut.

—MR. JOHN GAVIN, who has been 43 years gardener to the Earl of MORAY, Donibristle, Fifeshire, has retired on full pay. This, says the *Gardener*, is an instance of long service and kind treatment which it has much pleasure in announcing. Mr. GAVIN has long been known as a most successful flower grower and general gardener. He is succeeded by Mr. GEORGE MUIR, formerly gardener to the same nobleman at Damaway Castle, Morayshire.

—In the schedule of the STAMFORD FLORAL and HORTICULTURAL SOCIETY, which is a comprehensive one, with a well filled cottager's department, we note that prizes are offered for the best basket or stand of SWEET-SCENTED FLOWERS, shown in bunches. This should be a very interesting feature of the show. Far less satisfactory is the invitation to set up bouquets of wild flowers, the tendency of which is generally to fill the tables with rubbish, and to assist in making rare native plants rarer still.

—It has long been known that BORAX was a valuable detergent. It has had an extensive use for cleaning the hair, and in the United States has been employed instead of the carbonate of soda for washing linen. The *New York Druggists' Circular* now informs us that BORAX is superior to everything for exterminating the Cockroach. The small or touch of BORAX is said to be certain death to them. A knowledge of this fact cannot but be valuable to a large number of householders in London and elsewhere, who are pestered with those annoying beetles; nor less so to the growers of Orchids, amongst which they often do incalculable mischief.

—The ARENG PALM (*Arenga saccharifera*) is well known as yielding the coarse black fibre called GOMUTI or GOO FIBRE, which is made into strong and durable cordage. The tree is common in the Malay Archipelago. On the west coast of the island of Sumatra it grows in the higher regions at an elevation of from 3000 to 4000 feet, where the Cocoa-nut no longer succeeds. In these parts the Arenga takes the place of the Cocoa-nut in point of utility. The juice or toddy obtained from it is more esteemed than that from the Cocoa-nut; it is procured by cutting off the flower-spike at a few inches from the stem, and collecting the flowing juice in a hollow Bamboo; it is allowed to ferment for a few days, after which the

liquor is drawn off, and the palm wine, which has a somewhat bitter taste, is ready for use. The juice, if not allowed to ferment, furnishes a quantity of sugar, which, though known and used to some extent in Java, is little appreciated in Sumatra. Sago is produced from the stems of the young trees which have not yet flowered, but this sago is not obtained in any quantity, and it is only in times of scarcity of Rice that it is regularly extracted. The most important product from the Palm is a coarse black fibre, the spokes of The thorn-like appendages of the stem are made into pens for writing. It appears that altogether this Palm is much more highly prized in Java than it is in Sumatra.

—THE MAXIMUM TEMPERATURES of the air in England during the week ending April 7, were 70° at Salford and 64° at Nottingham to 55° at Hull, and 57° at Newcastle; whilst the mean for all stations was 65°·2, being 8°·6 above the mean for the different towns in Scotland, where the extremes were represented by 65° (at Paisley), and 52°·2 (at Aberdeen). The MINIMUM TEMPERATURES in the two countries show but little range. In England the extremes were 28° at Salford (the extreme highest and lowest being thus recorded at the same station), and 33° at Leeds, and the mean for the whole country was 30°·5. In Scotland, 26°·5 at Paisley (where also the extreme highest temperature was observed) and 37° at Edinburgh were the two extremes, and the mean for the country was the same as for England, viz., 30°·5. The MEAN TEMPERATURES in both countries show a decided decrease as compared with those recorded at the different towns during the preceding week, the decline being somewhat larger in the northern country. The following Table gives the mean temperature of each country as deduced from the observations taken at the different stations during the month of MARCH:—

	England.	Scotland.
Week ending March 4 ..	44·3 ..	43·2 ..
" " 11 ..	45·5 ..	45·6 ..
" " 18 ..	45·5 ..	45·5 ..
" " 25 ..	47·3 ..	46·7 ..
" April 1 ..	47·8 ..	41·6 ..

Thus the week under discussion was colder, with the exception of the week ending March 18, than any other in March. In England, 45°·9 (at Portsmouth) was the highest mean temperature at any station, and 39°·6 (at Hull) and 39°·7 (at Newcastle) were the lowest. In Scotland 45°·3 at Edinburgh and 39°·6 at Aberdeen were the extremes. RAINFALL.—Very little or no rain fell at most of the stations in the two countries, Nottingham, with 0·52 inch, standing alone, the next in order being 0·15 inch at Hull and 0·13 inch at Newcastle. The mean for all stations in England was 0·08 inch, and for those in Scotland was 0·02 inch, which is the lowest mean for the latter country during the month of March, as will be seen by the following Table of mean rainfall in the two countries:—

	England.	Scotland.
Week ending March 4 ..	0·22 inch ..	0·39 inch ..
" " 11 ..	0·41 ..	1·68 ..
" " 18 ..	0·25 ..	0·05 ..
" " 25 ..	0·67 ..	0·05 ..
" April 1 ..	0·08 ..	0·02 ..

(See MR. GLAISHER'S Tables in our present issue.)

—In some of the mountainous districts of Sumatra many EUROPEAN VEGETABLES are grown, and several varieties of Potatoes of excellent quality are successfully cultivated. It is noticeable that over the whole of India where there are Europeans, most of our culinary vegetables are to be found in cultivation, such as the various kinds of Cabbage, Radish, Celery, &c.

—In an article in the *Canadian Pharmaceutical Journal*, on the uses of BEECH NUT OIL, we are told that the soap made from it is of a dirty grey colour, becoming yellow by exposure to the air, and having a slightly characteristic odour of the oil. It is somewhat greasy and sticky, and for these reasons is less valuable to the soap maker than any other kinds of vegetable oils, though in France it is extensively used for this purpose. Three pounds of the oil will make 5½ lb. of soap, as taken from the frame, which in two or three months, by drying, will lose a considerable portion of its weight. Beech nut oil, however, is most valuable for culinary and lighting purposes, for the former of which it is considered very wholesome and reliable, and to a great extent takes the place of butter and lard among the French and German inhabitants of certain districts. It burns well, giving a good light, and is free from smoke. When properly refined it is good for lubricating delicate machinery, such as clocks, &c.

—We have already mentioned that the ROYAL NATIONAL TULIP SOCIETY will this year hold its show in the Manchester Botanic Garden, in connection with the Great National Horticultural Exhibition of the Manchester Botanical and Horticultural Society. The very liberal schedule of prizes has just been issued, and we learn from it that 52 *bouds* *de* tulip growers have already entered. Amongst the rules which regulate the raising and judging of the tulips, the judges shall adopt as the basis of their decisions—purity, correct marking, symmetry in form, uniformity in size, and perfect dissimilarity. Small growers, and maiden growers (*i. e.*, such as have never won the amount of their subscriptions at any one show) are very liberally provided for. All entries must be made, and subscriptions, on or



FIG. 86

before April 23, on which day, at 3 P.M., the making-up meeting will be held at the Falstaff Inn, Manchester. Mr. S. BARLOW, Chadderton, near Manchester, is the hon. treasurer and secretary.

—We have lately examined samples of some very excellent HORTICULTURAL SHADING and PROTECTING MATERIALS, manufactured by MESSRS. COLLINGS & SON, of Manchester. The fabric is of cotton, and very strong, though somewhat loosely woven, the threads being so disposed as to form square meshes or open spaces—like the meshes of a sieve. The meshes vary from squares of about $\frac{1}{4}$ inch width in both directions, to parallelograms of about half that width or less in the transverse direction. The latter will form excellent protecting materials for wall trees against spring frosts, while the different samples, of which five appear to be manufactured, are also exceedingly well adapted for shading greenhouses—the amount of shade, of course, varying with the closeness of the fabric. They serve, equally with ordinary netting, for protecting fruits or seed-beds; and for the latter purpose, we learn, that if merely spread over the surface of the bed no bird will venture to approach. Altogether they appear to us to be extremely useful materials of the lighter class, for the purpose above indicated, and at the present season they may soon be put to the test.

—General MORNÉ has made a communication to the Academy of Sciences of Paris relative to the CULTIVATION of QUINQUINAS in the Island of Réunion (Bourbon) by his son and Dr. Vincent. The seeds were originally obtained from Ceylon, through Dr. Hooker, in March, 1866. The last accounts received are only two months old; at that time the plantations were in a perfectly satisfactory condition. The original seed had produced two trees, which are now 4½ years old and 16 feet high. They are now flowering for the first time, but it is not yet known whether they will produce seed. This matters little, however, as regards the propagation of the plants, and which is effected perfectly by means of cuttings. There are many hundreds of cuttings of all ages now in the gardens of the island in excellent condition. The best altitude for the Quinquina seems to be between 1000 and 1200 metres; 800 seem insufficient.

—A great deal of discussion has taken place during the last twelve months relative to the durability of the JARRAH TIMBER of WESTERN AUSTRALIA; but, says the *Builder*, until the present time no positive proof has been given of its good qualities. There are, however, at present on view at the Flinders Street Station of the Melbourne and Hobson's Bay Railway Company there, three logs of Jarrah timber which have, for the last 30 years, formed a portion of the jetty at Perth, Swan River, Western Australia. The logs are about 20 feet in length, with a diameter of about 12 inches, and, having been sawn down the full length and polished, exhibit the splendid grain of the wood to great advantage. The wood, it appears, is as firm and solid as when first hewn. The grain is close, of a fine dark colour, and taking a rich polish. Each pile bears a written certificate from an officer of the Western Australian Government. It is to an astringent principle in the wood, poisonous to insects, that the preservation is attributed. Jarrah is stated to be the produce of *Eucalyptus rostrata*.

—The genus CURCUMA is known as furnishing the yellow powder called TURMERIC, which is used as an aromatic ingredient in the preparation of curry powder, and also in various branches of eastern cookery as well as in medicine, and as a colouring matter and a test for alkalis. The young tubers, which are colourless, also yield a kind of arrowroot—that known as East Indian arrowroot being the produce entirely of species of this genus, such as *C. angustifolia*, Roth., *C. rhombica*, Koob., &c. In Borneo, *C. purpurascens*, Bl., is a common plant, and the older rhizomes are dug up, beaten to pieces, and washed to separate the farina from the fibre. The powder is not only used in the preparation of native

dishes, but, mixed with water and perfumes, it is smeared over the faces and bare arms and necks of brides and bridegrooms when they sit in state before marriage, or receive their first visits of ceremony. Perhaps our perfumers may take a wrinkle.

MORMODES CARTONI.

"THREE grows," wrote Dr. Lindley in Paxton's "Flower Garden," iii. t. 93, "in the temperate parts of the snow-capped ridge of Santa Martha, a Mormodes of which travellers speak as being most remarkable

had a very pretty effect, which was rendered all the more interesting from the remarkable form and profuse spotting of the individual flowers; and though the plant could scarcely claim to occupy a place in the front rank amongst Orchids, it was considered sufficiently ornamental to merit a First-class Certificate as an ornamental representative of its particular genus. The flowers are individually of the normal shape and size, and have the same undinate or angular lip; while the colour, at first of a dark orange-yellow, becomes afterwards changed to a deep wine-red, which is relieved by distinct deeper spots, scattered irregularly over the surface of the sepals and petals, a few appearing also on the lip. Altogether the plant forms a really striking object.

Apart from these general features of interest and of ornament, the different kind of Mormodes are well worth growing on account of the singular structure of their flowers, which look as if in some way more or less distorted, and sometimes, as in *M. luxatum*, so much so that the parts seem to be altogether unfitted to each other, whence the name, which signifies dislocated. *M.*

THE PARIS GARDENS AND NURSERIES AFTER THE WAR.

I LEFT London on the evening of Saturday, March 18, not knowing anything of the events of that day in Paris, or probably I should have waited for a better opportunity to see the ruin caused by the war. The morning of the 19th was beautiful; and, as the sun drove the cold fogs across the snow-wreathed fields, and burnished the golden flowers on the Willow trees, it seemed to promise a fairer future for unhappy France. But German soldiers and officers were at the stations; the houses inhabited by them were wreathed with evergreens in honour of German victories; the cannon on railway waggons, prepared to go home after their brutal work, were garlanded with Ivy and with Laurel; and all showed too plainly that this is no sun of Austerlitz for the French. I learned at Amiens that a good deal of the corn distributed by the English among the peasants for sowing their land had been taken by the German troops. Though permitted to pass by the authorities, it had frequently fallen into the hands of small foraging parties who would hear of no excuse, and to whom nothing was sacred.

When I got to Paris, finding no cab, and having traversed a considerable portion of the city on foot without noticing any particular commotion, I was not

a little astonished to hear, on arriving at my hotel, "We had a revolution here yesterday! two generals shot," &c. Not a good time, clearly, to take horticultural observations in these parts. As my hotel was near the square of St. Jacques, I went out to see the condition of that once pretty spot, and was pleased to find it uninjured in any important particular. There were no spring flowers; the surface looked rough and unkempt here and there, but the trees were safe, and on the whole it could be set right in a day or two. At the end of the road leading from this to the Hôtel de Ville was a barricade, about and beyond which, in the great Place round the hotel, was a vast crowd. Just as I approached the barricade several shots were fired, and the people began to disperse in hot haste, evidently much frightened. I then walked up the Avenue des Champs Élysées, where, notwithstanding the revolution, the little children were enjoying their games. A crowd, mostly composed of grown persons, was gathered before a small structure, waiting in a state of considerable expectation for the opening of a Punch and Judy show, and three other crowds were enjoying others already opened! Nor were the attentions of non-revolutionary folk entirely devoted to the delights of Punch and Judy, for the pretty baskets of Violets, single Hyacinths, Daffodils, &c., with which the Paris used to abound in spring, had yet their vendors and buyers, surrounded by highly interested crowds. The next day I went to see M. Rivière at the Luxembourg Gardens, and found him lecturing on fruit-tree cultivation to 150 students, which surprised me not a little, con-



FIG. 87.—MORMODES CARTONI VAR.

for the infinite variety of its colours." This is the plant now called *M. Cartoni*. The form originally figured in the "Botanical Magazine" (t. 4214) has the flowers of a bright yellow, striped throughout with well defined red lines. Two other forms are figured in Paxton's "Flower Garden" in the plate above



FIG. 88.—MORMODES CARTONI VAR. (natural size).

quoted (figures B and C), the one having dingy red flowers marked with lines of deeper-coloured dots, the other having dark lake-coloured flowers, speckled, but not, like the other, barred with red.

Of this variable plant, the very beautiful wine-red variety (*vinosa*) represented in the annexed woodcut (figs. 87-88), was shown at the meeting of the Floral Committee in December last, from the rich and varied collection of W. Wilson Saunders, Esq. The erect, dense, oblong spikes of flowers, three of which sprang from one of the short, acutely-pointed, leafless stems,

sideing the state of the city, and of that quarter in particular. He began his usual course of lectures this year on February 24, and did so reluctantly, not thinking that in the miserable plights in which Paris then was, he would have any students. On the day, however, 300 persons attended. On the opening lecture, Walp might be said to have said, "Voyez-vous que nous sommes en peuple curieux."

The gardens of the Louvre looked much as usual, minus the spring flowers that used to be dotted over them; so did the private gardens of the Tuileries, and though the large public gardens of the Tuileries were covered with stables and wooden buildings of various kinds, and the once perfect walks had been cut up by cavalry, no great damage appeared to have been done. So, again, on the boulevards, it was gratifying to see the fine young Planes which were so much admired during the year of the Exposition not levelled but looking a few degrees better than ever. On some of the boulevards the trees had been cut down, but, considering the amount of suffering the people endured from want of fuel, it is very creditable to them that the more important parts of the city look just as well furnished with trees as ever. Many will be glad to hear that the trees of the Parc Monceau, so much of whose beauty are not destroyed in toto. I doubt if we should have a stick left in London if our people were put to a similar test. One good lady told me, that the only way she could keep a delicate husband alive during the famine, was by keeping him always in bed, while she herself went about the house covered with an indiarubber overall, in addition to the usual integuments, in the endeavour to keep in the little heat generated by the minute allowance of food which she and siege bread. If such hardships fell on well-to-do people, how badly must it have fared with the numerous poor!

The Parc Monceau seemed to have suffered no serious damage, so far as the trees and shrubs were concerned, but had been much disturbed, and, like many of the squares, &c., was shut. It was not until I saw the Avenue de l'Impératrice (now Avenue d'Alsace) that a real scene of desolation presented itself. This magnificent avenue, with its belts of turf, on which were tastefully grouped fine coniferous and other trees, with large beds and groups of shrubs and herbaceous plants, was, a couple of years ago, on the whole, the finest avenue garden I ever saw. Now only an odd specimen Pine is left here and there, with all its lower branches cut off (probably to preserve a clear field of view beneath), and looking in a most seared and miserable condition. One *Sequoia gigantea* was in this way cut near the top. All the rest of the avenue, near the Arc de Triomphe may be simply described as looking like a manure-heap, while the greater part of its remaining surface was dug into small pits (so arranged as to prevent the movements of cavalry), the earth being carried to the sides of the avenue. Then at its end, at the entrance to the Bois de Boulogne, were enormous earthworks, on mounting which a view could be obtained of that once attractive scene. A most disagreeable sight, however, which by anybody who had seen it in all its beauty. The noble roads that once were invisible from the fortifications, in consequence of being embosomed in its dense woods, were now as clearly defined as if on a map, all the trees for a long distance having been cut down. The scene was about as cheerful as a brick-field, and only enlivened by a sign-board and an old summer-house here and there. In parts of this, and in some private parks I saw near Paris, in which every tree had been cut down, I was reminded of the prospect one sees everywhere in the United States and Canada, where the woods have been cut or burnt down, and the stumps allowed to remain for years till they rot away. In the distance the waters of the lakes glistened in the bright sun, and looked as lonely as a mountain tarn, for the Bois was shut, and visitors excluded. Happily, the trees that fringe these pleasant waters were not cut down.

The poor old Jardin des Plantes looked as straight-laced, as ugly, and as well-raked as on any previous 20th of March. The ruin caused by the shells had been quite repaired, and nothing was wanting but plants, which no doubt will soon be replaced from the other public gardens of Europe. By the way, it would have been a great gain to gardening if the old place had been utterly destroyed. Then perhaps a scientific garden, worthy of Paris in design as well as in contents, might some day be the result. It is perhaps the worst example of the numerous public gardens that are laid out in direct violation of the most essential and evident principles of garden design.

To see the condition of the nurseries and suburbs of Paris, I went out to the southern side on the 20th and 21st. A very wide belt of ground round the fortifications presents the aspect of a very sparsely furnished stone-yard. Beyond this are the forts, and round each of these there is another scene of desolation, which beyond these again, the zone occupied by the French outposts and by the Prussians offers the most melancholy exhibition of all. Arrived at Bourg-la-Reine, almost the first house I noticed was that of M. Jamin, whom I found busy, cheerfully endeavouring to repair what most people would have been too disheartened to endure the look of. His large new house, at first occupied by the Germans till made too hot for them by the French shells, was literally riddled

with shot—large holes, from 18 to 24 inches across, having been made through the strong stone walls; and the house was set on fire, and, though built of stone and iron, much injured thereby. The outhouses and glass houses were shattered, the walls of the garden look black, and trenches cut along very near the roots of his fine wall fruit trees. The house and garden, being nearest to the French forts, were the objects of great attention from the batteries, and a good many Bavarians who had encamped under the walls of the garden had been killed and wounded there. Many of the beautiful pyramid and other trees were cut down, as were also the specimen Conifers, some of which garnished the top of the ditch running close by. Nearly 4000 worth of plants and flowers were burnt up. Every kind of wood from bark or light. Many unexploded shells were yet about. These were being collected and placed in the tanks to prevent danger. The large nurseries of M. Jamin also present a melancholy aspect, large quarters of fine specimen fruit trees being cut down to within a foot of the ground, as was indeed everything except the youngest plants that were not high enough to obstruct the view which the Prussians, occupying the village desired to have over the surrounding country. Some of the Plum and other trees cut down here, and simply laid on the ground where they stood, were attached by a slender strip of bark and wood (sometimes a mere shred) to the stump, and it was interesting to observe that in all these cases the prostrated heads were as full of sap as ever, and as well furnished with buds as the undisturbed trees, so that with little trouble the heads of the house could be thus we learn something even from such scenes of evil.

In Paris I noticed the pretty *Epiphyllum truncatum*, which usually flowers before Christmas with us, opening on March 19. As, from want of coal, men and women had to endure existence enveloped in unwhitened linen, the poor *Epiphyllum* also came to grief for want of heat, and was languidly opening its flower-buds in the shop windows, as the tips of the earliest Chestnuts were getting green in the Champs Elysées. Let us hope the people who are taking and sowing the seeds of the year, as well as in mid-winter, blooming batches of this unique plant. M. Jamin calculates that he has lost altogether by the siege about £4000. The only thing he seemed specially to regret was a collection of the curious and valuable Walnuts cultivated in Dauphiny, which require to be inarched, and cannot be propagated in the ordinary facile way by grafts, &c. The fields not devoted to nursery stock here were quite bare and uncultivated; they used to be covered with Violets, and now here and there among the coarse weeds were colonies of the sweet Violet that had naturalised themselves, coming lustily into bloom.

The fine and large nursery of M. Durand here, suffered much less than that of M. Jamin, the house being uninjured and the fine specimen Conifers untouched. But here, too, the glasshouses were nearly all destroyed, avenues driven through the fruit-tree nurseries, and hosts of noble young planes 20 feet high, and all other tall stock cut down. Cherry trees, not cut down but torn up by the roots and thrown on the ground, sometimes had a small root or two unbroken, and in these cases the trees seemed full of sap and life, as in the case of the Plums before mentioned.

The village of Sceaux, near Bourg-la-Reine, was not destroyed by shells; had it been it would probably have presented a less miserable aspect than it did; for nearly every house was disfigured and mutilated to an incredible extent, and all other tall stock cut down. Cherry trees were beginning to return to their homes at the time of my visit, and the first thing they had to do in every case was to turn out an enormous heap of multifarious rubbish, which had been made by the soldiers in every house, and never removed by them. On the day I passed through this little town I saw in some of the streets irregular manure-heaps piled up with torn books, old bottles, old breeches, &c. On one of these heaps of refuse a column lay open, as if a "Botanical Cultivator"—a book I should have liked to be sharing a happier fate. There might have been some comfort in seeing a book on bedding plants, or say, "Florists' flowers on mathematical principles," crowning the rubbish! M. Keteleer, known so favourably to many of your readers, had a library of about 1500 gardening and botanical books. These were not stolen, not taken to Germany, but simply torn to pieces in their stoneware, or thrown out of the windows, and of them are now useless. An old shawl was collected the remains of a number of valuable gardening periodicals, torn and useless now except as waste paper. Many of the houses in this village had the flooring and every combustible part taken away and destroyed, so that between the ruin and the filth their appearance was most deplorable.

The nursery of Messrs. Thibaut & Keteleer, one of the most interesting about Paris, also presented a sad sight. In this house, an Indian Orchid, which the late Mr. James Veitch offered £1000, were all standing in their pots on the benches just as they were left last autumn; scarcely a plant had been disturbed, but all were as dead as the pots they stood in, and of a pale nut-brown colour, presenting the most melancholy sight ever witnessed in a glasshouse. In the same condition was the cool Orchard-house—nothing surviving there but a few plants of *Pteris* self-sown on the floor.

Here nearly everything indoors and out was destroyed, but the houses were intact. In the other nursery of the same firm, houses and everything else were ruined, as, indeed, was the whole village of Bourg-la-Reine, near which it was situated. In the fine house in the Sceaux nursery the very marble chimney-pieces were chopped off, and several parts of the house, as well as the various glasshouses right beneath it, with their fountain vases, were filled with ordure. Had I not seen this place, I should have been inclined to think that some accounts given by the French of the filth of their invaders were inventions.

A battery erected by the Germans between Sceaux and Bourg-la-Reine offered some interest to the horticulturist, and was a fine example of the way in which it was protected and faced was made up to a great extent of tubs of earth, from which once sprang Orange, Oleander, and other tender trees, which had lately been the pride of the occupiers of the many cosy little houses about here. There were about 40 of these tubs visible in this hideous bank, relieved here and there by bedsteads, sofas, barrels, &c., with the earth packed in between and over all. Any furniture left in the house was mostly shared in fate similar to that of the tubs, none being together under the superintendence of the mayors, so that the owners may recover any of it worth claiming—which is very little indeed.

Near Bourg-la-Reine there is a little village—L'Hay—situated on a pleasant airy hill, which is now almost all laid in ruins by shells. And here I visited the house and small park of M. Dupont. A Prussian battery had been erected on the lawn, and the place was literally riddled with shells thrown by the French, the house being about an Atlas about 4 feet in diameter at the base. A shell struck it 4 feet from the ground, went straight through, making a large hole more than 2 feet wide, and left the tree standing supported by what remained of the wood and bark. Many fine trees in this place were cut down by shells, and the lawn was full of freshly torn up hollows made by them. The ruin of the house, stables, glasshouses, garden, &c., in every thing here was complete, though perhaps the most melancholy sight was the wood and pleasure-ground, where nothing seemed to have escaped but the sweet wild Violets now in full bloom. One could scarcely think how the proprietor could ever face the task of restoring this once charming place.

The region now alluded to is but a small portion of the vast zone round Paris destroyed in a similar way, and with a few words on a short visit to Vitry I will endeavour to give some idea of the extent of the calamity that has fallen upon them when I say that two million, forty-four thousand, and four hundred trees have been destroyed round these two villages alone. At Vitry is the nursery of M. Defresne, one of the largest and best-stocked nurseries round Paris when I last saw it. Now all is deserted, the large house and its outbuildings are half-ruined, the country of everything but filth; the whole of the large nursery, which was mostly covered with well-developed subjects, is cleared to within a foot of the ground, and everything of the least size or value destroyed over a surface of many acres. Here and there near the house long beds of young *Aucubas* and other evergreens might be seen. On closer inspection these proved to be the plants of the glasshouses which had been carried bodily away, and the plants which had been left in the open air, and all this was carried off by the Germans, nor would it be incomprehensible if M. Honoré Defresne were to begin anew somewhere else, rather than face such a scene of desolation.

I might have visited other quarters to witness similar scenes, but on the fourth day of my stay in Paris occurred the massacre in the Place Vendôme, when it was evidently time to cease investigations of this kind.

And such a war—glorious in name, but which nobody witnesses its devastations and its carnage can ever wish to see again. It may require a Darwin to point out man's ape-origin to the many, but for evidence of his suicidal folly commend me to the environs of Paris, in their present condition. It is said that the revolution has seriously interfered with subscriptions to the various relief societies for the relief of the French; the various horticulturalists likely to be benefited by the relief of the disturbances as have the subscribers in England. The whole affair is the work of a mean minority of the National Guard, who have the contempt of nearly every class of the population, but who, unhappily for poor France, command the situation. A similar thing might happen in London if circumstances forced us to arm all capable of bearing arms. There does not exist a more industrious or worthy class than the ground round Paris, whose wants the French Horticultural Relief

Fund is intended to supply. From what I saw of the ruin in the district visited, I should say the amount already subscribed will have a very slight effect on the distress. The claims of the fund do not seem sufficiently evident to the nurserymen and seedsmen of the United Kingdom. It is nurserymen and gardeners who are to be relieved by it—nurserymen, too, who do not seek more than any other class, by reason of their stock as well as their trade being destroyed; and our nurserymen have probably never before been appealed to in a cause which so much deserved their sympathy and help. A committee of French horticulturists has been formed to ascertain, as far as possible, the exact amount of loss suffered. Their report cannot be issued for a week or two to come, and perhaps events may take place which may defer its appearance. When it is published, it is certain to record the greatest calamities that have ever fallen upon this class of men. *W. Robinson.*

BOTANY FOR BEGINNERS.—I.

THERE is a nursery rhyme which bids us, if we wish to warm our hands, warm our hands now; so if we would know something of flowers, we must take care to look after them in due season. Dried specimens are all very well for reference when fresh flowers are not to be had, but they are not suitable for those who have no previous botanical knowledge. For such persons the following notes are intended, and their object is to describe, in as simple language as possible, the structure of the flower in some of the more common plants, and thus to put the beginner into the way of examining flowers for himself, and to enable him the more readily to profit by the ordinary books on the subject.

No particular order will be followed beyond that of the season of flowering, but should these notes prove acceptable, occasional systematic summaries may hereafter be given. A pocket magnifying glass, a penknife, and a couple of needles, firmly mounted in handles, will be all the apparatus absolutely required, though it will add much to the pupil's convenience if the magnifying glass be mounted on a little stand, so as to allow of the use of both hands in pulling the flower to pieces. An inexpensive apparatus of the kind, made to carry in the pocket, is sold by Messrs. Matthews, Portugal Street, Lincoln's Inn. Very little practice will be required to enable the pupil to "dissect" flowers sufficiently well to gain a good general idea of their conformation; this obtained, it will be easy, if desired, to pursue the subject more fully.

In studying a flower, the first thing is to look at it well as it stands, so as to get a good notion of its general form and appearance; and in further proceeding to dissect, the beginner must start with the idea that he has a machine made of several parts, more or less complicated, to pick to pieces. His object in thus dismembering the flower should be to ascertain of what parts it is constructed, their number, their shape, in what manner they are pieced together, whether they are separate or joined together, what their relative size and position in regard one to the other, and so forth. When the student has carefully ascertained these points, he should, if possible, make drawings of what he sees—no matter if the sketches be rough, they will still be very useful, and errors can be corrected as he progresses. Having made himself familiar with the structure of one flower, another should be taken, treated in the same way, and ultimately compared with that which was first studied, in order to see wherein lie the points of resemblance and of dissimilarity between them. No special instructions are needed for the general examination of the leaves, stem, roots, &c.; but when occasion demands, a few suggestions may be given on these points.

With these few hints to start with, let us avail ourselves of time present, and examine the flower of the Willow, "Palm," as the country people call them. It is not too much to assume that a Willow is known to everyone likely to read these notes, but the most superficial observer cannot fail to have noticed that there are several kinds of Willow—some are trees, others shrubs. It makes no difference, for our present purpose, which kind of Willow be taken. Just now by every river's bank may be seen, in the full flush of beauty, bushes smothered with golden blossoms, redolent with spicy fragrance, melodious with the hum of bees. Not far off is pretty sure to be found a similar bush, much more modestly caparisoned, its blossoms of a dull quaker-grey or pale olive-green, very pretty and graceful, but not so attractive as the one of which we have first spoken. These are Willows. The golden blossoms are really flowers, so are the grey ones; wherein lies the difference will presently be made apparent. As one object of these notes is to foster a tendency to notice common things, we may just remark that the flowers are here produced before the leaves; a fact to be noted; moreover, it serves to confirm our assertion that what we have called flowers really are so. It is obvious there are yet no leaves on the bush—what, then, can these be but flowers?

Now let us pick one of the yellow flowers from the branch, or, better still, pick one up from the ground, and examine it with the glass, using the point of a knife or of a needle to separate its parts. What do we find? An oblong mass, made up of shaggy scales, beyond which protrude long threads, like pins with yellow heads (fig. 89, A). Now with the knife separate one of

the little shaggy scales from its fellows, as carefully as possible. By preference, take a scale from a young or recently opened blossom, and from near the pointed end of the mass. Suppose this proceeding satisfactorily accomplished, the observer should have before him a little scale (fig. 89, B), generally shaggy, with long hairs, and within the scale, attached to its very base, two or

That's all we have to deal with in this case. In truth, we have here a flower of very simple construction indeed. The shaggy scale is called a *bract*, the threads are called *stamens*, the yellow head of the pin is the *anther*, which by the way we may notice is divided by one deep long furrow into two halves, called lobes, each of which is marked by a similar long groove, but not quite so deep, and which marks the place where the anther will presently split. The anther contains a yellow dust-like powder, which falls in showers when the bush is shaken, escaping from the two chinks just mentioned. This powder is the pollen. The green knob is a *gland*, secreting a honied juice.

The oblong mass, then, which we picked off the ground is not a single flower, but a mass of flowers. It is what is called an *inflorescence*. As we shall see by-and-by, the inflorescence is very different in different plants, and different names are applied to these variations. The particular inflorescence before us is called a *catkin*, and one distinguishing feature of a catkin lies in the fact that it does not long remain on the bough which bears it, but falls off very early; and this is the reason why we advised the pupil to pick up the catkin from the ground. He will the more readily remember the "deciduous" character of the catkin.

If now we pluck a branch from the grey-looking Willow—this time we shall have to pluck from the bush, as we shall not find many blossoms on the ground—we shall find a similar oblong mass (C), a catkin in fact, with the same sort of scales or bracts; but these bracts do not in this case protect pin-like stamens, but a small flask-like body (D), supported on a short stalk. The neck of the flask tapers off into a thick thread, which divides into two divergent arms. This flask-like body is the *pistil*, in this case stalked and consisting of an *ovary*, constituting the flask, a *style*, the thread surmounting the flask, and two *stigmas*, which are the divergent arms of the style.

Within the ovary are a number of very small *ovules*, which the inexperienced beginner will hardly be able to see, but which will in a few weeks' time make themselves sufficiently conspicuous as seeds covered with cottony hairs. In the Willow, then, we have two sorts of flowers, both of the simplest construction. We do not as a rule find both sorts of flowers on the same tree in the case of the Willow, but on different trees. The one set of flowers (male flowers) furnish pollen from their anthers; the other (female flowers) yield seed from their pistil. But unless the pollen from the one kind of flower gains access to the stigma of the other kind of flower, no seeds will be formed. If, however, the wind conveys the pollen from one flower to the other, or if bees or other insects visit first the highly scented stamen-flowers, and afterwards the pistil-flowers, they are pretty sure to scatter the pollen on to the stigmas of the latter, and the tiny "ovules," which the beginner will have difficulty in finding, will ripen into seeds which he cannot fail to see if he looks for them.

For comparison sake let the beginner examine the Poplar. He will find it in all main points like the Willow, but with its stamen-flowers (E, F) more complicated, first in that the bract is deeply cleft, and next in that the stamens are more numerous, and spring from a little cup-shaped "calyx" or "perianth" placed within the bract. In the Willow there was a bract but no calyx; in the Poplar there is a distinct "perianth." In two respects, then, we have an advance in complexity—in the increased number of the stamens and in the presence of a perianth. In the pistil-bearing trees just the same difference exists. The flask-shaped ovary is very like that of the Willow, but it rises from a cup, and not immediately from within the bract (G). When ripe it will split into two pieces—carpels (H), and expose the seeds. The seeds of the Poplar (I) are almost exactly similar to those of the Willow.

Home Correspondence.

Fruit Exhibitions.—I think it will be admitted that those compilers of schedules who propose that fruit should be shown for four, five, or six days, and offer prizes under those conditions, are doing much towards uprooting the real object of exhibitions, which have heretofore done much in advancing horticulture. I cannot imagine how any gardener can have the conscience to ask his employer to allow him to exhibit, say a basket of 12 lb. of Grapes, three or four dishes of three bunches each, or probably a collection of eight or 12 bunches. I will leave it to your readers to estimate the weight of Grapes that would be cut for such an exhibition. Then, again, take the case of a collection of fruit consisting of all the best Strawberries that the garden will produce, five or six varieties of Peaches and Nectarines, two or three Melons, to say nothing of small fruits; stage all this in a hot tent for a week, and then invite the proprietor at the end of the same to inspect the once beautiful fruit—the best productions of the garden. Will he not be disgusted with the arrangement that compels it to remain until it gets into the same stage of decay in which we saw it at the end of the week at Manchester? I must say that these long shows do tend in a great measure to influence gentlemen to forbid their gardeners to exhibit, and I know that several gardeners, if not discharged, have got themselves into sad disgrace by joining in them. This, I think, accounts to some extent for the fact that



FIG. 89.—DISSECTION OF WILLOW AND POPLAR FLOWERS.

References:—A, Male catkin of Willow; B, Male flower of Willow; C, Female catkin of Willow; D, Female flower of Willow; E, Male flower of Poplar, from the outside, showing the bract; F, Male flower of Poplar, from the inside, showing the perianth; G, Female flower of Poplar; H, Fruit of Poplar; I, Seed of Poplar.

sometimes more of the pin-like threads before mentioned, and on one side of them a small greenish sticky knob—unfortunately not represented in the drawing.

we do not see such good fruit staged now as we used to at the London shows 15 or 20 years ago, when it was staged for one day only. If I might be allowed to offer a suggestion, it would be that at all shows which extend through the week the gardener should be allowed to remove his fruit on the evening of the second day, and that our large fruit growers who grow for market only should be allowed to replace their contributions with choice fruits if they thought fit to do so. This might prove beneficial to the advertiser, and the point of view, but in my estimation, unless fruit shows can be supported without such a great sacrifice, there will shortly be but few gardeners that will support them. *7, Dell, Stoke Newford.*

Colloidon as a Styptic.—Having had occasion to cut down some Vines started last November, I tried to stop the bleeding by having resort to the good, although old-fashioned mode of placing a Potato on the fresh cut end; but not finding it so effectual as I should wish, although put to the test for a time, it struck me very forcibly that Flexible Colloidon, being found so thorough a styptic in the late war in the case of the human body, should also stop bleeding in the Vine or any other plant given to bleeding, as the case might be. I therefore resorted to giving it a fair trial, and the following is the result:—I dressed the wound by simply using a feather and thoroughly covering the wound twice in the course of a few minutes, the third or final one being done about half-an-hour afterwards, when the cut was completely sealed up, and in a few minutes became quite hard, and there was not the least sign of any bleeding.

In the course of ten days the Vines grew away strong and vigorously, and have continued to do so up to the present time. Being successful with the Vines, I began to cut down other plants, and found it equally so on the following. Having some new and choice Pelargoniums, I cut them and dressed them twice, finding that quite sufficient to heal the wound; in the course of three or four days the eyes were starting again, also showing great vigour. I also cut back the following list of stove plants, and found it equally efficient:—*Aphelandra Leopoldii*, *Euphorbia jacinthifolia*, *Hebeclonium anthinum*, and also all the tribe *Hebeclonia* that I had at the time. In the case of plants that bleed at the tip, the general use of Colloidon found it necessary to have a small piece of sponge to wipe off the milky juice so as to get the colloidon to adhere, and they require to be gone over the same number of times as the Vines. *Luculia gratissima*, moreover, seems to be greatly benefited by the application, for it starts to grow and breaks strongly in the course of seven or eight days, and continues to grow vigorously, which is not always the case, as most gardeners at one time or another have had cause to regret. At the same time there may be nothing new or original in the use of flexible colloidon to stop the bleeding of plants, and therefore it may be quite unnecessary for me to have recorded the above facts; but not having seen anything of the sort mentioned, I shall be only too pleased to hear that it has been used before, and with what success. *James Stewart, Bellfield House, Beacon, Windermer.*

Plants for Table Decoration.—I know of no plants more suitable for this purpose during the winter months than Primulas. There is nothing in my estimation which has a more elegant appearance by gaslight than a glass stand nicely arranged with Primula flowers, the colours—carmine, white, and green—forming a most pleasing contrast. I have had some flowers this winter which measured 24 inches across, and which were also beautifully fringed. I obtained the seed from Mr. B. S. Williams, and am much pleased with the results. I sowed my first batch of seed in the last week of March or the first in April, in a small seed pan, well drained, and filled with a compost of equal parts of light loam, leaf-mould, and silver sand. When the seedlings are large enough to handle, I pot them into 4-inch pots, and afterwards transfer them into 6-inch pots, in which they flower. The compost I employ in giving these shifts is composed of equal parts of pig-dung, light loam, and silver sand, with plenty of drainage, and they receive occasional waterings with liquid manure when they are coming into bloom. Throughout the summer months I keep them in a cold shaded frame. I make some sowing in August, and treat the plants as before, and the result enables me to have them in bloom for seven or eight months of the year. *W. White, Crossmad Gardens, St. Thomas, Exeter.*

The Variegated Watercress.—Allow me to draw the attention of the initiated among the spring bedding community of your readers to the merits of this, as yet, comparatively little known hardy perennial, introduced as far as I am cognisant for the first time last year, and known technically as *Nasturtium officinale variegatum*. Like its prototype, the common Watercress, it is edible; the flavour, however, is coarser and more pungent than that of the latter variety. It has been recommended as suitable for summer bedding purposes; however, my somewhat limited experience, which I have carried back to the summer, impresses me that it is not so well suited for the purpose indicated as it is for spring use, owing to its more rampant growth and consequent less decided golden variegation than that it assumes during the latter season.

Having, however, extra growth in a somewhat rich soil last summer extra growth was induced, causing a more pallid and less abundant variegation, thus indicating that a comparatively poor and sandy soil is required to bring out the fullest variegation; nevertheless, in the same medium, the self-same plants are at the present time strikingly effective, attracting as they do the attention of all observers. I learn that Mr. Ingram was with much effect at Belvoir Castle, in the *recherché* spring gardens there, and it would be interesting were Mr. Ingram and others of your readers to record their experience of the plant in question. In conclusion I may add that it comes perfectly true to seed, and that it should not, in rich soil, be planted nearer than six or eight inches from the edge of the border or beds. *Wm. Gardiner, Gr., Lower Ealington Park.*

Enville Early Chestnut.—My employer, the Earl of Stamford and Warrington, told me on Monday, the 31st inst., that on January 28, 1866, this very remarkable tree was equally in as forward a state as it is to be seen at the present time. No doubt it was a very mild winter, for his lordship informed me that on his return home from covert shooting on that day, he and his friends noticed a swallow—a very unusual thing so early in the season. And, further, that his lordship's friend, Mr. Soerck, with the appearance of this beautiful tree, the depth of winter that branches covered with bloom were taken away by most of the party on their leaving Enville, the next day; branches were also sent to the *Gardeners' Chronicle* office. *Edward Bennett, Enville.*

Hebeclonium anthinum.—There can now be seen in one of the stove-houses at Chiswick some examples of this fine soft-wooded Composite plant in full bloom. It is one of those useful plants so valuable for winter decoration that the great modern influx of new plants has elbowed on one side, without supplying a good equivalent. It is an abundant bloomer, and the flower-heads, which are of a pleasant mauve-purple tint, are produced in very large corymbs from the points of the branches. This species Mr. B. S. Williams has been high in his recently published volume of "Stove and Greenhouse Flowering Plants," respecting its culture, he states:—"The soil should consist of two parts loam, and one each of leaf-mould and well-decomposed manure, with a little sand added. If large specimens are required, the plants, after blooming is past, and having been rested for a short time, should be cut back to within one or two eyes of the old wood, and placed in a close, moist atmosphere for a short time; but if small plants only are required, they should be struck from cuttings every year, when they will make little bushes by autumn if properly tended." *R. D.*

Fruiting of Stauntonia latifolia.—A correspondent some weeks since made inquiry if any one had fruited *Stauntonia latifolia*. I planted a plant of this genus against the south-west wall of my house 20 years since, and it began to flower three years after planting it matured two clusters of flowers; one cluster consisted of three fruits each, about 5 inches long. The following year it matured one cluster; from these fruits I reared many dozens of plants—the greater part I gave away to different friends, but some I planted against other parts of my house. I have never fruited any of the plants since; but for this I believe there is a cause. I like birds as well as plants, and as the *Stauntonia* grew to the top of my window, climbing up the point of the gable, and forming a most beautiful bird cage, birds of all kinds have taken possession of it, and I believe they have prevented it fruiting; but I have the scent of the flowers, which in early summer is delicious—equal to Orange blossom—and for growth, for beauty of foliage, for grace of form, in fact, for every requisite of a beautiful hardy evergreen creeper, there is no plant superior, or equal to it. I saw hardly—the frost of 1860 did not kill it, although Bartram's "40 years' growth" were killed near it; it was injured, but not destroyed. My urgent advice to every one having a stone or brick house, and desiring to have it covered by a beautiful natural ornament, is—plant a *Stauntonia*. *K. K., Tuddiford, Exeter, Devon.*

Potatoes Grown from Transplanted Shoots.—It has struck me, after reading what Mr. Barrett has said upon this subject (p. 345), that to carry out his conceptions into correct practice, it follows as a natural sequence that it is altogether wrong to plant Potato tubers at all. Although Mr. Barrett holds it to be a possible, or theoretical advantage, that by this mode of propagation disease in the resulting crop may be avoided, yet it is evidently with him an article of belief; and no doubt he looks upon the possibility of this desirable result as the chief recommendation of this proposal. But it is impossible to get any shoots from Potatoes without their possessing a certain amount of the "effete fluid" generated for their origin and earlier existence in the parent tuber, and when these shoots have reached that stage of growth of which Mr. Barrett writes, and have roots of their own, I question they do not also then possess an existence of their own, quite independent of the parent tuber altogether. If this is really the case, the severance of the shoot from the tuber can carry with it no preven-

tive influences. Now, it is a well-known fact that if seed Potatoes are exposed to warmth sufficient to promote germination, but are kept lying on dry shelves in a dry atmosphere, where there is plenty of light and air, the young shoots will not attain to a stronger growth than from 1 to 2 inches, and at this they will wither until the juices of the Potato are quite dried up. It is not until the base of the shoots come into contact with either soil or moisture, that an independent and further degree of growth ensues. Now, I should argue from this example, that if a shoot attached to a tuber assumes an independent existence as soon as it makes a root, it can be no gain, as a mode of preventing disease to shoot, that shoot after it has already had probably a month of independent existence. I believe it to be incorrect to look for the cause or origin of disease in the growing Potato in the seed-tubers. No doubt it is vastly important that the seed should be as sound and healthy as possible, otherwise deterioration in quality will naturally result, but the cause of the disease does not lie there. We must look for the origin of the disease in atmospheric causes, assisted more or less by surrounding soil and conditions. Let us take, for instance, the case of some newly-raised Potato from seed. Here there cannot have been the least possible intimate connection with the parent tuber, as is the case with young shoots; and yet, after a year or two's cultivation, these seedlings will get diseased as freely as older kinds, should the blight be prevalent. It still remains as a conclusive fact, that even since the first appearance of the disease, our greatest and most potent preventive influence has been a dry season. But Mr. Barrett's proposal has an economical side as well as a theoretical one, and it was rather in reference to that view of it that I opened with a seeming paradox. When I say that, according to Mr. Barrett's proposal, it is wrong to plant tubers at all, I mean to say that more could be made of them, and by them, in the carrying out of the transplanting idea, instead of first planting the tubers in the garden, and then thinning out the young shoots, the tubers were to be spread out thinly on a surface, and the soil and more ashes were strewn all over them, just sufficiently to cover them. Then if a good watering was given, and the Potatoes left for a few weeks, the grower would have but to begin at one end of the bed and lift out the mass of roots and shoots carefully, and separate them from tubers and each other; and if planted out the same distance apart as tubers usually are, there would be found enough of rooted shoots to fill at least three times as much ground as the tubers would have required. Will any one experimentalise on this? I purpose to do so in a small way. *Alex. Dean, Belfast.*

Breeding Gold Fish.—From the following statement it will be seen that your correspondent "G." is in error in stating that gold fish will not breed in cold water. About 40 years since a few pairs of gold fish were placed by my late father in a shallow pond supplied by the draining of the ground—at the present time have in the pond been reared very large number of gold fish, of all sorts (in colour) and of all sizes in the pond. I believe it is essential that the pond should have a very shallow margin of water sheltered by stones and water plants in which the spawn can be deposited, and it is a matter of doubt whether a stream of water running always through the pond is good for the fish. They evidently like muddy water, and to be undisturbed. Of late years I have raised the banks of the pond, and cleared out the mud occasionally, and I do not see so many small fish as I used to raise in the pond. It has been constantly frozen over—in 1860 and 1861 for some weeks, and the past winter for a considerable time. The depth of my pond in the centre when quite full in the winter is under 3 feet; in the summer it is much less. *K. K., Tuddiford, Exeter, Devon.*

In reply to "G." on the subject of gold fish breeding in ponds, I have to state that some years ago I put a few small gold fish in some public ponds supplied by the drainage of the neighbourhood. They were formed in yellow clay flint soil, such as is generally found on the top of the Chiltern Hills in the neighbourhood. In less than two years the pond swarmed with fish of all sizes, breeding very fast. I stocked every pond in the neighbourhood from this supply. A dry summer came, and my fish were taken by the natives, I reserving enough for stock; when, should the supply of water to ponds not fail, I doubt not of like success. The fish grew very large and fat. *Henry Gibbons, Loxford, Bladford Ridge, Bucks.*

The Cool Treatment of Orchids.—In your edition of March 24, at p. 380, I see a letter from "Ex-Cantab." quoting from my letters, and asking me to explain the two extracts he gives. I have turned to the letters he mentions, and find that when I said that Orchids require two distinct treatments, one for the growing season, and another for the resting season, I was writing to thank Mr. Gammie for his letter, and referred to the habits of *Dendrobium* in particular. The other quotation, that they only require one treatment all the year round, is from the letter containing the extracts from the Rev. C. Kingsley's letters from the tropics. The Rev. C. Kingsley's letter, in your edition of Saturday last, bears me out in this opinion, as concerns the Orchids that are found in such climates; *Dendrobium* are not found in the climate I

was then writing about. I may, perhaps, as well acknowledge that I have not had a college education, and do not pretend to be able to comprise all classes of Orchids in the short space of one letter, therefore I must lay myself open to be taken up by any one who inclines to exercise his ingenuity in this way. Will "Ex-cantab" take as much trouble to explain his views and practice? On the point of changing my opinions in 16 months, I touched upon this question the other day; as long as we are learning we cannot be said to fully comprehend the subject, and therefore must modify our views as we gain information. I am free to own I have much to learn. I should not advise Odontoglossa having a temperature of 80° in the day all through the winter, and do not know that I have advised it. I gave a mean for the year, with a daily range of 10°; my house will go up to 90° in the hot weather, and no doubt will go as low as 50° in the cold weather; but as I cannot prevent their growing, that is, not only making up bulbs but also commencing fresh growths, I cannot think that I shall be wise to reduce the heat below 60° in the day, as a rule, and running it up to 70° if there was any chance of giving air. I wish that Mr. van Volxem had given temperatures in his letter. In conclusion, I was very glad to see both his letter and that of Mr. Kingsley, and I hope that the subject of the homes and climates of Orchids may receive still more attention in your pages; and if I shall have assisted to bring about such a result, my own satisfaction will heal the wounds which my critics may inflict. G. H.

The Cocoa-nut Palm.—I was surprised to read in your impression of the 18th ult., in thence on the Cocoa-nut Palm, that you regard it as being a difficult plant to cultivate in our stoves. During the time I was at Kew I had much to do with the plant in question, and my experience goes to prove it to be one of the easiest plants to cultivate that I have ever had to do with. When I first went there I found one large plant and eight small ones; the large one in good health, the small ones sickly. The large one had been treated to a little salt at times, and water once a week; I threw away the salt, and watered the plant every day, and the result was that it grew so fast that the roof had to be raised up to the top of the plant again, and pushed the glass out of the light, which was removed to the Palm-house, where it died, for want of heat and moisture. The young ones I potted into strong loam, and they soon grew into fine plants; three of these were sent to the Palm-house, where they shared the fate of the large one, and I can confidently say that the only cause of death was the want of heat and moisture, two requisites, surely, not hard to be obtained in our stoves. I am sure that the Cocoa-nut Palm is easy of culture, but the temperature must not get below 60°. I also raised several from seed, and must say I never had less trouble with any plants than with them; in fact, they are as easy to cultivate as Turnips, providing they have the requirements above stated. Then, as to the soil, I am convinced that we are not always right in following what we find a plant growing in naturally. That it will grow in it is true, but often, in something else, it will grow better in cultivation we should remember that a plant is surrounded with very different circumstances from those of its native habitat. Sandy soil may suit the Cocoa-nut Palm in the open ground, but I am of opinion, from experience, that for all Palms loam is the best for pot culture. *Joseph Croucher.*

Propagating Bedding Calceolarias.—I wish to thank Mr. D. T. Fish for his method of striking the Calceolaria, given at p. 1184 of your last year's volume. I was amongst the first to use the cold frame for striking and wintering the Calceolaria in, and often with the greatest success. This season I must say the plants are finer and healthier than I have ever had before; they are not so much cramped; the only protection they had through the whole winter was a laid two thick, the ends being allowed to fall to the ground; they were not entirely uncovered for 12 weeks, being gradually inured to the light, and not a single cutting was lost. I attribute the success to the firmness of the wood. The cuttings were slipped off 6 and 8 inches in length, and inserted at once, leaves and all, without "making." I may add, that for some seasons I have put in cuttings of Verbena, Thymus, Alyssum, Petunias, Gnaphalium, Ageratum, Violas, and many others, without "making," and I find that they root quite as quickly, and make even better plants than by the usual method. The time saved in this way would be very great where large quantities are required. T. W.

Vitality of the Mulberry.—I believe writers on arboriculture and horticulture generally, are agreed that the Mulberry is singularly tenacious of life. I met with a striking example of this the other day. Those who are in the habit of taking the Staines road out of London, will remember passing through the village of Uxbridge, with a venerable, old-fashioned barn-like church, and the Yew trees which grow in the porch quaintly trimmed, and looking like gigantic evergreen birds of a remote time. Right in front of the church, but on the opposite side of the Staines road, is an orchard, and in this is growing a large spreading Mulberry tree. From this tree Mr. William Sherborne, the proprietor of the orchard, cut off in the month of

April, 1870, a large branch some 10 inches in diameter at the point of its junction with the trunk. This branch was removed, because, being near the ground, it interfered with the cattle grazing beneath. Not far away, a large hole some 4 feet in depth was dug, the gravel removed and replaced with soil, and the branch inserted in it nearly to its full depth. Some water was given to settle the soil about the branch, and it presently budded, bore, and ripened its fruit, though the crop was somewhat smaller in number and size than that on the parent tree. On examining the planted branch a few days ago, it was seen that the buds were swelling rapidly, and were quite as advanced in development as those on the tree from which the branch had been taken. There seems some reason to believe, either that the second branch has made roots, or else that it absorbs from the soil sufficient nutriment to enable it to perform its peculiar vegetative functions to all appearance as completely as if it had remained on the parent tree; for at every point of the branch signs of vitality were abundantly present. *Richard Dean, Ealing, London, W.*

The Old Dutch Potato.—Mr. Bennett, in his communication, at p. 416, on new Potatoes at Christmas, says he believes that the old Dutch Potato is now lost to cultivation, and I fear it is. Before the Potato was first introduced into this country, it was used to grow a quantity of it, for the late Duke of Portland had no other as long as he could be supplied with it. It was the first, however, to succumb to the disease, although grown on poor limestone soil, very near the limestone rock. When grown on this soil its texture was very waxy, and its flavour peculiarly good, in my opinion the best of all Potatoes. In shape it was very round, and never reached above the middle size, and it altered ones, kept in water, made excellent substitutes for young Potatoes all through the year. It happens some Potato growers may be able to state if it is still grown by them; or if lost it may be still cultivated in Holland, and worthy of re-introduction into this country. *William Tillery, Welbeck.*

Boilers.—Much has been written lately in the pages of the *Gardeners' Chronicle* as to the best form of boiler we should use in heating our horticultural structures, &c., in the most efficient manner, but at the same time with the least possible outlay of fuel and labour. I have often been puzzled when having to take out old boilers to know which to choose out of the many recommended. I may mention that when I came here, in October last, I found two saddle boilers, that had been in use some years for heating our principal forcing houses, completely worn out; and feeling sure they could not possibly carry me through the approaching winter, I determined at once to replace them with new ones. This settled, the next question to decide was, which boiler shall I fix this time? I said to myself, I have used upright tubulars, fired away with cannons, and ridden saddle-backs for years. At last I settled the question by ordering two of Morrison's new wrought-iron conical boilers to be put in place of the foregoing; and I am now glad to be able to say that, after such a severe winter as the one just past, they have quite answered my expectations. In short, after upwards of 20 years' practical experience in the working of many kinds of boilers, I have never met with any that have given me so much satisfaction as the wrought-iron conical form. *John Brown, &c. to the Right Hon. Earl Howe, Gosport Hall.*

Dinner Table Decoration.—I have long taken an interest in this subject, and have been interested in the articles which have from time to time appeared in the *Gardeners' Chronicle* relating thereto, more especially those of my friend, "W. T.," who is, as an authority on this subject, *facile princeps*; but it must now be noted that an immense change has come over the taste of the upper ten thousand in this matter. I am not going, snob-like, to talk of my friends His Royal Highness the Prince of Timbuctoo, or the Maharajah of Trincomalee, but I have nevertheless remarked lately at some tables, whose service would go not a little way in ruling such matters, that all the high and large stands were banished, that plants were placed on the table, not elevated, and that these plants were of the most common sort, such as a change of nasturtiums, the elaboration of detail, the flower garden aspect of some tables which were arranged by those who professedly ought to know what is correct, as seen at the June show at the Crystal Palace last year, showed that, like the bedding out, it had run riot, while "W. T.'s" beautiful arrangement one felt was not within the reach of many. Instead of the large vase now coming to the small, and this is but the following out of the same idea, we are getting massive pieces of plate, even large forks and spoons are giving way to something smaller and neater; and those, therefore, who have to do more or less with the floral decorations of the table, must shift their sails a bit and go with the tide, for to attempt to stem it, where fashion is concerned, is hopeless. We must, therefore, now find a substitute for the Minton stands, for the new collars, and other ornaments thereof, and "W. T." must tax his ingenuity to contrive something which shall meet the changing fashion. At present either a low plant or a low stand of flowers from the centre piece, around it are placed the glass bordering containing water in which cut flowers are arranged, while small specimen glasses are placed about the table.

Personally, as a matter of taste, I dislike these borderings; they are finical and poor looking I think, but the small glasses are charming. What I should like to see would be a stand in which the flowers might be arranged, so as to be about a foot from the table, either round or oblong. I am not sure that a Majolica stand of about that length would not be very effective, but all this I would leave to others. My main idea in this communication is to indicate the change that is taking place, and to advise all who have to do with these matters to prepare. I end by saying, "W. T.," to the rescue." *D., Deal.* [Nothing is more charming or more chase-looking for cut flowers than neat low well-selected chaises, just large enough to hold two or three well-selected chaises, and as for formal stands, the less of them the better. Ebs.]

Laurus latifolius.—This magnificent evergreen shrub has stood out the past winter unprotected and uninjured. I saw it a few days since in Mr. Cooling's nursery at Derby, and Messrs. Fisher, Holmes & Co., Handsworth Nurseries, Sheffield, and others, say. May we not, therefore, now regard it as a valuable acquisition to our hardy evergreen shrubs? *W. D.*

Double Hyacinths (p. 384).—Without entering into the question as to whether single or double Hyacinths were the popular ones at the beginning of the present century, there can be no doubt that the former were in cultivation in England many years before the introduction of the latter. Gerard, in 1597, speaks of them as though they were common garden plants; but the double ones are not mentioned by him, and it is not until 1636 that we find them referred to by his editor, Johnson, in the "emaculate" edition of the "Herbal." In "Flora Domestica" (p. 218) we find that "the King of Great Britain" had attracted the attention of florists, the double flowers seem to have been held in little esteem; and Phillips ("Flora Historica," i., 134) says that previously to the time of Peter Voerhelm (also called Foerlem, of Haarlem, "only the single kind had been propagated." It appears that this cultivator, who lived about the beginning of the last century, was in the habit of growing out all double-flowered Hyacinths from his collection; but, being struck with one which had accidentally been permitted to remain, he cultivated it, and increased it by offsets, which soon fetched a high price. The first he produced was named Mary, but this and one or two more have been lost. Is the King of Great Britain, which Phillips refers to as "the oldest double Hyacinth known," still in cultivation? This writer seems to have overlooked the mention of double Hyacinths by Johnson; they are also mentioned in the "Art of Gardening," published 1688. *James Britten, Kew.*

Ringed Ash Trees by Hornets.—It will be found that all attacks upon the sap of trees by insects are owing to a peculiar state, brought on by a failure in the root supply. It occurs either in unusually dry seasons, or in the case of young trees newly transplanted, whose roots in consequence have not got fair hold of the ground. If there is besides anything in the nature of the tree which gives sweetness to the insipid sap, this of course renders such a supply of food unusually attractive to insects. Such may be the case with our common Ash in dry seasons in this country, for we know that the drug called Manna is a substance exuded from the *Fraxinus ornus*, a foreign species. I insert above the general term "insects," to confine my remarks to wasps and hornets—for it will be found that the common aphid is, at all events in the first instance, attracted to plants whose juices are in an unhealthy state through impaired root action. *F. S., Strathly Viarage, April 3.*

Gardeners' Discount.—I am pleased to see that this subject has brought out such a varied correspondence; the subject will be the better for being ventilated, and the nursery and gardening interest will be placed on a sounder basis than at present. I believe I am correctly informed that some firms do give gardeners 10 to 15 per cent., either through strong competition of rival houses, or from the unscrupulous exactions of certain gardeners, or from the influence of the highest bidder. Such vicious practices must be stoutly and countenanced by upright men. Therefore I hold it will not be wise to find fault with each other, but it will be better to try and remove this standing abuse by suggesting a remedy. I will with all due modesty recommend those of the trade who are really desirous of reforming this club, to induce the members of the "Horticultural Club" held at Anderson's Hotel, Fleet Street, London, or some other place, to meet, and to take the matter in hand, and hold a special meeting for the purpose of drawing up suitable propositions, which should then be submitted to the trade and gardeners through the medium of the press, or by circular. Those nurserymen and gardeners who are desirous of trading conscientiously, should, I think, be invited to enroll themselves as an association, by subscribing a nominal fee, say, one shilling, or gardeners 2s. 6d. per annum, to cover registration and other expenses. A list of the members and rules should be published annually in the form of a small pamphlet (to make it self-supporting advertisements should be allowable), obtainable at 6d. each, and duly advertised in the leading horticultural papers, so that employees and

others interested might know where to seek for the necessary information. Again, should any member be proven to the satisfaction of the association to have wilfully broken its rules, he should be liable to be publicly noted in this annual pamphlet. In order to avoid the tyranny of nurserymen, and in order that some of your correspondents, I should further advise that a gardeners' central registry office should be attached to the association, so that employers and employed might know where to apply to obtain or to fill up situations. There is another matter which I hold to be well worthy the attention of the club, namely, the credit system of the nursery trade; it is unreasonably long when compared with other trades. If credit is necessary, let a moderate term be fixed upon, with the understanding that the members will charge 5 per cent. interest on accounts exceeding that period. If some such plan as this were adopted, it would do away with the ruinous system of long credit, which adds so considerably to the cost of trees and shrubs, whereby good customers are made indirectly to pay for the debts of the bad. *Veritas*. [A similar proposal was made by Mr. Fish, in our columns, March 3, 1866. Eds.]

Asparagus.—Last year one of your correspondents recommended that Asparagus beds should not be covered with leaves, the plants being quite hardy. To prove this theory, I grew, last year, some young trees in glass pans in small pots, for parlour and table decoration (nothing but the purpose), and the result was, and on purpose I placed all the pots in the most exposed situation possible out-of-doors during the whole of the past winter. Of course they have been frozen hard frequently, but, to my surprise, all the young plants are now coming up as thick as possible. I shall never cover Asparagus beds again. *K. A., Tuddiford, Exeter, Devon.*

Foreign Correspondence.

SOUTH AMBOY, NEW JERSEY, U. S. A.—*Tree Carnations* are grown in this country by the hundreds of thousands. The idea of growing them here from layers, which involves two seasons' cultivation, would simply be laughable, and the system of giving progressive shifts into larger pots with the common labour of watering, would certainly not be considered a bright idea. I thought that the system of striking cuttings in the winter and early spring, and flowering the plant in the succeeding autumn and winter, was generally known, but it appears from a paragraph at p. 239 the old system is still recommended. It reminds me of 20 years ago, when a few Carnations were to be found in the back settlements of many gardens, with their sprouting shoots supported by sticks from 4 to 6 feet high, which rewarded the gardener with a strong flower at uncertain intervals of a week or two throughout the winter. These were certainly Tree Carnations. Of course I do not for a moment infer that your correspondent grows his plants in that style; I only state the case to show that the system involves a great waste of time and labour. Our plants when struck from cuttings put in about the middle of November (plants struck in the middle of March will answer as well), take about a month to root in a propagating-house where the temperature ranges from 55° to 60°. They are then potted into 2-inch pots, and placed in a similar temperature for two or three weeks, from whence they are transferred to a house from which the frost is just excluded. We plant them in the open ground about the middle of April, and the only attention they afterwards require is to stir the ground, to keep down the weeds, and to cut off the flower-stems, until autumn. At the end of September the plants are lifted, some being potted into 6 or 7 inch pots, or larger if the soil requires reducing too much to get them into the small sizes, and the remainder are planted out on the greenhouse benches. We have plants now in full flower, which will continue flowering profusely; and these have been in continuous bloom from last midsummer. They are plants from 1 to 2 feet high, with (at the present time) from 50 to 100 buds, and flowers of various shades of colour. English growers generally have not such fine varieties as *La Purite*, Flatbrus, President Degraw, and many other sorts grown in this country; but the system of growing which I here recommend I adopted for several years in England, with the varieties there obtainable, with much more success and with less trouble than the layering system. Another thing is quite certain, it would not pay to grow Carnation flowers in the latter system to sell at a dollar a hundred at Christmas.

Alphalping Garden Walks does not appear to be perfect in England yet. I gave a detailed account of a plan which answered well, in the *Field*, a few years ago, so that it is not necessary for me to repeat but a few particulars, which may be of service to your readers. I may mention that I would use either coal-ashes or gravel, either separate or mixed. In the case of ashes put through a 4 or 4½ inch sieve, and ram the rough clinkers and lumps which would not pass through firmly at the bottom, which should have previously been levelled. If gravel is used take the sand from it with a fine sieve, after passing it through the same size sieve as that employed with the ashes. This work, though not absolutely necessary, is best done in the summer, when the materials are dry. Provide an old iron furnace boiler of any size, and make a fire-

place with a few bricks. Place the furnace on this and fill it with gas-tar, which costs about a penny per gallon. Start a fire to boil the tar, and while the heat is getting up place some ashes or gravel in a round heap; make a hole in the middle, as if to mix a heap of mortar, and with an old can or other vessel fastened to a strong stake add some boiling tar to the heap; stir and thoroughly mix together. A little practice will teach the quantity of tar, but only as much should be used as the material will absorb. A little slaked lime added is an improvement, or even dry gas lime may be used if available without expense. Your correspondents will find no trouble in rolling it after a slight beating with the back of a shovel, if a little sand is thrown on the surface, and a sprinkling of water is given. It is also better to let the material, after mixing, lie in a heap for two or three days. For the ordinary traffic of the garden I found about 2 inches thick of the asphalt sufficient. Some I laid had not to my knowledge a crack or hole in it for two years after. It is of course necessary to level it to a drain, previously laid, to take away water, for any inequality holds water until it evaporates. It would be necessary to lay a greater thickness of asphalt, and use rougher material, if heavy carting had to be done over it. If wished, fine Derbyshire spar or any other coloured material can be rolled on to the surface. When the colour of materials could not be seen I used to see many years' accumulation of which had become a nuisance, and could not be turned to any other use; and the tar being obtainable on the ground, probably the labour in preparing and mixing and laying did not cost more than 6d. per yard. The only objection to it was the smell, which remained in hot weather; but it never got so, although the asphalt used in New York, and prepared much like that described by one of your correspondents, is said to be a failure. For a small place it would perhaps be best to concrete the walks with gravel and cement.

Pointsettias.—One of your correspondents recently informed the gardening world how to grow these plants, and, after holding forth on the beauty of the plant in general, and those grown at a certain place (which shall be nameless) in particular, he gives us the astounding fact that the bracts were fully 8 inches in diameter. I waited, thinking the printer must have left out a 2, or at least a 1, before the 8, but as I had no other correction made I can only say that I have waited with interest to see the result. When I used to grow small Pointsettias in 2 and 3-inch pots, for standing up over the covering of Lycopodium in Orange-tubs and large plants in vases, those measuring from 6 to 12 inches answered very well; but for cutting, and also large plants for the conservatory, we reckoned 18 inches across the bracts a good size. These plants were grown in light airy vineries and low pits, with air on a small scale. One who has lots I ever saw taken as a whole, was at Trentham, the plants just cleared as the glass of some low pits, and the lights were left off quite late in the autumn, day and night, except in very wet stormy weather. Here we grow them out-of-doors for about three months, placed in the full sun; and where the sun will raise the thermometer up to 130°, it takes considerable attention in watering the plants. Under those circumstances I would not trust a result would be leafless in winter with a tuft 8 inches in diameter on the top, instead of plants at Christmas furnished with leaves to the pot, and magnificent bracts, from 18 to 24 inches across, of which sizes we cut hundreds last Christmas, and at the commencement of the new year. *James Taplin, March 11.*

Societies.

ROYAL HORTICULTURAL: April 5.—J. Bateman, Esq., F.R.S., in the chair. After the usual preliminary business, the Rev. Mr. Berkeley directed attention to some cut specimens of *Aspidistra*, furnished by Mr. Gumbelton, a plant of which he had in flower nearly the year, and will remain so for two or three months longer. There were said to be nearly 70 heads of flower on the plant, many of them 8 inches wide, and very sweet scented. The young growths, as they are described as being very handsome. The species, said Mr. Berkeley, were figured in the *Illustrated Magazine*, and also in the *Flore des Serres*, but the latter plant evidently belonged to a group which was found in Java, but was not the same as that before the meeting. It bore a considerable resemblance to *Browniana*. When Mr. Berkeley had stated this, he produced probably the best collection of *Browniana* in the country was to be found in the grounds of W. H. Crawford, Esq., Lakeland, County Cork, Ireland. Mr. Berkeley then exhibited specimens of *Wellingtonia*, gathered from one tree in the grounds of the Marquis of Huntly, to show that the plant was monocious. There was also observable a difference in the size and shape of the cones in some of the varieties of this tree. Alluding to the prize offered two years ago by Mrs. Lloyd Wynne for the best specimen of *Aspidistra*, which was distributed at the time would be given for distinct species only, and not for varieties of *N. Tazetta*, and for which there was then no competition, he observed that the same prizes were again offered this year, but owing to some misapprehension, and the fact that the prizes were not wished of the giver, to a collection containing only varieties of the species above-mentioned. He had, however, to state, that a similar prize would be offered again by the same lady, to be competed for under the conditions first

mentioned. He (Mr. Berkeley) was aware that it would be impossible to get many of the species of *Narcissus* in bloom at the same time; but he hoped that, by commencing at the next meeting with those in bloom, and by exhibiting them from time to time up to the end of next April, the competition might be as productive of some interest. He also stated that cut flowers of well-marked species would not be excluded; and that he hoped to induce the Rev. Mr. Ellacombe, who has a very fine collection, to send a box of cut blooms.

Mr. Bateman, after moving a vote of thanks to Her Majesty's Commissioners for the Exhibition of 1861, for their presentation to the Society of two copies of the programme of proceedings enacted at the opening of the Royal Albert Hall, alluded to the specimen of *Odontoglossum Hallii* sent by Mr. Linden, of Brussels, the finest horticultural specimen of the Belgian florist, which the curators intended to join issue with us in congratulating to the interest of these popular Wednesday meetings. After commenting upon the controversy which has taken place in our columns on the subject of the cool treatment of Orchids, and especially on the letter from Mr. van Velsven, which appeared in our last number, Mr. Bateman exhibited two kinds of pods of Vanilla, sent by Dr. Hanbury, Esq.,—one from Mexico, the pods of which were long and thin, and which was the best in commerce; and the other, of inferior quality, with the pods short and thick. The latter, he said, he had before now been largely cultivated in England, and, he hoped, would be again. As a perfume, he knew of none which was so subtle, or so charming, as that of the vanilla. Major Trevor Clarke said he had grown the Vanilla for many years, and he had not got it yet, but he thought that there might be some very valuable varieties of the plant, which he grew as *V. planifolia*. (See Mr. Bennett's remarks on this subject in *Gardeners' Chronicle*, 1867, p. 997. Eds.)

Scientific Committee.—Dr. T. Thomson, F.R.S., in the chair. At this meeting several subjects of interest were brought forward in a somewhat desultory fashion.

Professor Westwood brought specimens of a species of *Erica* split by frost, in the same way as those shown on a previous occasion, and which had, moreover, been attacked by mice.

Professor Westwood also exhibited specimens of *Pezia lanuginosa*, from Otlands Park, and stated that when freed from grit the Fungi in question were good esculents.

A letter was read from Mr. Maw, in which he stated that he had ripened a specimen of *Aspidistra* in the last season, but found that no effect except that of diminishing the colour was produced. His experiments had not, however, been conclusive, and it was intended to resume them under more satisfactory auspices this year. Mr. Ayres stated that the experiments made at Chiswick confirmed those of Mr. Maw, and that he had, on the other hand, added facts to show that it was access to full solar light, rather than heat, which heightened the flavour of fruit.

Messrs. E. G. Henderson sent a specimen of the variegated *Acer japonicum* var. *pinatum*, in which some of the branches had reverted to the green condition.

From Mr. Crawley, Waddon House, Croydon, came a singularly perfect virecent *Primrose*, in which all the parts of the flower were more or less replaced by green colour. We may have more to say on this on some other occasion.

Rev. Mr. J. Berkeley showed a Carnation with a stem spirally twisted, so that the leaves were all disposed in one continuous line along the spine. Dr. Masters alluded to similar instances in *Galium* and other plants.

Mr. Reeves, exhibited an *Arum* (*Richardia*) with a double spathe.

Dr. Masters then alluded to an instance brought under his notice by Mr. Ayres, in which a male flower was produced on the end of a tendril in the case of a *Cucurbit*, and he said that such an instance was not confined to this as to the nature of the tendril in the *Cucurbitaceae*, that it was not safe to press this exceptional case into the service as an exponent of the morphological nature of the organ in question.

Mr. Berkeley stated that he had seen both male and female flowers on the tendril in some varieties of *Vegetable Marrow*.

Prof. Dyer, of the Royal College of Science, Dublin, communicated through Dr. Masters a note on the germination of *Tropaeolum*, from which it appears that the radicle, instead of elongating, produces a secondary radicle from its end with a well-marked coleorhiza, as in the case of monocotyledonous plants. Other secondary radicles are produced later from the sides.

Prof. Dyer also contributed a note on the curious "burrs" so frequently met with in the seed pods of *Lotus*. He alluded to Dr. Harvey, a similar growth is described in a species of *Banksia*. "The masses are not unlike *Hotentots'* heads, and are formed when a certain little fly fixes on a young flower-bud as a nest for its eggs." In reference to this, Mr. Professor Dyer stated that, having occasion to cut through one of these bird's nest-like excrescences, he was annoyed by large quantities of bluebottle flies, though it was early in the season for them; and the carpenter, in sawing the mass through, met with "some hundreds of pupae." Although the flies took up their abode in the mass of interlaced twigs, it was hardly likely that they had anything to do with the original cause of the anomalous growth.

Dr. Masters stated that similar productions in the case of the Silver Fir were associated with the presence of a parasitic mould, and in the so-called *Witches' Besoms* of German forests.

A letter was then read from Dr. Baird, of the British Museum, in reference to the earthworm exhibited by Mr. Lowe at a recent meeting of the Committee, and which Dr. Baird considered to be a new species, a *Legatocollema*. We shall allude more fully to it in our next future number. Dr. Masters then exhibited specimens of the *Acubia* alluded to by him at the last meeting, and in which, though the fruit ripened, the albumen of the seed

to exercise a beneficial influence on gardening and agriculture."

"The principal indigenous orders exemplified in Travancore are grasses (including the giant Bamboo), Sedges, Arums, Palms, Plantains, Gingerworts, Orchids, Lilies, Yams, Euphorbias, Cucurbits, Capparids, Malvaceae, Water Lilies, Amaranths, Peppercorns, Leguminosae (including a large proportion of the regular flowered Cuscutas and Acaclads), Apocynaceae, Solanaceae, Asclepiadaceae, Convolvulaceae, Jascioneae, Labiales, Verbenaceae, Bignonias, Acanthas, Asters or Composite flowers, Myrtles, and Cinchonoids.

"For Oaks, Fir trees, Apples, Gooseberries, and many other plants of temperate regions, one would search in vain. Potatoes, except in the west, will not bring their tubers to maturity, though the plants will grow for a time. Cabbages and English Peas hardly yield as much as will repay the trouble of cultivation. Wheat is not grown at all in Travancore."

"Yams, the tubers of Dioscorea, a slender climbing plant. I have seen grow to nearly 4 feet in length and 6 inches in diameter. On one species commonly called the 'Travancore Potato,' additional tubers grow attached to the climbing stem, so that it may be said with truth that the Potatoes grow upon the tops of the trees in that country rather than underground. Yams are very palatable, but hardly so fine in flavour as the Potato. Several species of Arum produce large and nutritious roots, weighing sometimes 7 lb. or 8 lb. each."

One of the most popularly interesting of our hot-house plants, the Mimosa pudica, or Sensitive Plant, "is one of the commonest and most troublesome weeds in the country. It spreads with singular rapidity in gardens and fields, and one's footsteps may be traced for some time by the shrinking of this little plant. Another little plant whose leaves possess a similar power is Oxalis sensitiva." The Palmyra Palm (Borassus flabelliformis) has always had the character of being perhaps the most useful Palm next to the Cocopalme, and we cannot conclude this notice without referring to the excellent and very full account the author gives of its many uses.

In the current number of the *Gardener* is a very plausible and more than plausible, sound—plea for evergreen or shrub gardens, and several other articles of the usual good practical notice that Mr. Donaldson's experience of the effect of the pollen of one species of Passion-flower is not altogether in accordance with that of others; and we may add, that he must not rely too much on the number of glands on the leaf-stalks, of Passiflora quadrangularis as a mark of that species, as the number is variable in many cases. The hybrid $\times P.$ Buonanaparte is often cultivated under the name of $\times P.$ quadrangularis, than which in point of flower it is preferable.

The *Villa Gardener* gives a good list of half-hardy annuals. For many amateurs of limited leisure, it will be found a good plan to buy the young plants from the nursery, and transplant them in early summer, than to raise them themselves.

Garden Memoranda.

THE HAILE FARM NURSERIES, TOTENHAM, N.—We may as well state, for the guidance of those who may not be "well up" in the geography of the northern suburbs of the metropolis, that these nurseries adjoin the Tottenham station, which is on the Cambridge branch of the Great Eastern Railway, a few miles from Shoreditch. A visit to this place at any time, from early spring to late autumn, will repay those who take any interest in hardy herbaceous and alpine plants; and, as far as practical to our comments on the rarities to be found here in due season, we need not again inflict such details on our readers. This beautiful and interesting class of plants—which were in years gone by at once the pride and glory of the gardeners at that time—have, owing to the vicissitudes of fashion, been left out in the cold; in fact quite deserted and neglected, by all but a few persons devoted to their charms and worth. But thanks to the saturation of colour, which have all more or less experienced, a change is coming over the scene, and herbaceous and alpine plants are again rapidly rising in popular estimation. Perhaps there is no man who has so persistently advocated the merits of these old favourites, against the popular will, as the proprietor of this establishment, Mr. T. S. Ware, and this will become the more evident when we say that at few other places in the three kingdoms are there to be seen such a vast variety of garden gems as are gathered together here from all corners of the world. The demand for them has almost suddenly set in with great vigour, and to show its extent it may be mentioned that last year upwards of 70,000 plants were potted off for sale in small pots, and plunged in the open ground. It must be mentioned, however, that there are several formidable obstacles to the general re-introduction of these plants into our borders. Mr. Sutherland, whose work we have referred to, p. 420, says, and with much truth, in the introduction:—"It will be admitted to believe very generally, that an intimate knowledge of these neglected classes of plants has not for many years been regarded as a necessary accomplishment in a professional gardener." Here then is a great stumbling block, which must be overcome before it can be expected that gardeners will pay as much attention to these plants as they require, or as they give to such

easily grown subjects as Pelargoniums or Fuchsias. In consequence of the great demand, and the scanty stock in the country to supply it, purchasers must of necessity be content with a little for their money at first, but this need not be more aggravated by ultimately losing the plants altogether, through the obstinacy or carelessness of those who have charge of their places. There are all plants require but little attention when once established, but that little they must have, or the result will be a failure.

For general adaptability to the requirements of the spring gardener, the Scillas pre-eminently claim our attention, and we see them here as they should always be grown—in large masses. It is of no use planting only half-a-dozen or so of this—as of many more of our hardy spring-flowering gems—if an effective display is required. They must be planted liberally, and the picture in return for the outlay will be a bright one. Several of the varieties or species of this genus come into flower with the Snowdrop, and by carefully regulating the period of planting, a successional display may be prolonged far into the spring. *S. bifolia* and *S. sibirica* are undoubtedly the best for all ordinary purposes, though by this we do not by any means wish to depreciate the merits of many of the other species of this genus. *S. bifolia* var. *alba*, for instance, with its soft rose flowers, is a fine acquisition. *S. sibirica* was in full beauty here five weeks ago, and there is now to be seen a mass of flowers of the richest sky blue. It is almost a puzzle to think why this plant is not more grown. It cannot be that it is difficult to procure, for it bears from two to three spikes of flowers on a single bulb and seeds remarkably freely. *S. bifolia* *alba* is the earliest of the white-flowered varieties, and a capital companion to either of the above. There are several other fine things in this class, but they are not yet in bloom.

Another invaluable group of plants for spring gardening are the various members of the genus *Primula*. As Mr. Ware has justly observed, whether they are called *Primrose*, *Polyanthus*, or *Auricula*, every species and every variety is full of lively interest. The *P. cortusoides* is a gem of the first water, and its varieties, of which Mr. Ware has five, are in some instances even better. We noticed a flower of *P. cortusoides* lilacina, a charming novelty, with prettily striped liliacina; *P. marginata* maroon, also a fine lilac; *P. fivalis*, white; *P. intermedia*, fine deep maroon, a new and decidedly fine acquisition; and *P. glutinosa* viscosa, of a purplish hue, and very attractive; large plants of this in pots would be a grand feature in any showhouse.

We also noticed a good useful *Polyanthus* for massing, named *Golden Chain*, a very bright yellow, compact in growth and free-flowering. For edgings to beds, or for grouping in mass borders, this will be most useful. These plants, under ordinary care, may be grown as freely as the common *Primrose*, and at this season of the year, when flowers are somewhat scarce, their free-blooming properties should cause them to become universal favourites. The alpine section, which is rapidly usurping the place of the florists' varieties in popular estimation, has every claim on our support. They are very distinct in their characteristic features, and being mostly natives of mountainous districts, they are admirable subjects for planting on rockwork, and the strongest growers amongst them come in well for the open border.

Those old and beautiful favourites, the Narcissus, are still unsurpassed for grouping in the open borders, and their well known adaptability to pot culture renders them at once necessary adjuncts to every establishment where spring flowers are in demand. The simplicity of their culture, their hardiness of constitution, and the beauty and delicious fragrance of their flowers are all merits of high order, and claim for them more attention than they have hitherto had. Unfortunately, notwithstanding what Mr. Baker has done to simplify the nomenclature, there is still much confusion on this point, many of them having several synonyms, which will make it some time before the names are properly adjusted. In bloom at the time of our visit were about 13 species and varieties, including most of the *Polyanthus* narcissus and *Ajace* sections, lighter and brighter, and the same may be said of the *Primula* place with glorious masses of golden and other shades of yellow. The singular *Trillium grandiflorum* was very fine in pots, though not out in the open air. Its large pure white petals, rising as it were from the centre of just sufficient green foliage to show them up, are very attractive. The plant is not grown to half the extent to which it ought to be. *Grobus vernus*, with its racemes of reddish-purple flowers, was a bright feature, and the same may be said of the *Primula* corulea, a dwarf variety, with bright-coloured flowers. A spare bed of these worthies, taken up and brought forward in succession for the conservatory, would be a very useful addition to the plants available for that purpose, and their singular flowers, in the dull early spring months, would furnish a source of interest as well as lend a charm to the house in which they are so happily placed. *Ajace* Auriculas are also coming into notice; they are of easy culture, and the bright colours are very attractive. They have one great merit, good varieties can always be raised from seed, which will in a measure do away with the multiplication of names given to particular flowers, and render the slow process of propagating by division almost obsolete. The following were also very fresh and nicely

in bloom:—*Dentaria digitata*, a strange lilac-flowered alpine plant; *Bulbocodium vernum*, a fine purple flowering bulbous plant, capital for borders when established; *Corydalis bulbosa*, puce, a very useful plant, with bright green foliage, and very free-flowering; *Draba aizoides*, a charming yellow-flowered rock plant; *Thalictrum anemoneifolium*, pale-pleno, white, a capital subject for button-hole bouquets; *Adonis vernalis*, large bright yellow, and very showy in the open border, small plants producing as many as 15 flowers at a time; *Hepatica triloba rubra plena*, pink, one of a beautiful genus which flower very early and are now just over; *H. triloba corulea*, single blue, is also a very fine variety; *Anemone palmata*, large yellow, very fine; and *A. ranunculoides*, dwarf yellow, very rare and good. Amongst other plants coming into flower were *Dicentra eximia*, a very hardy and distinct species, with beautifully cut leaves and rosy-purple flowers; the foliage is very handsome, and a grand substitute for Maidenhair Ferns, for backing up bouquets; and while the frost injures, if not kills the common species, it never affects this one; *Goodyera pubescens*, a prettily netted-leaved North American plant; and the golden variegated *Perrinkle*, white, a useful and effective subject for planting under trees.

In addition to this class of plants, Mr. Ware has a fine stock of Roses and fruit trees, which, like the above, thrive clean and well in the soil of the district—a strong retentive loam on a gravelly subsoil. We also noticed a good collection of succulent plants, which will be seen to better advantage by-and-by. Of the many other groups of plants, and their name is legion, that were coming on for flowering, we can at this time say nothing, but we hope to have the opportunity of doing so at the proper time.

THE WEATHER.

STATE OF THE WEATHER AT BLACKHEATH, LONDON, FOR THE WEEK ENDING WEDNESDAY, APRIL 5, 1871.

		At 9 A.M.			
1871 MONTH DAY	Reading of	Hygrometric Deduction		Dew-Point.	Weight of Vapor in a Cubic Foot of Air.
		from Glasher's Tables, 5th edition.			
March and April	Barometer reduced to 32 Fahr.	Dry Ther- mometer.	Wet Ther- mometer.	Degree Humidity	
		Deg.	Deg.	Deg.	Gr.
30. Thurs.	30.14	46.5	41.3	100	2.8
31. Friday.	29.91	41.1	42.9	39.5	2.8
1. Satur.	29.99	41.9	41.1	81	2.8
2. Sunday.	29.75	42.9	43.5	44	2.8
3. Monday.	29.62	41.8	44.2	11.4	2.0
4. Tues.	29.91	41.8	44.8	40	2.0
5. Wednes.	29.87	45.8	48.0	85	3.0
		WIND.			RAIN.

		TEMPERATURE OF THE AIR.		WIND.		RAIN.	
1871 MONTH DAY	Month and April	Highest.	Lowest.	Range in Day.	Mean.	Direction.	Inches.
30. Thurs.	Dec.	49.8	16.2	33.6	33.0	W	0.00
31. Friday.	41.1	49.0	11.1	37.9	33.0	W	0.00
1. Satur.	52.6	35.5	14.8	40.1	33.0	W	0.00
2. Sunday.	52.9	35.9	14.1	41.1	33.0	W	0.00
3. Monday.	52.0	37.0	15.7	47.0	33.0	W	0.01
4. Tues.	52.0	37.0	15.3	40.0	33.0	W	0.00
5. Wednes.	57.0	38.2	10.8	46.4	33.0	W	0.00

March 30.—Generally overcast. Thin rain fell in the early morning.
31.—Overcast throughout. Foggy in the evening.
April 1.—Generally cloudy in the forenoon. Variable thin rain fell occasionally. Auroral light seen at night.
2.—Cloudy but occasionally fine. A few drops of rain fell in the evening.
3.—Generally overcast. A little rain fell about 9 P.M.
4.—Fine and clear. Light clouds prevalent.
5.—Cloudy but fine.

TEMPERATURE OF THE AIR AND FALL OF RAIN AT DIFFERENT STATIONS, DURING THE WEEK ENDING SATURDAY, APRIL 1, 1871.

		TEMPERATURE OF THE AIR.					
NAMES OF STATIONS.	Highest.	Lowest.	Range of Week.	Mean of all Highest.	Mean of all Lowest.	Mean of all Daily Range.	FALL OF RAIN.
Portsmouth	16.2	16.2	16.2	16.2	16.2	16.2	0.00
Blackheath	67.4	31.2	36.2	39.9	36.9	35.0	4.18
Bristol	67.0	30.0	37.0	51.4	37.8	11.6	41.4
Exeter	67.1	28.5	38.6	50.0	37.2	11.5	41.3
Wolverhampton	67.1	28.5	38.6	50.0	37.2	11.5	41.3
Sheffield	67.1	28.5	38.6	50.0	37.2	11.5	41.3
Nottingham	67.1	28.5	38.6	50.0	37.2	11.5	41.3
Leeds	67.1	28.5	38.6	50.0	37.2	11.5	41.3
Liverpool	67.1	28.5	38.6	50.0	37.2	11.5	41.3
Manchester	67.1	28.5	38.6	50.0	37.2	11.5	41.3
Salford	67.1	28.5	38.6	50.0	37.2	11.5	41.3
Bradford	67.1	28.5	38.6	50.0	37.2	11.5	41.3
Leeds	67.1	28.5	38.6	50.0	37.2	11.5	41.3
Hull	67.1	28.5	38.6	50.0	37.2	11.5	41.3
Newcastle	67.1	28.5	38.6	50.0	37.2	11.5	41.3
Edinburgh	67.1	28.5	38.6	50.0	37.2	11.5	41.3
Glasgow	67.1	28.5	38.6	50.0	37.2	11.5	41.3
Dundee	67.1	28.5	38.6	50.0	37.2	11.5	41.3
Aberdeen	67.1	28.5	38.6	50.0	37.2	11.5	41.3
Paisley	67.1	28.5	38.6	50.0	37.2	11.5	41.3
Inverness	67.1	28.5	38.6	50.0	37.2	11.5	41.3
Perth	67.1	28.5	38.6	50.0	37.2	11.5	41.3
Dublin	67.1	28.5	38.6	50.0	37.2	11.5	41.3

* Used as 68° F.

JAMES GLAISHER.

Miscellaneous.

AMATEUR MARKET GARDENING.—It has now become a fashion for persons with independent means to plant fruit trees, and to sell their produce; a few words of instruction may not be amiss to such as take pleasure in fruit culture and yet wish to derive some benefit from their efforts. Apples. These should be grafted on the English Paradise stock (the French Paradise stock forms pretty trees for small gardens), and cultivated either as bushes or pyramids. They should be planted four feet apart in rows, and the central space between the rows may be cropped with light crops, such as Onions, &c., for six, eight, or more years, till the trees meet. Their pruning should be of the simplest; from the middle to the end of June every young shoot should be shortened to one-third its length, and towards the end of August all the young shoots that have put forth since the June pruning should be shortened to three leaves. In winter a few autumnal shoots will still be found that require pruning; these should all be shortened to three or four buds; and if the trees are aged and a little crowded with shoots, they should be thinned with a sharp knife, and this will constitute the whole of the pruning for the year. The soil for the trees may be planted six feet apart, or if planted at four feet apart, every alternate tree may be removed and replanted in fresh soil at the end of ten or twelve years. In all cases the soil should be solid, *i.e.*, not dug, and if the trees bear too profusely so as to exhaust themselves, some decomposed manure, about five bushels to twenty-five square yards, should be spread on the surface in winter and left there. I have commenced with Apples because they are the fruit of the people, and seem almost a necessary life.

Cherries: Those of the Duke and Morello tribe may be planted as bushes and pyramids, four feet apart, with advantage if grafted on the Mahaleb stock. The Heart and Bigarreau Cherries, unless double-grafted, do not do well as pyramids in gardens.—Pears: These should be grafted or budded on the Quince stock, otherwise their growth is by far too vigorous; they may be planted as bushes, and nothing in fruit culture is more beautiful than a bush of a Goodenough berry bush full of large fruit; four feet apart for bushes, and six feet apart for pyramids, will be perfect culture.

Plums: Next to the Apple, the Plum is the most valuable domestic fruit, for it may be preserved all the winter without sugar or any expense, till Plums are again ready. The trees may be planted six feet apart, and if, as is the case with some soils, they make a vigorous growth without bearing fruit, the trees should be taken up early in November and replanted in the same place. If large trees are required, pyramidal Plums may be thinned out so as to stand 12 feet apart; their produce here by this course is something to wonder at; my trees are 20 years old. Pruning in all these cases must be that recommended for Apples. In these short and rough notes, I have given, I trust, enough to guide those who wish to make their fruit gardens profitable. The taste for good fruit is every day increasing, and it is therefore no wonder that it should be a profitable sale for healthy fruit. I have only to note that, in the first week of this month, August, 1870, from 1,000 to 2,000 bushels of my Early Profic Plums could have been sold in Covent Garden at a remunerative price; we had not a full crop, but the few hundreds of baskets sent up made me wish for more.

Those who would like to know a fruit salesman, may apply to Mr. John Black, Covent Garden Market. A few words as to market garden cultivation will, I think, do good, and I give them as axioms:—Do not plant many varieties, but find out by trial, *i.e.*, planting several sorts, one tree of each sort, and closely observe them, and if you find one or two or three sorts more prolific than others, plant from fifty to five hundred of such a sort. About thirty years since, I found that one tree of Louise Bonne Paris bore a crop when some hundreds of sorts failed. Our plantation of this sort of Quince stock, from fruit trees, is now 50 years old. And again, my Early Rivers or Early Profic Plums is so popular, that our plantation of bearing pyramids is now nearly 5000. Of new Pears for market, Madame Treve is a great bearer, and most excellent Pear; Beurre de l'Association is large and good; Beurre Bachelier, Beurre Clairgeau, Beurre d'Amanlis, and Doyenne du Comice are good market Pears. Of Plums, Prince Engelbert, Belgian Purple, Reine Claude de Bavay, Angelique Bures, Early Orleans, and Belle de Septembre may be planted as pyramids six feet apart with great advantage. *River's Fruit Catalogue.*

AQUARIUM AT THE CRYSTAL PALACE.—The Crystal Palace Company have occupied the piece of ground laid bare by the fire of some years back, and stretching from the north tower to the door of the tropical department, by erecting thereon the necessary buildings for an aquarium on a great scale, the top of which will form a terrace leading to the north tower, while the visitors who pass through the aquarium beneath will be able to continue their walk through a new conservatory leading to the orangery in the north wing. The new aquarium is intended to be wholly marine in its character. The portion of the new building which will be open to the public is 320 feet in length, and 35 feet in breadth; two smaller rooms, 25 feet in breadth, open into this long hall, and in these are placed smaller tanks. The tanks are 60 in

number, and vary considerably in size, some being suited for the habitation of cod fish, and others more especially for the molluscs and other small denizens of the deep. Underneath the long hall is a great tank for storing sea-water, which will hold 130,000 gallons, carefully excluded from light. The whole of the work is rapidly approaching completion, and will ere long be a special attraction to the Crystal Palace. *Builder.*

Garden Operations.

(FOR THE ENSUING WEEK.)

PLANT HOUSES.

GREAT fluctuations in the weather are invariably the cause of much anxiety in the minds of the true cultivator, and greatly increase his labours. The excessive heat which we experienced during the third week in March, when the thermometer out-of-doors registered 70° and upwards, caused a very extreme temperature to suddenly pervade all plant structures. It may also in some instances have caused plants to make a sudden start into growth out of their natural season. Since then, cold easterly or north winds have prevailed, and it has become positively injurious to admit air in any quantity. These facts will therefore readily suggest to amateurs and others how great is the necessity of acting with caution and discretion. Thus, if fine warm weather occurs for a day or two, we should do our utmost, by giving air with freedom in cool houses, and very liberally in connection with all others, and by cooling the artificial heating medium, &c., to keep the mean temperature down as nearly as possible to the required average. In connection with stoves and such-like structures, this is done by the careful grower mostly by anticipation. If he anticipates a fine day through the appearance of the heavens which he studies, the damper is decisively used early in the morning, and the heat turned off, and *vice versa*, when appearances are to the contrary. However important these facts may be considered in relation to high class culture, they should not be less so to the horticulturalist of less pretension. However felicitous the month of May is in its natural season, we would not, if we could, transpose it with March; nor should we permit a sentence of the heavens which we hail with our glass structure. In whatever form of structure warmth with prevailing humidity is maintained, a moderate temperature, always exceeding 55° by a few degrees, is needful; whilst in houses which are habitually cooler, a temperature of 50° and slightly above is a good mean. Both of these, I scarcely need add, are liable to advance 5° or 6° by external influences of a favourable kind. Keep those *Calceolarias* and *Falgularias* which are intended for early blooming comparatively close now, as compared with the later successions. Above all, in connection with these, as indeed with all other plants, attend to the fumigating of all that require it. Proceed with potting operations, until the whole general stock requiring such attention is gone over. Pinch back the stronger shoots upon all plants where a neat bushy habit is a desideratum. Seedling plants of *Framulas* should now be pricked out into pans, or, if sufficiently advanced, potted off singly into an open, free, peaty soil, with a liberal proportion of leaf-mould. Give the forward *Gloxinias* and fine-leaved *Begonias* another moderate-sized shift. Cut down *Begonias* which have finished blooming in instances where it is intended to retain the old plants. Make use now of any forcing pits or houses, the use of which for ordinary flower forcing purposes will be drawing to a close, to grow on *Crocodendrons*, *Stephanotis*, *Balanis*, *Cockscombs*, *Catalpums*, and *Globe Amaranthus*, &c. Afford them liberally heat, light, and humidity.

FORCING HOUSES.

Proceed with the thinning out of Grapes upon all those *Vines* in a stage requiring this operation. This should be done, as I have frequently urged, rather by anticipation than one day too late, as by neglect in the matter the capability of each *Vine* become more or less overtaxed. Always, when thinning the bunches individually, cut away the berries rather freely at their lower extremities in all instances where they have "set" freely, as this materially aids the swelling of the whole of the remaining berries. Encourage a young shoot or two to grow upon each *Vine* at this stage in instances where they will in no wise interfere with the foliage already formed. Fine *Vines* will persist in only a few subterminal shoots which continue to form.

Above all, see that *Vines* at such a stage having their roots in borders within the structure are properly supplied with root moisture. If the borders are properly prepared in the matter of drainage, the soil being porous and open, too much can scarcely be applied at this particular season. In a word, a thorough moistening, even to soaking every particle of soil, becomes now imperative, if success is to be looked forward to in the matter of swelling, stoning, and the proper colouring of the fruit. Proceed with the thinning out of *Peaches* and *Nectarines*, disbudbing when necessary and stopping back any shoots that are not required, or which are too densely packed together. Stop back *Fig trees* which have attained to the fourth or fifth leaf, and syringe them freely overhead, watering as advised above.

HARDY FLOWER GARDEN.

Prick out seedling *Folyanthuses*, *Garden Primroses*, *Panicle*, *Turk's Head*, into the open borders, and choose kinds of *Picotees*, *Carnations*, *Pinks*, &c. which have been maintained in pots under shelter during the winter. When not already sown summer climbing plants, such as *Maurandias*, *Tropaeolums* (the canary creeper especially) *Lophospermums*, *Convolvulus major*, &c., may now be sown for summer work. Tubers of the Chinese Yam (*Dioscorea Batatas*) may also now be planted at the base of any pillars, or bell-shaped scabers, &c., if it is desired that they should clothe in the ensuing month. Some of the hardier annual bedding *Polargoniums*, and *Verbenas*, *Salvias*, &c., may be placed into cold pits. Prepare without further delay all beds or borders intended for summer bedding plants; to delay this operation longer will be at the risk of having the beds too light, and, consequently, wanting in latent moisture at a more trying season.

KITCHEN GARDEN.

Those who wait a reasonable time before sowing their main crops of *Carrots*, *Beet*, and *Onions*, should now have the seeds put in quickly. In sowing *Carrots* and *Beet*, the very deep effect of the thick seedling, which causes the permanent crop such injuries in process of thinning out the excess, besides entailing a vast amount of unnecessary labour. Transplant autumn-sown *Onions* finally now, if delayed so long; do not dabble them in deeply, the root alone requires to be beneath the soil. Make successional sowings of all things already through the ground. *Even Basil* may be sown in the open ground now, in sunny spots. Make the main sowing of *Celery*; remove at the earliest date possible the coverings from old forced *Sakale* stools, sowing seeds of this valued vegetable if a further supply is needed. Bring the final transplanting of *Asparagus* to a close. Choose a fine dry period to hoe over every part of this department. Already seedling weeds abound abundantly, even on autumn dug ground. *W. E.*

TOWN GARDENING.

Hardy Annuals may still be sown as directed last month, and *Shrubs* may still be removed, but it should be done as soon as possible, and with care in the matter of lifting them with plenty of mould about the roots. Those *Trees* and *Shrubs* that have been planted this spring will derive great benefit from being occasionally watered, and by having a little mulching over the roots. On a dry day, if the surface of the beds and borders with a Dutch hoe, being careful to leave undisturbed the plants which may be coming up. Neatly rake the borders afterwards, taking off the rubbish and large stones. Small stones, it should be remembered, perform a useful part, in keeping the ground open in wet seasons and cool in hot; thus they materially contribute to the health of the plants, and should not be taken out. *Window Plants* should have the surface earth of the pots removed, and the beds added. Give them all the air possible in fine weather. The *Crocus* leaves should now be tied neatly together, and a little mould should be thrown over the roots. Cut them down where they are quite dead, and if the crops are allowed to remain in the ground they will flower better the second year. *J. D.*

Notices to Correspondents.

BOOKS: *H. P.* "Glenny's Handbook to the Fruit and Vegetable Garden" will probably meet your wants; consult also, if this is insufficient, "Mawe's Every Man his Own Gardener," and "Profitable Gardening." **CALADIUMS:** *E. E. B.* If started with bottom-heat, it should be continued till the leaves have become fairly developed, when they may gradually be diminished, and at length witheld, the plants being all the while kept in a proper temperature. **CIBOTIUM SCHIEDEI:** *J. S.* This is usually seen with a creeping caudex, but either it or some very closely allied plant do exist, and become more and more rare. **FERN:** *E. E. B.* By no means cut off the old fronds, if they are of a persistent character; it would be like stripping a tree of its leaves. If they are damaged, or unsightly, or infested with insects, remove the worst, and cut the rest off thoroughly as you can, cutting away others of them when the young fronds have developed. A good general compost for stove Ferns is turfy peat, with abundance of sand and ample drainage, and for the more vigorous kinds a dash of turfy loam in addition. **FUNGUS:** *Salvia G. S.* The specimen sent is one of *Phoma*, or *Phoma*, *Morella esculenta*. See p. 105 of Mr. Cooke's popular work on British Fungi.—*G. R.* *Romford*. Your Fungus is *Reticularia umbrina*, Fr., common on rails, stumps, &c. *W. C. T.* The fungus is *Xylaria Hypoxylon*—its name is not its mycelium; it is seldom so strongly developed. *M. J. B.* **HYACINTHS:** *Zeta*.—They are propagated, like other bulbs, by offsets, and take from four to six years' growth, on the average, to arrive at a marketable condition. The flowering of the bulbs is not prevented by the flowering of the plant. You will find a full account of the whole process in the *Gardeners' Encyclopedia* for 1863, p. 556, with illustrations. **INSECTS:** *B.* Your friend's Peach trees are infested with Aphid persica. See answer to "T. F." under insects in last week's *Gardeners' Chronicle*. **PLANT KNOWLEDGE:** *L. O.* Your plant appears to have been growing very robustly, and possibly continued to do so late into the autumn, in which case it would not be ripened before the dull, cold days of winter set in. It has, moreover, the appearance of having been subjected to a sudden change of temperature and cold drip; but

As Supplied to the

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SUTTONS'
GRASS SEEDS



FOR ALL SOILS,
CARRIAGE FREE.

For nearly forty years we have given the subject of laying down land to Pasture our most careful attention, and from a long and practical experience of the Soils of this and other countries, we are enabled to prepare Mixtures for every description of Soil, which need only be mentioned in sending the order.

FOR PERMANENT PASTURES,

Prepared for the following Soils and purposes:—

STIFF CLAYS	LIGHT SANDY SOILS
HEAVY LOAMS	SHARP GRAVELS
MEDIUM LOAMS	CHALK SOILS
LIGHT LOAMS	SHEET DWYNS

GOOD BLACK PEATY SOILS.

BEST QUALITY, 28s. to 32s. per Acre. Carriage Free. Two Bushels of Grass Seeds and 12 lb. of Clovers supplied per acre.

SECOND QUALITY (good), 20s. to 26s. per acre. Special Estimates given for large quantities.

UNSOLICITED TESTIMONIALS,
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SUTTONS' PERMANENT PASTURE MIXTURES,
20s. to 32s. per acre. Carriage Free.

From J. J. MECH, Esq., *Tipton Hall, near Kidderminster.*
February 5.—"Your Grass Seeds are so pure and well selected that I have often spoken of them to those who required them."

From J. L. WILLIAMS, Esq., *Boyle View, Nant, North, Ireland.*
March 30.—"Last year I got you Permanent Pasture Grass Seeds for an acre, and I laid down one-half of a 20-acre field (the Irish). I am very much pleased with the way the Grass Seeds have answered, and I now want to lay down the other half of the field in the same manner."

From J. WARD, Esq., *Round Oak, Greenwich, Newbury.*
July 4.—"The Permanent Grass Seeds for about 30 acres, supplied by you last year (the greater part sown with Barley), have given me great satisfaction, and produced a crop (this dry season) of about 45 tons of good hay, 4½ acres of which have fed five head of cattle during the spring."

FOR PARK GROUNDS, &c.

18s. per bushel (½ bushels per acre), carriage free.

From Mr. HENRY AWCOCK, Agent to Lady Geary.—"The Grass Seeds you sent last year, for seven acres in the middle of Oxen Heath Park, is the best herbage I ever saw."

FINE LAWNS AND CROQUET GROUNDS.

BY SOWING

SUTTONS' LAWN GRASS MIXTURE,

Which forms a choice velvet turf in a very short time. For making New Lawns or Croquet Grounds, 3 bushels or 60 lb. is required per acre, or 1 gallon to every 6 rods (or perches) of ground.

For improving those already in Turf, 20 lb. should be sown per acre.

March, April, and May, are the best months for sowing. 1s. per lb.; 2s. 6d. per gallon; 20s. per bushel. Carriage Free.

From Mr. J. MERRICK, *Gardener to S. FOSTER, Esq., Lt. Col.*
January 21, 1868.—"The seed you sent me last year is uncommonly well. Several gentlemen who came to Le Court could scarcely credit, from the appearance of the lawn, that it was sown in May. In August it was as fine and thick as I have seen some lawns that had been laid down for three years."

Special Estimates given for Large Quantities.

LAYING DOWN NEW, OR IMPROVING OLD, GRASS LANDS.

FOR THE BEST PRACTICAL INFORMATION ON THE ABOVE SUBJECT, SEE

PERMANENT PASTURES,

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By M. H. SUTTON, F.R.H.S., &c.

"If you want to grow the right sorts of plants, you must show the right sorts of seeds, and you cannot do better than read Mr. Sutton's paper on Laying Down Grass, which you will get by sending to Reading.—*Grassland, &c.*"

Opinion of Professor Buckland.—"I do not know of anything to equal it." Price, 1s. post free. Customers gratis.

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CARTER'S NEW GRASS SEEDS

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Are now ready, carriage free.

For Ordinary Soils—Best quality, 26s. to 30s. per acre.

Second quality, 20s. to 24s. per acre.

For Heavy Soils—Best quality, 28s. to 31s. 6d. per acre.

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Reduced rates for quantities of more than Five Acres.

From Lady CARBERY, *Cattle Frick, Feb. 1, 1871.*

"Lady Carbery is glad to say Messrs. Carter's Seeds (Grass and Green Crops) have proved excellent, and been much admired in their results."

JAMES CARTER AND CO., THE ROYAL SEEDSMEN,
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LAND TO LET, on Lease, immediately; favourable aspect, and very suitable for Glass Elevators; Stabling.—J. SMART, Hendon.

FOR SALE, an old established NURSERY and SEED BUSINESS, within a few miles of London, containing about 14 Acres of General Nursery Stock, Green Glass Structures, Seed Shop, Dwelling House, &c. For particulars apply, by letter only, to G. H. H. C., 47, Bessborough Gardens, Piccadilly, S.W.

SALES BY AUCTION.

Established and Imported Orchids.
MR. J. C. STEVENS will SELL BY AUCTION, at his Great Rooms, 38, King Street, Covent Garden, W.C., on THURSDAY, April 13, at half-past 12 o'clock precisely, a small COLLECTION OF ESTABLISHED ORCHIDS, the property of a Gentleman deceased; several importations of ORCHIDS, the property of AUKAUM from Japan; LILUMS, GLADIOLI, ANEMONES, and RANUNCULI, from Holland; and a variety of CONIFER SEEDS and BULBS from various parts.

On view the morning and afternoon, and Catalogues had.

Consignment of Seeds of Cedrus Deodara.
SEAFORTHIA ELEGANS, and CORYPHA AUSTRALIS.

MR. J. C. STEVENS will SELL BY AUCTION at his Great Rooms, 38, King Street, Covent Garden, W.C., on MONDAY, April 17, at half-past 12 o'clock precisely, in suitable lots, a quantity of SEED of the above, which appears to be in very good condition.

Highly Important Sale of an Importation of perfectly New MASDEVALLIAS, ODONTOGLOSSUM, ALEXANDRE and MASDEVALLIA, and a small quantity of a small quantity of the very rare DENDROBIUM TAUROINUM, excellent health, DENDROBIUM MACRANTHUM, &c.

MR. J. C. STEVENS will SELL BY AUCTION, at his Great Rooms, 38, King Street, Covent Garden, W.C., on MONDAY, April 17, at half-past 12 o'clock precisely, the finest lot of MASDEVALLIAS which has ever been imported. The varieties are believed to be perfectly new, and to include a yellow variety; a white variety; spurs, and also a very fine scarlet-flowered kind, the dried blooms of which measure 4½ inches in length. The plants are in the most robust health, and dried flowers and drawings can be seen on day of sale.

Also in splendid condition a very fine lot of ODONTOGLOSSUM ALEXANDRE and varieties, many very deeply spotted and marked (see dried specimens). The ONCIDIUM has bright golden-yellow flowers, of considerable size, and of fine habit (see dried specimens). A photograph of the DENDROBIUM TAUROINUM will also be shown, which will convey some idea of its magnificence.

On view the morning and afternoon, and Catalogues had.

Imported Orchids.
MR. J. C. STEVENS will SELL BY AUCTION, at his Great Rooms, 38, King Street, Covent Garden, W.C., on FRIDAY, April 14, at half-past 12 o'clock precisely, a small quantity of choice ORCHIDS, including new Angraecums from West Coast of Africa, and Cacti and Orchids from Rio Grande do Sul, a magnificent new scarlet flowering Epidendrum from the Chontales Mountains, Cattleya Dowiana and Trichopilia Dowiana from Costa Rica, Cattleya Trianae from South America, and some plants of a new Ansellia from South Africa.

On view the morning and afternoon, and Catalogues had.

Turnham Green, near to Brentford Road Station.
STOCK of a HORTICULTURAL BUILDING, comprising Two Ornamental Conservatories, Five Lean-to and Span-roof Greenhouses, and a Portable Greenhouse, of superior construction and fitted with the most approved system of ventilation; 10 Pit Lights; 40 Single, Double, and Four-light Frames; 41 Box Barrows, Garden Seats, Rollers, &c.

MR. JAMES H. GREEN is instructed by Mr. Smith to SELL BY AUCTION, on the Premises, as above, on THURSDAY, April 13, at 12 o'clock, the above stock of GREENHOUSES, PIT LIGHTS, FRAMES, &c.

On view three days prior to the day of Sale. Catalogues on the Premises, and of the Auctioneer, 72, King Street, Hammersmith, W.

Moortown House, Moortown, near Leeds.
IMPORTANT SALE of the STOVE and GREENHOUSE PLANTS, including an extraordinary Collection of the finest ORCHIDS, formed regardless of cost; and specimens from which have been raised the numerous fine plants, York, and other great Shows.

MESSERS. HEPPER AND SONS have the pleasure to announce that they have received instructions from Rev. W. M. Richmond, who is leaving the neighbourhood, to SELL BY AUCTION, on WEDNESDAY, THURSDAY, and FRIDAY, May 3, 4, and 5, commencing each day at 11 o'clock, in a spacious Marquee, to be specially erected at Moortown House, Moortown, near Leeds, the large and extensive valuable COLLECTION of STOVE and GREENHOUSE PLANTS, in which the ORCHIDS, which are altogether unrivalled in this neighbourhood, form a highly important and attractive feature, including the following well-known rare varieties:—

- Angulica sesquipedale
 - Ardisia alba majus
 - "Larpetia"
 - "Lobelia"
 - "maculosa"
 - "nobilis"
 - "Dayanum"
 - "Trineri"
 - "Thalictarum"
 - Barkeria Acanthi and spectabilis
 - Cattleya Adonis
 - Dendrobis, Lælia, Mesaspindium sanguineum, Miltonias, Odontoglossa, Orchids, Phalaenopsis, Renanthera, Saccolabium, Sobralias, and plants of Andraea ciliaris, and other rare and valuable varieties.
 - Chrysanthemum, Bougainvilleas, Caladiums, Gloxinias, Crotons, Dipladenias, Amaryllids, Cycas revoluta reflexa, Todeas, Lapageria alba and rosea, Stephanandra and many many more.
- Catalogues, price 6d. each, entitling the holders to view the Plants any week day between the hours of 10 and 4, may be had from the Auctioneer, before the Sale, on application at the Offices of Messrs. HEPPER, East Parade, Leeds.

A Choice Collection of First Prize Exhibition

PEARLGRASSES, AZALEAS, RHODODENDRONS, FERNS, and OTHER PLANTS, STOVE, HOT, and COLD FRAMES, GARDEN TOOLS, SEATS, TANKS, a SHORTHORN COW, and other objects.

MESSERS. DEBENHAM, TEWSON, AND J. RAVENHILL (having disposed of the Lease) are instructed by the Royal Horticultural Society, on MONDAY, April 17, at 12 o'clock, to sell, at the premises, The Rectory, Walthamstow, a site about three-quarters of a mile from Sharnbrook Station, and with a drive of some miles, containing a well-known collection of very fine specimen PEARLGRASSES, grown by David Lindor, for which numerous 1st prizes have been taken by him at the Royal Horticultural Society, Kensington, Crystal Palace, and other places. Also a very good variety of large CAMELLIAS, ARACALIA, EXCERPTA, 12 feet high; Specimens of AZALEAS, from 1 to 3 feet high; GREENHOUSES and STOVE PLANTS, 3000 BEDDING PLANTS, &c. Also several Garden Seats, Iron Tanks, a capital SHORTHORN COW, Garden Tools and Implements, 100000, Faggets, and Firewood.

May be viewed on Friday and Saturday, the 14th and 15th, and morning of Sale; and Catalogues obtained of Mr. DAVID WILKINSON, Gardener, on the premises; and of the Auctioneers, 80, Cheapside, E.C.

Packington Hall, Warwickshire.

IMPORTANT SALE of SHORTHORNS.

MR. STRAFFORD has received instructions from the Executors of the late Earl of Aylesford to announce for SALE BY AUCTION, without reserve, on TUESDAY, May 9, next, at Packington Hall, near Coventry, the entire and very Superior HERD PURE SHORTHORNS, consisting of about Thirty-six Head of Bulls, Cows, and Heifers, descended from some of the most fashionable blood, and which the Prize records are fully attested at the Birmingham and Smithfield Shows fully attests to the merits of the stock. From this herd have descended the prize-winning specimens of the Gwynne tribe, with several descendants of the prize cow Blushing Bird, purchased at the Bushey Grove sale in 1862; also a few Heifers, Bulls, and Cows, which the entire and very Superior HERD PURE SHORTHORNS, consisting of about Thirty-six Head of Bulls, Cows, and Heifers, descended from some of the most fashionable blood, and which the Prize records are fully attested at the Birmingham and Smithfield Shows fully attests to the merits of the stock. 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be presented. The donor hears no more heart-rending falsehoods, and he knows if a really starving man gets a ticket he will at once seek for the bread, and be thankful for it.

If anything were wanting to put the nature of the mischief which may arise from indiscriminate almsgiving in a true light, the following report on vagrancy in Dorset will surely supply it:—

"At a recent meeting of the Sherborne Committee of the Dorset Mendicity Society, the Chief Constable, Captain BROWN, afforded some interesting particulars of the effects in the Sherborne Union and in the county, produced by the establishment of the Society. In the spring quarter of 1869 there were lodged in the Sherborne Union 421 vagrants; in 1870 the number had fallen to 233, and in the first half of the present year it was but 77, 154 against 233 and 421. In the county, in the year 1869, 11,248 vagrants were relieved; in 1870 the number had fallen to 8107. Further, to show how much of the urgent distress pleaded by tramps is feigned, out of 42,000 bread tickets issued last year, 8145 only had been used, so that four-fifths of the vagrants may be assumed to be not in need of bread. Indeed, on Ridgway Hill one of the Dorset constabulary found in a crevice a pile of tickets, apparently left by a tramp, who had rid himself at once of this superfluous assistance. Financially the Society has also been successful in its work, for it has an income of only 1,147, and although printing has been a very heavy item (about one-fifth of this amount), there is a balance of £28 to the good."

Mr. JULIAN GOLDSMID recently stated, at a meeting in Kent, that tramps had been heard to say, in reference to the bread tickets, that "The game was all up in Dorset."

Those who have spoken upon the subject somewhat hastily conclude that as these beggars are driven from one county they go to another, and it may be true; but let every county have its society, and the "game" will be "up" throughout the country; and no one need fear that deserving men will starve thereby, or that true charity will be injured. The fact is, that the people who prowl from village to village, and town to town, are usually strong, able, sturdy fellows, well able to work, but having so great a horror of labour that they would rather get money by begging than in any honest way. It is not bread they want, but money for self-indulgence, and if this be everywhere withheld we feel sure that the professional tramp must in a great many cases be forced to labour.

The beggar by profession has hitherto made large profits, but let this pay cease, and we feel assured the profession will not have so many aspirants as at present. For a time, then, we may suppose that one county adopting this preventive check will drive the fraternity to another; but let the mischief cease everywhere, and the honest poor will be even better provided for. One pound of bread is no bad meal; at all events, it is good enough for 99 out of every 100 who take to the road. As farmers, we are well aware that the end of all these vicarious methods of living is to augment the rates; and, while the farmer is burdened with poor-rates at the rate of from 10 to 15 per cent. upon his rent for the prosecution of these vagabonds, who go beyond their calling on the one hand, or the maintenance of those whose vices have brought them to the union on the other, he feels that somehow or other these expenses are for men who, with a better system, might have been respectable labourers. That better system will be to feed the hungry, but not to encourage idleness and profligacy.

THE very useful paper, read by Mr. CLEMENT CADLE, of Gloucester, on "THE GROWTH OF CABBAGE AND KINDRED CROPS," on Monday evening last, met with the hearty approbation of the London Farmers' Club. It was introduced by remarks from the Chairman, Mr. J. B. SPEARING, on the growing importance of the Cabbage plant as compared with the Swede and common Turnip, which are now generally failures, especially in the southern counties.

Mr. NEILD, "a young farmer" as he was called, opened the discussion in a maiden speech. His short experience had taught him the practical value of the Cabbage crop. He went over the growing plants, stripped off the drooping or falling leaves, which furnished a large supply of food to his sheep in the summer time without interfering the process of hearing. He had come some 60 miles to hear the paper, and did not think too much of what he said in his favour.

Mr. MECHT followed, with one of his happiest addresses. He had grown Cabbages for many years, and had found the crop invaluable in stall feeding. He gave an outline of his mode of cultivation, which was similar to that recommended in the paper, with heavy manuring, deep

ploughing, and subsoiling. He made it a point to plant after rain. He threw water over the bed of Cabbage plants before pulling, in order to raise as much earth with the roots as possible. Every farmer ought to have his bed of Cabbage plants. He had found the crop to stand the past severe winter well. In feeding stock he put the hearts through a pulping-machine, and in this way, mixed with chaff, the mess formed a most wholesome dietary for all sorts of stock. He also grew Kohl Rabi, both by transplanting and by sowing the seed, his mode of culture being as for Mangel Wurzel, and he had harvested very heavy crops. He next drew attention to the almost incredible force of Cabbage and Kohl Rabi, forced forward by sewage in a few weeks' time, vegetation during summer resembling that of a tropical climate in the rainy season; and recommended the examination of sewage farms to see the wonderful effects of liquid manure, and the promise which this mode of culture held out for the successful growth of Cabbage.

Mr. TRETHEWY had grown Cabbage for some 10 years. He took his first lesson from the late Mr. FISHER HOBBS, who grew this crop successfully in Essex, and who strongly recommended its culture. He preferred growing from his own seed, which he sowed in August, pricked out the young plants into a nursery in November, and planted in the field in February, and the crop came into use when the grass began to fail, about June, and lasted up to Christmas. Before planting he dipped the roots of the plants in a puddle, which was greatly in favour of starting a healthy rapid growth. He then referred to the successful growth of Cabbage by Mr. CHAS. HOWARD and others. In selecting plants for seed, he went through the crop himself, and had a stake put in at the best plants; and, by having the plants grown beyond the reach of harm by bees, he had improved his sort very much. He thought the crop a great exhauster of the land. He had also grown Kohl Rabi successfully, and thought the crop a great boon to farmers, it being much more valuable in the South than Swedes. The plant, too, was adapted to most soils, being successfully grown on the stiffest clays and on very open, porous soils, and it stands the winter well. He prefers drilling in the seed to transplanting.

Mr. TRASK discussed the merits of the several letters quoted by Mr. CADLE from farmers who grow Cabbages. All heavy crops exhaust the land, so that the more exhausting the crop the better, the counterpart of which was to manure heavily. This was the practice which they followed in Hampshire, where the growth of a few acres of Cabbage was becoming common. He preferred the summer and autumn crop to the winter and spring one. He next referred to the heavy crops grown in the eastern counties—60 tons per acre, as reported by the *Mark Lane Express*.

Mr. NEILD referred to the Cabbage plant as supplying the demand of large towns which was increasing. The consumption of large towns like Manchester was almost incredible. He referred to the importance of liquid manure and water, and concluded by energetically recommending—"Whatever you do, grow Cabbage."

Mr. HARVEY cultivates deeply, and manures with farmyard dung in the autumn, applying guano or ammoniacal fertilisers in the spring. The plant is a gross feeder, but only during the season of its rapid growth, and that is the time to apply the artificial manure. He grows different sorts, in order to have a supply in succession for stock. He prefers planting in rows for horse-hoeing one way only, the plants being grown in the rows closer than would permit of horse-hoeing across. The crop is the most valuable one that can be grown for lambs, but game and rabbits are most destructive to it. As for the question of exhaustion, that is more than counterbalanced by the value of the crop. He referred to the large crops of seed Cabbage and Kohl Rabi grown in Bedfordshire, in proof of the growing interest in both crops.

Mr. OWEN thinks the value of a crop of Cabbage is enhanced by its coming in between others, thus obviating losses often not easily estimated. Sufficient attention, he considers, has not been turned to the Thousand-headed Cabbage, which he has seen growing as high as the table.—Mr. LEEDS drew attention to the necessity of not sowing too early, as the young plants had then a tendency to run to seed instead of hearing a second time.

Mr. MASFEN (one of those whose letters were

read by Mr. CADLE), rose for the twofold purpose of supplementing his letter and of drawing attention to the value of plants from Scotland as compared with those grown in England. They grew stronger and harder and produced heavier crops than those grown in the South. He dipped his plants in a puddle of liquid manure prior to planting, as recommended by Mr. TRETHEWY.

It appears to us that, both in the opening paper and in the discussion which succeeded it, "the Cabbage" was considered almost to the entire exclusion of the "kindred crops," which also claimed attention. Among these is Kohl Rabi, of which more ought to have been said; for it is one of the most important of our agricultural crops. During the other day, through a number of parishes in Bedfordshire, we inquired if there yet remained any of the winter store of Swedes and Turnips. "Swedes and Turnips," was the reply, "are almost out of date hereabouts. We are tired of constant failure; and farmers in this neighbourhood now depend more on Rabi than on anything else for winter food." Kohl Rabi is one of the most productive, hardy, useful "root" crops for arable land of almost any kind of soil. Its cultivation has wonderfully increased of late years, and we doubt not it will yet further extend.

— ON Monday, in Mark Lane, an advance of 1s. per qt. in the price of English wheat was in some quarters noted. In the Metropolitan Cattle Market the supply was hardly equal to the demand, and prices were rather higher than last week.

— At the meeting of the CENTRAL CHAMBER of AGRICULTURE on Tuesday, a strong opposition was shown to the Government policy with regard to local taxation as stated by Mr. GOSCHEN on the previous night. The report of the Local Taxation Committee considered the return of local taxation lately issued by the Poor-law Board (No. 437) to be "delusive and fallacious," "calculated to mislead and give false impressions," and it held that if the Government Bill were drawn up on the statement and figures therein presented it would be so drawn on false premises. In the return the rates which were national in their object and those purely local were confused together, and the rates levied under local improvement Acts for paving, lighting, Burial Boards, baths and washhouses, &c., in towns were exclusively local requirements, and the substitutes for these, the report said, in rural districts, were provided for from private sources. The report went on to state that the returns did not give a fair statement with respect to the position of town and rural local taxation, for the Committee held that the conclusions of the return were, in fact, reversed. They could hardly suppose that the return had been "designedly rendered so delusive, but it seemed to indicate the most unmistakable animus and bias." A long conversation followed, and this was marked by expressions of strong disapproval of Mr. GOSCHEN'S proposals. Some of the speakers acknowledged that they had not mastered the details in Mr. GOSCHEN'S speech, but his proposals were accepted in the aspect of giving the towns advantage at the cost of country districts. The resolution was then adopted to hold a meeting with special reference to the subject of this measure.

— A motion was proposed condemnatory of Mr. GOSCHEN'S proposals, and urging that the Government measure was objectionable for one thing, that it contained no provision for taxing personal property by local rates. One gentleman in a very warm speech demanded that all property should be taxed alike; but there was a difference of opinion on this subject, and eventually the motion was referred to the Local Taxation Committee for consideration and report. After other business had been discharged, the meeting adjourned.

— The New York correspondent of the *Times* thus announces an AGRICULTURAL BANKRUPTCY:—

"The most extensive agriculturist of the United States, JOHN P. ALEXANDER, of Illinois, well known for the vastness of his farms and the numbers of his cattle, has just made an attempt to force his creditors to his creditors. His liabilities are stated at 1,000,000 dollars, and his assets about 1,200,000 dollars. He resides in Morgan County, Illinois, where he has a large grazing farm, but his most extensive domain was in Douglas County, a tract of 27,000 acres, known as 'Broadacre.' He has been for some time unsuccessfully endeavouring to sell this farm, which he valued at 500,000 dollars. His failure is probably heavier than that of any agriculturist ever recorded in this country."

— ON Monday evening, in the House of Commons, Mr. GOSCHEN explained his promised scheme for the REFORM OF LOCAL TAXATION and LOCAL GOVERNMENT. By way of preface, he dwelt for some time on the changes which had taken place in the conditions, and the overlapping areas of the present system, under which some £30,000,000, including rates, tolls, loans, &c., was raised and dispensed by 20 different classes of local authorities; and while the Bill would endeavour to simplify local administration, it would also deal with the alleged grievances of the ratepayers as to the incidence of local rates on real and personal property. The first proposal was to

consolidate all the local rates into one, accepting the recommendation of two recent select committees. For the future, every local board or authority will send in an estimate of its year's expenditure to the parish authority, and all their requisitions will be paid out of the one consolidated rate raised for all these local purposes.

There will also be a consolidated audit, and the Assessed Rates Act will apply to the rate. Every year each parish will elect a parochial chairman, who, with the assistance of a small board, will discharge the functions of the overseers, the highway surveyors, the lighting and watching inspectors, and the executive duties of the vestries. He will make the rate, and generally represent the parish. By this means Mr. GOSCHEN expects to solve the problem of parochial combination and co-operation, and he brings the parochial and county administrations into contact by the creation of County Financial Boards, half of which will represent the Justices, and the other half will be elected by the parochial chairmen in areas of petty sessional divisions. All the local elections of boards of Guardians, of Parochial Boards, of Highway Boards, &c., will be held at the same time, and by ballot. Finally, he explained the changes in sanitary administration, the chief of which are that wherever two Boards exist, exercising jurisdiction over the same area, they shall be merged into one; that the Union is to be the area and the guardians the authority for sanitary purposes, with certain exceptions; and all matters relating to local finance are to be placed under the charge of the President of the Poor-law Board. Passing on to the question of rates, Mr. GOSCHEN assumed that the ratepayers have four grievances, viz., that certain classes of real property escape rates, that the mode of valuation was unfair to certain property, that the occupiers only pay the rate, and the owners and occupiers between them bear more than their fair share of local and imperial taxation. With all these the Bill will more or less deal. With regard to the first, it enacts that all hereditaments whatever in a parish shall be rated, and this will include Government property, charity property, mines, timber, game, &c. With the second point the Bill does not deal completely, but lays down a general rule that all property shall be valued on the same principles. The third grievance is met by providing for the division of rates between the owner and occupier, and making void all contracts to the contrary; and Mr. GOSCHEN spent some time in dwelling on the justice and policy of this arrangement, which, among other advantages, would give the owners a *locus standi* in local finance. On the fourth head Mr. GOSCHEN dwelt in great detail, repeating his contention on the debate raised some time ago by Sir MASSEY LOPES, that the largest increase of local rates has happened in the towns and on house property, that the burdens on land are not excessive, and that the landowners have not the grievance they complained of. But he admitted that there had been a great increase in the burdens on houses, and, after examining the various modes suggested for relieving this, he stated that the Government in the course of the next financial year would surrender the House-tax, amounting to £1,200,000, to the local authorities, to relieve the weight of local rates.

—The following circular has been addressed to the tenantry of his Grace the Duke of BEAUFORT in the counties of Gloucester and Wilts:—

"Dear Sir,—I am requested to inform you that the Duke has decided to do without keepers for the future, and to entrust the preservation of game and foxes to his

tenantry. If you will therefore be good enough to attend to his Grace's wishes in this matter, and prevent all poaching and trespassing, you will be entitled to one-half of the game killed on your farm, his Grace retaining the exclusive right of shooting and sporting for himself and friends.—I am, dear Sir, yours truly,

"JOHN THOMPSON."

NOTEWORTHY AGRICULTURISTS.

MR. MECCHI.

THE first of Mr. Mecchi's agricultural publications was a letter addressed to the *Agricultural Gazette* more than a quarter of a century ago. It was dated March 15, 1844; and this is how it ended:—

"I may be asked—'What can you, as a Londoner, know about farming?' I will answer, 'I always loved the beauties of Nature, the pure air of heaven, the sports of the field, and the hospitality of our honest yeomen.'

"I have seen one farmer making a fortune and his next neighbour losing one. I have seen one field all corn

than a quarter of a century of untiring, energetic, agricultural agitation—cheered, however, by the growing confidence and goodwill of many who at first opposed him or resented his activity—he stands a younger looking man at three score years and ten than most of those who are ten years his junior.

We do not need to relate his agricultural career to the readers of the *Agricultural Gazette*. They know his writings and his speeches—his pure and lucid English style—his exuberant enthusiasm, sanguine and impulsive, needing an unextinguishable good temper to bear the rough criticism to which it has sometimes laid him open;—and they are ready to acknowledge, we believe, that much of the life and activity of thought in agricultural circles, at agricultural meetings, and in agricultural journals, during the present generation, has been owing to his happily irrepressible agricultural vitality.

We add a few personal details. Mr. Mecchi's father, who was a native of Bologna, in the Roman States, had resided 40 years in England, and married an Englishwoman. He

was educated under the Rev. Mr. Watson; and was for two years at school in France. He served 10 years in a mercantile firm, and commenced business on his own account in Leadenhall Street in 1827. His first agricultural publication, as we have said, was dated March 15, 1844.—Mr. Mecchi was elected Sheriff of London and Middlesex in 1856, and became Alderman of London in 1858, having been elected on the unsolicited requisition of his neighbours. He held the office of Alderman eight years, and resigned it against the wishes of the citizens. He is now a magistrate for Middlesex, and one of the Deputy-Lieutenants for the City and County of London. He was born May 26, 1801.

LOCAL TAXATION.

THE principal facts with which Mr. Goschen had to deal were broadly described at the outset of his speech. From his report, which presents for the first time a complete summary of all the sources of local revenue, it appears that the receipts and expenditure of local authorities in England and Wales attained respectively the "astounding totals" of £30,140,000 and £30,240,000. Of this vast sum, sixteen millions, or 54 per cent., are raised by rates, or by direct local taxation; four millions and a half, or 14 per cent., are raised by tolls, dues, and fees, or by indirect local taxation; five millions and a half, or 19 per cent., are raised

by loans; one million and a quarter, or 4 per cent., are furnished by Government; and the remainder, or 9 per cent., by miscellaneous receipts or sales and rents of local property. How are these sums administered? By no fewer than 20 different classes of authorities. Besides boards of guardians, county magistrates, vestries, and other municipal authorities, we have a variety of local boards, commissioners, sanitary authorities, highway, market, and maritime authorities. The jurisdictions of these bodies are continually found overlapping each other; the rates raised by one authority are merged in the rates raised by another, and no clear account is obtainable of the relative amounts. Mr. Goschen mentions, for instance, that one column of the annual report of the Poor-law Boards lumps together the borough, hundred, county, and police rates paid out of the poor-rate, and no report has ever yet stated, nor has it been possible to state, how much went to each of these rates. The times of collection and the modes of collection are various, and thus the first condition of control—definite and clear accounts—is wanting. "The truth is," Mr. Goschen exclaims, "that we have a chaos as regards

and another nearly all weeds. I asked—'How is this?' inquired into the causes, noted the results, obtained from all the best farmers and all the best agricultural books within my reach every information bearing on agricultural pursuits, practised in my own little garden, on a small scale, a variety of experiments—and, after carefully weighing the evidence, I came to the conclusion that want of drainage, waste of manure, shallow ploughing, and short leases are among the greatest curses to this country; and I, as far as my individual means will permit, am resolved on remedying them."

Read it again!—Has any agricultural speaker, writer, thinker, during all the years since this was written ever better hit the mark? The judgment of this hearty "Londoner" was as true, his agricultural insight was as clear, as his resolution, here announced in straightforward and transparent English, was genuine and trustworthy. This was no mere flourish of fine words. Mr. Mecchi has worked out his "resolve" with persevering courage. Never swerving from his declared intent, he has never lost an opportunity of exposing the evils which he so long ago denounced; and after bearing with infinite good nature the brunt of anger, ridicule, misfortune, opposition, during more



JOHN JOSEPH MECCHI.

authorities, chaos as regards rats, and worse chaos than all as regards areas." It is as a remedy for this hopeless and increasing condition that Mr. Goschen's first proposal is designed. He would have all local expenditure provided for by one consolidated rate, to be levied by a single parish authority, and for this purpose he would reconstitute the parish. A parochial chairman would be elected every year, who with a small council would supersede the present vestries for executive purposes, and discharge a variety of minor duties. The chairmen of these parishes would elect representatives to a county financial board, and thus the various local units would be systematically united for purposes of taxation.

This would be an immense simplification as compared with the present system; and, if it was requisite, the Government have no doubt done wisely to take the old and easily defined area of the parish in place of the novel and artificial areas of unions or other modern organisations. The ratepayers would thus obtain, for the first time, a distinct knowledge of what they have to pay, and to whom they have to pay it. But, they will probably be still more interested in learning whether the amounts to be thus definitely levied on them will be in any degree readjusted or lightened. On this point Mr. Goschen announces a very great concession on the part of the Government. They propose, commencing with the ensuing financial year, to surrender the £1,200,000 of the House-tax to local authorities, in order to reduce the proportionate burden which now falls on houses. Considering the difficulties Mr. Lowe will have to meet from other causes, this proposal affords conspicuous proof of the energy with which the Government have addressed themselves to the present subject. It is the result of a very complete investigation into the relative increase of burdens during recent years on the various classes of property. Mr. Goschen shows that there has been during the last half-century a complete revolution in the relative position of lands and other classes of property as contributing to local taxation. While in 1814 lands represented 79 per cent. of the total value of real property, they now represent only 33 per cent., whereas houses, which in 1814 represented 28 per cent., or little more than one quarter of the value of real property, now represent 47 per cent., or nearly one-half, and railway and other property, which in 1814 only contributed 3 per cent. to the whole, now contribute 20 per cent. What has been the effect of this variation upon the incidence of local taxation? It is evident that if the amount of taxation had remained a constant, a great portion of the burden originally borne by lands would have been shifted to other classes of property. But the average amount of taxation has increased, as Mr. Goschen stated last night, by eight millions, within about the same time. Where has this additional burden fallen? It is conclusively proved that the increase has been in urban, and not in rural unions. Not only has the bulk of the new rates created by recent legislation fallen upon the towns, but the rate of increase in the chief of the old burdens—that is, the poor rate, has been three times as rapid in the towns as in the country. The consequence is that whereas in 1826 lands paid 69 per cent. of the poor-rate, houses and other property paying 31 per cent., in 1868 lands paid 33 per cent., while houses and other property paid the remaining 67 per cent. The county rate, it is true, has at the same time increased, but this impost accounts for only one-tenth of the total sum levied under the general name of poor-rate. This is rendered still more conspicuous by a comparison between four urban counties—London, the West Riding, Middlesex, and Surrey, on the one hand, and the whole of the remainder of England and Wales on the other. If we take all four, we find a total increase in 1868 over 1815 of about eight millions and a half, and the amount of this increase borne by the four counties alone is nearly five millions, or more than 58 per cent. Nor is this difference balanced by a greater proportionate increase of rateable value. It appears that, taking all rates, the rateable value of the four counties has increased between 1868 and 1815 in the four counties in the proportion of 145 to 100, while in the rest of England and Wales it was in the proportion of 81 to 100. It is impossible to misread the significance of such figures. So far from the land having anything to complain of, it has been most materially relieved. It is the burden on houses which has been augmented, and the rate of increase has been disproportionately large. Where, then, the Government have adopted the best mode of relief, they have undoubtedly proposed to apply relief in the right direction. The adjourned debate of to-day will throw further light on the bearing of this scheme. *The Times.*

OUR LIVE STOCK.

CATTLE.

THE long-looked-for sale of a considerable part of the Lillington Dayrell herd took place on Thursday week. Scarcely so large a company assembled as was expected, although the ring was surrounded by many first-rate Shorthorn breeders. Colonel Kingscote occupied the chair at luncheon, and was supported by Lords Fitzhardinge, Dunmore, and Penrhyn, Captain Oliver, Captain Gunter, Mr. Sartoris, Mr. Clayden, Mr. H. J. Sheldon, Mr. M'Intosh, and many other well-known gentlemen and agriculturists. The most

marked features of the sale were, first—the sale of DUKE OF TREGUNTER, well-known as "a Wetherby Duchess" origin. This, after being betageted a few calves, became "a hopelessly useless." Lord Dunmore, however, with great spirit bid up for him, until after a "somewhat languid" competition from Wetherby, he was purchased for 165 gs., in the hope that change of air and veterinary skill may restore him to usefulness. *Darlington 9th* was purchased by Mr. J. Thompson for 75 gs.; *Lady Barrington 8th*, by DUKE OF YORK (23,032), became Mr. M'Intosh's property at 100 gs.; and *Wild Duchess*, by 3rd GRAND DUKE (16,182) was bought by Captain Webb at 100 gs. *Barringtonia* and *Bridemaid* came next, the two heifers got by DUKE OF TREGUNTER, and justly looked upon as the two "crack" animals of the sale. The former was purchased by Capt. Oliver for 270 gs., and the latter by Mr. M'Intosh at 200 gs. The general results of the sale were as follows:—29 cows made an average of £69 13s. 3d.; 7 bulls averaged £54 3s., and the 36 animals sold at an average of £66 13s., and a total of £2,339 5s. Six Duncans averaged £134 11s. 6d.; 6 Wild Eyes averaged £72 14s.; and 11 Darlington made £47 12s. 7d. each.

Name of Animal.	When Calved.	Price.	Purchaser.
<i>Cows and Heifers.</i>		Gs.	
<i>Seraphina 7th</i>	1856	20 Mr. P. Denchfield.	
<i>Pandora</i>	1859	20 Mr. J. J. Sharp.	
<i>Darlington 9th</i>	1860	75 Mr. J. Thompson.	
<i>Wild Duchess</i>	1861	100 Mr. F. Barker.	
<i>Wild Eye 25th</i>	1861	35 Mr. B. Baxter.	
<i>Princess</i>	1861	60 Mr. B. Baxter.	
<i>Lady Barrington 8th</i>	1865	100 Mr. D. M'Intosh.	
<i>Wild Duchess</i>	1865	100 Captain Webb.	
<i>Lady Seraphina 2d</i>	1865	35 Mr. C. Bayes.	
<i>Wild Duchess</i>	1865	45 Mr. W. Ashburner.	
<i>Pandora</i>	1866	35 Mr. D. M'Intosh.	
<i>Sultana</i>	1866	70 Captain Webb.	
<i>Cassara</i>	1867	20 Mr. H. J. Sheldon.	
<i>Clara</i>	1867	30 Mr. Freeman.	
<i>Clayton</i>	1867	10 Mr. Grettton.	
<i>Songstress</i>	1868	16 Mr. C. Bayes.	
<i>Isolde</i>	1868	20 Captain Gunter.	
<i>Barnard</i>	1868	75 Mr. J. A. Mumford.	
<i>Barringtonia</i>	1869	20 Captain Oliver.	
<i>Isolde</i>	1869	20 Mr. D. Hill.	
<i>Wild Cherry</i>	May, 1870	80 Mr. J. J. Stone.	
<i>Seraphina</i>	May, 1870	35 Mr. F. W. Stone.	
<i>Princess</i>	May, 1870	40 Mr. J. J. Stone.	
<i>Seraphina</i>	Aug., 1870	41 Mr. F. W. Stone.	
<i>Brigantine</i>	Aug., 1870	77 Mr. W. Ashburner.	
<i>Cambria</i>	Aug., 1870	40 Mr. T. Barker.	
<i>Princess</i>	Nov., 1870	32 Mr. B. Baxter.	
<i>Isolde</i>	Nov., 1870	43 Mr. D. Hill.	
<i>Birthday</i>	Dec., 1870	32 Mr. J. J. Stone.	

Bulls.	When Calved.	Price.	Purchaser.
<i>WILK DUKES (27,508)</i>	1868	165 Lord Dunmore.	
<i>Isolde</i>	1868	45 Mr. C. Bayes.	
<i>Sheriff</i>	June, 1870	35 Mr. F. W. Stone.	
<i>Caliph</i>	Sept., 1870	22 Mr. W. Ashburner.	
<i>GIRASWEITH</i>	Nov., 1870	12 Mr. J. J. Stone.	
<i>DANDY</i>	Feb., 1871	14 Mr. Grettton.	

— We have received catalogues of the following Shorthorn sales, advertised to take place at the end of the month. Mr. David Neasham's herd will be disposed of at Haughton-le-Skerne, near Darlington, on the 21st inst. Mr. Richard Eastwood and Mr. Jones's herd will be sold on the 26th inst., at the hotel, Whitwell, between Lancaster, Preston and Clitheroe; and Mr. Jefferson's (Preston How) sale comes off on the 28th inst. All these sales are entrusted to Mr. Thornton. We also hope in due time to draw special attention to the dispersion of Mr. Christy's herd of 70 well-bred Shorthorns, near Roxwell, Chelmsford, on May 4, and of the Merton Shorthorn cattle and Southdown sheep.

In making a few remarks on some of the above sales, we commence with the Haughton-le-Skerne and Merton herds. Shorthorns ought to thrive at Haughton if native air has anything to do with their success. Situated directly in the line between Darlington and Barmpton, and about one mile from each, Haughton occupies a central position in the district from which the race has extended. A large proportion of Mr. Neasham's animals are descended from cattle bred by the late Mr. W. Raine, of Gairford, while others date back to the herds of Col. Cradock, the Hon. H. Hill, and Messrs. Mason, Hopper, Baker, Greenwell, Linton, Maynard, and Willis. On further examining the catalogue, we find six representatives of *Hannak* by YOUNG MATCHEM (4422), as many well-got descendants of *Dido* by MARTON (4408), and single representatives of the *Flora* by BURLEY (1766), and the *Certainty* by SIR WALTER (2639) tribes. At the conclusion of the catalogue of Mr. Neasham's Shorthorns is a list of some well-bred cattle, the property of Messrs. Jeffrey Palmer and Becherby, of Middleton-one-Row, Darlington, comprising representatives of the "Certainty" and "Dido" tribes, and other fashionably bred Booth cattle, among which may be mentioned *Familiar*, *Hopewell* 2d by DUKE OF HAMILTON (10,618), three heifers by GAY LAD (21,800); *Princess Royal 7th* by ROYAL BUCKINGHAM (20,718), and *Princess Alice* by PRINCE IMPERIAL (27,146). ROYAL BUCKINGHAM (20,718), and his son BRAWLEY LAD, and of the "Certainty" tribe, will also be offered.

The Knowlmore catalogue embraces the entire herd belonging to Mr. Peel, and commences with *Boundaries* by the Warley bull MOORE (11,824), a thoroughly well bred cow, in which the best Bates and Booth blood is mingled. Her pedigree extends back to YOUNG PILOT (4702), PILOT (456), and SON OF APOLLO (36), and his 3rd grand-dam was *Bliss* by LEONARD, the ancestress of so many famous Booth cattle. This pedigree is interesting, as it is shared down to a recent date by almost all the Knowlmore cattle. *Bliss* by LEONARD, and her daughter *Bridget* by BARON WARLEY (7813), were the common ancestresses of nine cows and six bulls of the 20 animals for sale, and continuing the line one generation further we find *Blissful* by GRAND DUKE appearing in a considerable number of the pedigrees. Later, the Bates' bulls 2d and 3d GRAND DUKES and 2d DUKE OF BOLTON, have been used upon a section of the tribe, while, in some cases, a return to the Booth blood, in the form of PRINCE IMPERIAL, SIR JAMES (16,980), &c., has been resorted to. The remainder of this catalogue is filled with members of the *Mistress Mary* by BARON WARLEY (7813) family, originally purchased at Killibry by Mr. Carr, of Stackhouse. The following remarks by Mr. Thornton form a commendatory report upon the origin of this herd:—

"The pedigrees of the animals will be seen to trace back to two cows—*Bridget* by BARON WARLEY, bred by Mr. Richard Booth, and *Mistress Mary*, also by the same bull, bred by Mr. John Booth. The former was privately purchased at Vithaby by Mr. Bolden, and while in his possession produced the celebrated cow *Bridget* by CROWN PRINCE, from whom there are several descendants. GRAND DUKE (10,284), bred by Mr. Bates at Kirklington (and afterward sold to the Americans for 1000 gs.) was then used, and he was succeeded by bulls coming from Bates and South, PRINCE IMPERIAL (15,065) by 2d GRAND DUKE from *Bridget*; 2d DUKE OF BOLTON (12,739), by GRAND DUKE from *Flora*, by 2d DUKE OF YORK, bred by Mr. Bates, g.d. *Fame*, bred by Mr. Booth; and 3d GRAND DUKE (16,182), by DUKE OF BOLTON. The pedigree of the latter tribe was then sold to Mr. Peel, who hired, among other Warley bulls, MONK (11,824), SIR JAMES (16,980), SIR SAMUEL (15,302), ELFIN KING (17,795), and KING CHARLES (22,404), from Mr. Booth. These bulls were used in the herd, and their blood will be found in the various sires of the present catalogue. *Princess Maude*, descended from *Bliss*, the dam of *Bridget*, was a later purchase from Mr. J. Grove Wood, of Castle Grove, Ireland, and her son, KNIGHT OF KNOWLMORE (22,055), a well-known prize bull, has been in service, and will be found among the lots for sale."

POULTRY.

A GOOD, healthy, growing fowl will consume weekly two-thirds of a gallon of corn Wheat or Barley, and if the bird come from a walk where it has been badly kept, it will for a time eat more than this; but after it has got up in flesh and condition it gradually eats less, and two thirds, or even half the quantity, will keep it in good condition. Again, the weather must be consulted. In mild, damp weather, they prow about, and pick up many things, as insects, worms, young herbage—these all assist; but in frost, and above all in snow, they require generous feeding. Do not spare good food for chickens. They require plenty while they are growing, and they will make a good return in health and vigour, when arrived at maturity. If it is possible to get them their green food as Lettuces, &c., in a growing state. It is not only more nourishing, but they eat it with greater pleasure, because it resists the pull necessary to tear it, and it is more natural. Those who are obliged to keep fowls in confinement should have large sods of turf or grass cut with earth heavy enough to enable them to tear off the grass without being obliged to drag the sod about with them. A garden dunghap overgrown with weeds, chokes, &c., &c., is an excellent place for chickens, especially in hot weather. They find shelter, and meet with many insects there. *Baily on Fowls.*

SEWAGE UTILISATION.

THE sewage utilisation question advances steadily and irresistibly, sweeping away prejudice, perplexing town councillors and boards of health, and alarming ratepayers, who naturally dread a new rate as an additional tax, notice to quit, or so it must go to fertilise the land, instead of poisoning our streams.

The novelty of the position embarrasses the public authorities, who are naturally anxious to do that which is most effective and economical. There is a growing conviction that at some future period, when the general use of sewage has proved its value as a food producer, the towns may be partially, or entirely, recouped for their expenditure.

I receive such frequent inquiries from the various authorities, that I am induced to ask you to insert in your columns the opinions I have formed from my long experience in the use of animal and house sewage.

The first and most important point is, that the land to which the sewage is to be conveyed should be deeply and thoroughly ploughed, so that the whole of the sewage shall sink into and pass through it, leaving in the earth its valuable though disagreeable constituents, and issue from the drains as clear as pure water.

There are soils, such as chalks, loose sands, &c., that require no drainage, being natural filters. As, rule, light lands are to be preferred to clays, as they absorb and pass the fluids more rapidly; but the latter, when broken up deeply by steam or other power, will absorb immense quantities and produce great crops.

I prefer arable to grass lands for the reception of sewage, both on sanitary and food-producing considerations. It is especially suited for vigorous, deep-rooted, and rapid-growing roots, plants, vegetables, and fruit trees that make the quickest return.

Now that the manufacture of sugar from Beetroot is proved to be profitable, and that distillation is also on the cards, there arises an especially favourable opportunity for the use of town sewage.

Mr. Duncan, who has the sugar factory at Lavenham, assured me that the sewage Beetroots at Mr. Hope's, and at the Barking farm, were worth about 16s. per ton for distilling purposes. Where the Beetroot is to be used for sugar, it would be, I believe, necessary to thoroughly saturate the land, and, in the previous to sowing the seed, to prevent too rank a growth.

Of the grasses, the rapidly growing and greedy Italian Rye-grass is to be preferred, especially on light soils. The most perfect and practical instance I know of the utilisation of town sewage, is, in my opinion, that on Mr. Hope's Breton's Farm, near Romford, Essex, where, owing to that gentleman's liberality, public bodies are allowed to use it, on duty, at a small price. The luxuriant and rapid growth of the numerous and various productions, afford unmistakable evidence of the food-producing powers of town sewage. Mr. Hope pays 2s. per head, per annum, of the population of the town of Romford, who use the sewers. The town conveys the sewage to Mr. Hope's farm, and there raises it to 20 feet—all the rest is done at Mr. Hope's cost.

Mr. Hope's successful practice confirms my own deep conviction, that the sewage should pass direct from the town to the farm, and that settling tanks, deodorizers, &c., are a costly mistake.

The question of how and where to take the necessary land is a most important one, affecting the future interests of towns and cities. See what has taken place at Croydon. Land, which the Board of Health rented at £4 per acre, and which was previously let at only £2 per acre, has, now that the first seven years' lease has expired, risen in price. The tenants are obliged to pay £12 per acre by their new lease, on 300 acres, and, I believe, also on some 200 or 300 additional acres. Had they purchased the land outright at first, the town would have received the profit which is now another's.

Norwich (with its 80,000 inhabitants) has made the same mistake, but in a less degree, having hired 1300 acres, at £2 per acre, for 21 years, under the late Sir Robert Harvey. What will that be worth when the lease expires? The application of sewage and the growth of population soon give increased value to the land in the immediate vicinity of a large town or city. Of course, corporations should have power to resell, mortgage, or relet the land, so as to ease the demands upon ratepayers. My experience has taught me that sewage is a suitable manure for any and every crop when applied in proper proportions. As the municipal power of Britain is only the deposit from three sheep or three human beings per acre, it appears absurd to propose to convey to each acre the sewage from 300 people. One might as well suggest that 300 sheep should be folded continually for a whole year on a single acre. The greatest of all nuisances, the sewage from more than 3,000,000 of people in London, still remains to be dealt with, and hangs in the balance of doubt and indecision. Something must soon be done with the northern portion, or the Metropolitan Board of Works will rescind their contract and resume its control. The southern sewage is, I believe, still in the possession of the Metropolitan Board of Works. In the meantime a dreadful waste is taking place. The residuum of the consumption daily of the produce of 20,000 acres finds its way to the Thames, obstructing its channel and poisoning its waters. Our sanitary reformers, who introduced closets and the pipe system, could never have anticipated such a result of their system.

The Lodge Farm at Barking, under the management of Mr. Morgan, also affords abundant evidence of the productive power of town sewage.

It will be seen by the following extract from the speech of the Chairman of the International Society, at the annual general meeting on Jan. 27 last, that the town sewage question is a very important and useful condition. The idea of putting the northern sewage from some 2,000,000 of people on 500 acres of land is really monstrous. That is equal to keeping 4000 sheep on 1 acre of land for 365 days and nights in one year. There are thousands of acres of land in the immediate vicinity of the great outfall works at Barking, in which the sewage might be utilised if the lands were taken under Parliamentary powers.

"I regret to say, however, that the Board of Works absolutely decline in every way any assistance, either by funds or by guarantee; that they propose to confiscate our caution-money of £25,000, and that they have promoted a Bill in Parliament for the purpose of depriving us of the remaining period of the concession. It is, as I have said, a matter of great regret that they should have

taken this course, contrary, as we believe, to all the equities of the case, and with the experience before them that the great mass of sewage furnished by the south side of the river has as yet found, we believe, not even a proposition for its utilisation. The Metropolitan Sewage Company, on the other side, has therefore proposed a Bill before Parliament, by which they seek to alter the original scheme by substituting, in part, two iron pipes for the expensive brick culvert, and by stopping the works at Canvey Island instead of carrying them to the Maplin Sands, that is, to stop them half-way, or about 25 miles out of 44. They ask for powers also to purchase and irrigate Canvey Island, and other land, to the extent of 500 acres, and to discharge into the Thames, but so as not to create a nuisance, any sewage not used for irrigation."

—*J. J. Mechi, Tipster, April 5.*

LARGE OR SMALL FARMS.

[This was the subject of Mr. Trask's paper before the London Farmers' Club, in December. The argument was well stated on both sides by Mr. C. S. Read, M.P. for West Norfolk, and Mr. C. Paget, late M.P. for Nottingham.]

MR. C. S. READ, M.P., said he was glad that the intricate question of the subject had not gone very much into foreign farming. He had been rather afraid that they would be overwaded with that topic. He considered that the question of Continental farming, as regarded its applicability to England, was entirely exhausted by the able paper of Mr. Howard, the chairman of the year, some time ago, and by the admirable article which appeared in the first number of the Royal Agricultural Society's Journal for this year. If they took the case of France, they found that the average production of Wheat per acre was barely half what was grown in England and only just what Mr. Lawes' unmanured plot had yielded for 25 years. That, he thought, dismissed the case of France, which had sometimes been held up as an example for this country to follow. On the other hand, if they took the evidence of Mr. Jenkins and Professor Voelcker, they found that, with all the ingenuity and all the saving of the intelligent people like the agriculturists of England, the eastern and southern small farms were somewhat less than those of our own agricultural labourers. He maintained, therefore, that the example of France and Belgium ought not to be followed in this country. He thought that it might be laid down as a principle that some districts were specially adapted for large farms, and other districts for small ones; but he had never yet seen the district which should be all large farms, or the one which should be all small farms. In his opinion there should always be, even in a county like Norfolk, where the soil was naturally light and porous, and fitted for arable cultivation, and could only be profitably farmed—he did not know, indeed, how farming could now be carried on profitably anywhere through the application of a considerable amount of capital to cultivation: he said that even there there ought to be a few small farms, by which a struggling persevering man might rise above the condition of a labourer. He knew that all the best men were people in the world who, by saving and toil and intelligence, would be almost sure to rise if they had a chance, and on no account should the first stave of the ladder be taken from them. As he had before remarked in that room, the small farmer who really flourished was a man who would do the work of two labourers, and live at the expense of one. If they went through a county like Norfolk, or any other where there are large farms, he would be surprised to say the moment they came to a village where there was a whole lot of small farms, they would at once see a difference in the cultivation. Moreover, agricultural labourers were better paid and more constantly employed on large farms than they could possibly be on small ones. There were, however, some articles of produce which were particularly suited for small farms and just now were particularly remunerative; and, looking at the price of milk, butter, eggs, and poultry, he would say that in his opinion they could be produced cheaper and better upon small farms than upon large ones. Therefore, he said, there was room both for large and for small farmers, and even in a county where the soil was naturally light, he should be very sorry indeed to see the small occupier obliterated from the face of the earth.

MR. G. SMYTHIES (Marlow Lodge, Leintwardine) said: Coming as he did from a district where there was a great many small freeholds, he wished to state the result of his experience with regard to small farms. In one adjoining county to his, the whole, in the words of Radnor almost the whole, of the land was divided into small freeholds, which were, for the most part, let by the owners, who rented large farms in neighbouring counties, thereby showing their appreciation of the difference between a large and a small occupation. Those persons did not, as a rule, make anything like good landlords; on the contrary, although they were not very themselves in other counties, they did not seem to appreciate the difficulties which tenants had to contend with, and for the most part, they were hard and grinding landlords. The occupiers of small farms were inferior employers of labourers and others, because they only wanted labourers at periods of the year when they could get abundance of work. They employed labourers, if they could get them, in summer and in harvest, but all the rest of the year, when it might

be a boon to employ them, they discarded labourers altogether. Further, both the owners and occupiers of these small freeholds were very inferior to large owners and occupiers as regarded subscriptions for the repairs of a church, the building of a school, or any other public work which was required in the neighbourhood. He could corroborate the statement of Mr. Trask, that, as a rule, the children of those small occupiers were worse occupied than the children of those occupying employment on the farm as soon as they were able to do any work. If such farmers had by accident any good stock of calves or lambs they were almost entirely indebted for it to their neighbours, having no money of their own to purchase animals of the best kind. He agreed, however, with Mr. Read, that it was desirable that a man who was able to push his way should be able to obtain a small farm, but he did not know any other recommendation than the small farm system. The experience which he had spoken was obtained in Herefordshire. He formerly lived in Lancashire, and in that case the opinion which he had expressed did not apply. There the small farms were, in fact, market gardens for the sale of produce which could not be supplied in any other way, and therefore small farms were extremely valuable. Indeed he did not see any objection to the whole county being divided into small farms. He did not think large farms were any business there, and he must say that he felt out of his element. It would not, he thought, to lay down any hard-and-fast line; but, on the other hand, although there were some counties where small farms would do well, taking a view of the whole country they seemed to be very objectionable.

MR. C. PAGET (Ruddington, Nottinghamshire) said he had not the slightest intention of speaking on that subject when he entered the room. He had read many of the papers which were read before the Farmers' Club; being in London he determined to hear the discussion on that subject, and he would now make a few remarks which were not at all prepared. He had been struck with the truth of the observation, that between different localities there might with advantage be differences as regarded the size of farms. He lived in a district which was something like half-way between the east and the west, which were represented by the remarks of the paper, and by the gentlemen who had just sat down—a district which bordered on the one side on land which must consist of large farms, if it were to be occupied profitably, and on the other on land which might be usefully occupied in dairy farms—and his experience tended to contradict some of the observations which were made by both those gentlemen. In the first place he must say that the small farmers of the village in which he lived were cultivating their land well—he knew that, as he was speaking in the presence of very good farmers, as any farmer in England. The soil was free from Twich; it yielded from 6 to 7 qrs. of Wheat per acre, and from 24 to 40 tons per acre of Mangel Wurzel; and yet it was occupied by men who rented only from 10 or 15 up to 50 acres. He had on his estates five tenants who had all been labouring men—some of them on his own farm. They had been saving men; they had been saving money, and they had been saving to their means, until the poorest man among them must be well worth £500. No doubt that resulted in a great measure from the character of the land, which was partly arable land and partly very good grass land. He had 19 tenants, who had on the average 13 acres a-piece, and not one of them—he would call Mr. Read's special attention to this fact—not one of them worked as a labourer on another farm. Formerly he adopted the system of letting to labourers a small lot of land, in order that they might keep a cow; but farmers were most unwilling to employ them, and, consequently, the result was unsatisfactory. The time when farmers most wanted them was that at which they most required to work for themselves. In place of such persons there was now a class of men who had a small piece of arable land, and, what was most essential, there was attached to it a piece of grass land, and a very good cow. When he began to wall, and the difficulties to which he had alluded did not arise. Perhaps one or two of the number would keep horses instead of cows, and do the horse-work for their neighbours for hire, and that was found a convenient arrangement. The cattle had very much improved in consequence of the combination with arable land of a certain amount of grass land, the effect being that there was a sufficient amount of roots and straw to carry them through the winter. When he began to direct his attention to farming matters, now nearly 50 years ago, he had 12 to 15 neighbours who were yeoman farmers, that is, men occupying their own land; but they very soon discovered that whereas they could only get 3 per cent. for their land in the shape of rent, they could obtain 10 per cent. as a return for capital, and the consequence was that one after another sold their land, and they had now been sold to the One man had a small piece of land consisting of 70 or 80 acres, which he sold for about £6000. He afterwards took a farm of 600 acres, and became one of the first farmers in the district. In that way small properties had been disposed of, with very great advantage to small occupiers and to the country at large. The owners of such properties were not in a position to effect the requisite improvements, and he

had no hesitation in saying that, since the land was purchased by large proprietors its value had been increased 50 per cent. by means of improvements. He spent a large portion of the last 10 years in Hungary, and notwithstanding Mr. Read's depreciation of any allusion to foreign cultivation, he wished to say a word or two in reference to what he had learnt there. Under the former system of holding the owner did not pay any money for the work which was done on his land, but he got as much as if he did receive it, the tenants working for him with their ploughs, their oxen, and their own hands, and doing a specified

amount of work. There were disturbances in the country under that system, and in consequence the Government declared that every tenant should be the owner of the land without performing any duties whatever. The effect of that was that these men, almost all, ceased to work at all. They formed drinking habits, and it was not till a considerable number of them had absolutely sold their properties to those among them who were saving and thriving that there was any considerable amount of produce obtained from the land. What he wished to call special attention to was the effect of that state of things on labourers. The owners

had no capital to employ labourers during the winter months, and the consequence was that the labourers mortgaged their next year's work to Jews or usurers for half its value. They never had a harvest, and they were in a state of very great misery. He hoped, therefore, that they would never see adopted in this country a system of having very small proprietors occupying land all over the country; while, on the other hand, he thought that if a number of tenants had small plots of land which were highly improved by the landlord, they would prove of great advantage to the country.

AGRICULTURAL STATISTICS, 1869-70.

No. 2.—TOTAL ACREAGE AND PERCENTAGE PROPORTIONS OF EACH KIND OF CORN AND GREEN CROP, IN EACH DIVISION OF THE UNITED KINGDOM.

Description of Crops.	England.		Wales.		Scotland.		Total for Great Britain.		Ireland.		Isle of Man.		Channel Islands.		Jersey, Guernsey, &c.		Total for United Kingdom.		
	Years.	Acres.	Percentage, proportions of each kind of Corn and Green Crop.	Acres.	Percentage, proportions of each kind of Corn and Green Crop.	Acres.	Percentage, proportions of each kind of Corn and Green Crop.	Acres.	Percentage, proportions of each kind of Corn and Green Crop.	Acres.	Percentage, proportions of each kind of Corn and Green Crop.	Acres.	Percentage, proportions of each kind of Corn and Green Crop.	Acres.	Percentage, proportions of each kind of Corn and Green Crop.	Acres.	Percentage, proportions of each kind of Corn and Green Crop.		
Corn Crops.																			
Wheat	1869	3,417,054	43.9	135,562	24.4	115,741	9.6	3,668,357	37.8	281,117	12.7	8,748	30.6	2,798	82.0	964	46.2	1,921,025	33.2
	1870	3,447,091	44.1	136,488	24.9	115,844	9.7	3,700,423	38.1	282,117	12.8	8,756	30.7	2,806	82.6	969	47.1	1,923,777	33.1
Barley or Bere	1869	1,864,688	24.0	157,582	28.4	220,840	16.2	2,243,110	23.1	248,339	11.2	7,856	27.9	1,889	54.3	574	26.5	2,632,752	22.3
	1870	1,831,744	23.9	163,853	29.6	244,142	17.1	2,241,739	23.0	248,343	11.2	7,856	27.9	1,889	54.3	574	26.5	2,632,752	22.3
Oats	1869	1,511,975	19.4	259,970	45.5	1,047,775	71.8	2,789,720	28.5	1,684,768	76.3	11,823	41.3	361	10.6	431	20.6	4,480,125	37.1
	1870	1,468,647	19.7	253,997	45.7	1,046,508	71.6	2,769,152	28.1	1,684,764	75.9	11,818	41.2	363	10.6	441	22.2	4,474,935	37.7
Rye	1869	52,769	0.7	2,610	0.5	8,730	0.6	64,099	0.7	8,770	0.4	—	—	—	—	—	—	72,886	0.6
	1870	52,832	0.7	2,609	0.5	10,305	0.7	65,166	0.7	9,281	0.4	—	—	—	—	—	—	74,567	0.6
Beans	1869	548,257	7.0	3,944	7.1	2,903	1.6	5,895	0.1	8,833	0.4	130	0.5	1	1.6	73	6.1	10,851	4.0
	1870	593,520	7.7	4,482	8.1	25,093	1.6	5,895	0.1	9,944	0.4	145	0.5	10	1.7	74	5.8	15,593	4.6
Peas	1869	309,050	4.0	1,760	3.2	2,607	1.9	3,977	0.1	1,124	0.1	153	0.5	12	0.3	—	—	3,074,83	2.3
	1870	311,543	4.1	3,172	5.8	2,483	1.8	3,172	0.1	1,071	0.1	390	1.4	18	0.5	—	—	3,168,007	3.7
Total of Corn Crops	1869	7,785,031	100.0	553,888	100.0	1,417,176	100.0	9,758,037	100.0	2,207,970	100.0	28,545	100.0	3,441	100.0	2,098	100.0	12,009,411	100.0
	1870	7,750,279	100.0	553,501	100.0	1,424,261	100.0	9,548,041	100.0	2,171,109	100.0	28,222	100.0	3,644	100.0	1,087	100.0	11,715,033	100.0
Green Crops.																			
Potatoes	1869	356,939	12.0	40,107	38.5	170,275	26.0	567,321	16.4	1,041,817	70.9	4,336	35.4	2,736	40.9	1,167	31.3	1,635,347	32.3
	1870	353,809	11.9	38,604	37.2	180,169	25.9	567,661	16.1	1,043,783	69.6	4,107	33.1	2,792	41.0	948	29.3	1,629,966	32.1
Turnips and Swedes	1869	1,014,580	58.5	67,008	52.6	489,848	71.2	1,571,436	60.7	321,583	21.9	7,499	60.4	1,189	25.8	118	3.2	2,509,512	49.4
	1870	1,044,686	59.5	70,293	54.0	495,932	71.6	1,610,911	61.6	320,059	22.0	7,994	63.0	1,540	26.8	125	3.8	2,599,699	50.1
Mangels	1869	37,184	0.5	4,528	3.5	1,012	0.2	43,724	1.1	21,009	0.9	—	—	—	—	—	—	314,441	4.9
	1870	299,020	10.9	5,244	4.2	1,177	0.2	306,311	8.6	25,220	1.7	71	0.6	442	7.7	145	4.5	312,491	6.5
Carrots	1869	13,033	0.5	3,324	3.1	987	0.1	14,344	0.4	3,702	0.1	331	2.7	237	4.4	197	5.3	18,831	0.4
	1870	13,523	0.5	3,351	3.1	1,076	0.2	14,550	0.4	3,949	0.3	344	2.6	225	3.9	169	5.1	19,025	0.4
Cabbages, Kohl Rabi, and Rape	1869	141,156	5.1	791	6.0	3,300	0.5	145,247	4.1	49,237	2.9	21	0.2	36	0.6	122	3.1	157,669	3.7
	1870	140,074	5.1	699	5.5	3,137	0.4	143,910	4.0	45,460	3.0	15	0.1	40	0.7	93	2.9	159,344	3.7
Vetches, Lucerne, and any other green crop, except Clover or Grass	1869	346,318	4.5	8,600	4.4	14,075	2.0	375,013	10.2	38,210	2.0	102	0.8	14	0.3	148	1.9	407,155	8.6
	1870	395,474	11.0	8,834	6.7	13,350	1.9	417,658	11.0	41,446	2.3	77	0.6	800	13.9	1,771	54.5	406,337	7.7
Total of Green Crops	1869	2,759,038	100.0	127,432	100.0	688,517	100.0	3,575,977	100.0	1,468,585	100.0	12,406	100.0	5,836	100.0	3,729	100.0	5,095,913	100.0
	1870	2,759,279	100.0	130,203	100.0	697,701	100.0	3,587,183	100.0	1,470,710	100.0	12,688	100.0	5,741	100.0	3,729	100.0	5,107,151	100.0
* Acreage under—																			
Cabbages.	1869	24,931	—	17,318	—	—	—	103,002	—	—	—	—	—	—	—	—	—	59,724	—
	1870	20,919	—	23,902	—	—	—	91,052	—	—	—	—	—	—	—	—	—	54,433	—

Home Correspondence.

Sense Wanted in English Farming.—"Morton's Almanac" for this year says, under the head of "Credit wanted in English Farming":—"It is a common remark that more capital is required to be used on most English farms, for the benefit alike of the farmer, the landlord, and the labourers, and it expresses a fact." But, sir, there is another "fact" it expresses, viz., that sense is wanted in English farming. For who, in their senses, would waste their "capital," as farmers have done, and are continually doing, by purchasing their commodities through middle-men, who swallow up all the profits the farmer ought to derive? Your correspondent from West Sussex, "G. S.," p. 360, says, "How can a farmer get a manure good for anything, say for £6, when perhaps an agent may get £2 for selling it; and suppose the merchant gets £2 more, what can the material be worth?" What indeed! Dr. Voelcker, and his correspondents, as well as your correspondent, "Klwd Bux" p. 390, have answered, "nothing." The latter, after alluding to farm profits being but "bread and cheese" on combined skill and capital, says—"The farmer buys at the greatest disadvantage to himself, and sells in the same way. In buying artificial manures, grass, Turnip, Mangel, and other seeds, he is almost entirely in the hands of the dealer, be he honest or dishonest. He matters the matter of feeding stuffs, he often buys stuff worse than rubbish. What is called linseed cake is only such in name. His artificial manures are seldom worth the cartage. The year before last I paid a man £90 for artificial manures; as far as the benefit received went I did not get the cost of railway carriage and carting." Your correspondent then shows how linseed cake is made of "rubbish," and that his friends are of the same opinion as himself as to the value of the "rubbish" the farmer is deluded into purchasing under the name of "oilcake," &c., and "artificial manures." Such statements as the foregoing prove that the farmer would be a gainer by sowing broadcast his gold for a Turnip crop, instead of what he purchases, for he at least would save the cost of carriage and cartage of "stuff worse than rubbish," and his

feelings so much disappointment. This remark applies equally to feeding stuffs. I will ask, therefore, in which is the farmer most deficient, "capital" or "sense?" If he is deficient in capital it is because he has thrown it wholesale into the pockets of a lot of dishonest dealers so senselessly. It is high time for farmers generally to ask with "Klwd Bux" for a recipe to make muck at a cheaper rate, which may be found in "G. S.'s" excellent memorandum, where he alludes to co-operative societies, and in my letters on the same, at pp. 152 and 357. A Member of the Agricultural and Horticultural Association.

Stall-feeding Bullocks.—With your permission I will respond to the appeal of your correspondent, "Klwd Bux," for information on stall-feeding bullocks, by simply and briefly stating how my North Devon steers are treated as regards diet, that are kept in the stalls so long as six months. They receive each per diem 3 bush. of chaff (two parts straw and one hay), 1 bush. of pulped roots (white Turnips, Swedes, and afterwards Mangels), 1 peck of either maize, bean, barley, or wheat meal, 3 lb. of best American decorticated cotton seed cake, and clean water *ad lib.* After feeding on the above for six weeks 2 lb. of best linseed cake is given to some in addition, others waiting from two to three weeks longer before the latter addition is made. The chaff, pulp, and meal are mixed together the evening before the day the mixture is fed to the animals. Their average age is about three years, and weigh on an average about 9 cwt. when sold. If "Klwd Bux" will adopt a similar plan for feeding, taking special care his cake is pure, and reduce the number of sheep by one half, I think he will be more satisfied with the result than he appears now to be. A Devon Breeder.

The Pneumatic Sewage Cart, which Mr. G. Paston, in your journal of October 29 last recommended for adoption, as being "used in almost every large town in Germany with perfect success for emptying cesspools, drains, &c., so that the passers-by do not perceive the slightest effluvia," sometimes fails, as

I can testify, in preventing the escape of foul air. For when staying at one of the principal hotels in Milan, in 1861, I was awakened in the middle of the night by a noxious stench in my bed-room, which I found to proceed from the process of emptying, by a pneumatic sewage-cart, a cesspool in a side street beneath a window of my room that I had left open. On closing the window, and rushing into the passage to breathe some purer air, I found the same dreadful stench there, and was obliged to return to my bed and cover my head with the bedclothes. The sickening effect of the effluvia which escaped from the cesspool nearly gave me a serious attack of diarrhoea. A day or two afterwards, when passing along one of the public roads near the city of Milan, I saw one of the pneumatic carts discharging its contents into a pit in a market garden by the road-side, where it was immediately covered up with dry mould, which deodorised the effluvia. This may teach us that the earth-closet is the best mode of deodorising fecal matter, and of utilising that, under any other form, is most offensive. C. T. H.

Co-operative Societies.—I scarcely know whether I am right in replying to my anonymous opponent, who glories in being a member of one of the above, because, instead of arguing the question fairly, he again endeavours to make a personal matter of it, to which I before objected. He also insinuates that the whole trade engaged in vending feeding stuffs and manures are dishonest, and that they make enormous profits, but the only evidence he brings forward to support these statements is the fact that published analyses have exposed the malpractices of certain dishonest dealers, or manufacturers, whose shortcomings have over and over again been pointed out to farmers. I may just as well assume that the whole class engaged in farming are dishonest, because a few assume to be men of means when they have no capital, and run away without paying their debts, save that due to the landlord. We will know, however, that one swallow does not make a summer. There is, perhaps, no branch of industry,

in which the competition is so great and so keen as in the manufacture and importation of manures and feeding stuffs, and this well known circumstance ought to be sufficient to establish the truth that the profits are no greater or the failures more numerous than in any other trade of the same extent. Our friend, the member, endeavours to evoke the sympathies of farmers by pointing out the enormous interest charged to those who take credit. There is such a thing, however, as proving too much; for example, if enormous interest is charged to those who take long credit enormous discounts must be allowed to cash buyers; where, then, is there occasion for the go-between co-operative? These assumed enormous profits on extra credits are, however, about 5 per cent. per annum. It is a fact which no one will dispute, that although there are many individual exceptions, on the whole there is a great insufficiency of capital invested in the cultivation of the land, but our member would make this capital still less by depriving it of that large amount now invested in the form of credit for manures and feeding stuffs; for surely nothing can be clearer than that the merchant who trades on his books at all times for £10,000 to the debit of farmers for the space of four, eight, or twelve months: this sum forms part of the capital invested in farming, and aids its successful progress. If the farmer buys oilcake for his fattening sheep, and takes four months' credit, he is enabled to pay for his cake with the proceeds of the sale of his sheep, and so to a great extent in the case of manures. At the same time there is no merchant who would very willingly accept prompt payment, and allow discount accordingly. It is, however, rather too much to adopt the practice of some co-operative members, viz., to go to the merchant when they want credit, and to the society when it suits them to pay cash. Our member, who writes as a farmer, but with an assurance worthy of a secretary or manager himself, claims the credit of stopping the sales and exposing the fraud of dishonest manufacturers and dealers. Why, long before these high assumptions were brought out, our agricultural society, our chemists, and journalists, and none more so than this journal, have exposed these malpractices, so injurious to the interests of straightforward manufacturers. The pretension of the co-operative societies in this respect somewhat resembles the fly on the wheel in the fable, exclaiming, "See what a dust we kick up." However, there is no reason why the arguments should be limited to agriculture, or the co-operative movement confined to merely acting as a broker in buying American cake or artificial manures made from inferior materials, and consequently vended at the lowest rate. If these societies are good they ought to be generally supported, and applied to all trades; if their tendency is bad and detrimental to the public good, they ought to be discontinued, and not recommended by public men.

Any man has a legal right to use them, even if he has no man in right, just as a man with £10,000 a year may be in a right to pay on his rent, rates, taxes, and taxes; but one must not put in a claim as a public benefactor more than the other. Let us suppose that co-operative societies were generally adopted; what would be the result? All shops would, of course, be shut up, for only a few dismal stores will be required; markets and corn exchanges will be done away with. There will be no display of goods, no investment of capital, and our shopkeepers as a class must emigrate, or be ruined by their rent, rates, and taxes; how are the rates and taxes to be paid?—how is the army and navy to be supported? The landed proprietor as well as the farmer makes his purchases through his co-operative; the merchant and tradesman, having removed to another country, manufacturers will only make the goods they can immediately sell; there will be no stock on hand, there being no holders of stock and the bank trade and the employment of labour will be greatly diminished, and the public revenue will be diminished in the same proportion. Having met with such ominous success, these co-operative societies will, of course, affect other channels. Medicine and law will at once be put under their influence, the cheapest lawyer and physician will, of course, be retained, and the army, the navy, and the church must be all co-operated. Even the Government must be in the same predicament. It is very evident that the business of the nation can be done much cheaper by means of a co-operative society. And as for the civil service gentlemen, the great promoters of the movement—the servants or the masters of the nation, whichever they may be—their services will surely be dispensed with; for with fewer taxpayers there must, of course, be fewer taxes, less funds to administer, and less salaries for the administrators; and their labours, great as they may be in their own opinion, though less in that of others, can easily and cheaply be performed by means of a few co-operative societies. The principle of retiring pensions is quite foreign to co-operative principles, and must, of course, be eschewed, although some of the most industrious of the dispossessed may perhaps find employment in the co-operative stores. The country will become a nation of storekeepers instead of shopkeepers, and shall be able to live at much less expense, which will be fortunate, seeing that we shall have much less to live upon. To drop this banter, however, I maintain that the surest way of keeping prices and profits moderate is by allowing free room of trade and plenty of competition, and surely

there is no limit in this respect. The days of monopoly are gone, and if there are some exorbitant and dishonest tradesmen, there are plenty of an opposite character; and surely the latter ought not to be injured and punished for the delinquencies of the former. *W. C. Spooner.*

Societies.

LOCALITY.

April 3: On the Growth of Cabbage and Kindred Crops.—Mr. C. CADLE, of Gloucester, read the following useful paper on this subject:—

I am afraid the subject I have to introduce to your notice this evening is not so interesting as many that engage your attention in the room, still it is one of considerable importance, and one that has not received sufficient attention from agriculturists. It has never received any special notice by the members of your Club, although many gentlemen have more or less alluded to it in the papers introduced by them. It is also a subject that has not received its share of notice in the Royal Agricultural Society's Journal; it has, however, been noticed by the following gentlemen: The Earl of Lovelace, vol. v. p. 112, recommends the planting rows of Beans 3 feet apart, and a row of cabbage between, in May or June, and states that his crop of Beans was increased from 35 to 41 bush. per acre since the Cabbages were introduced. Mr. Hugh Raynbird, in his prize report on the Farming of Suffolk, vol. viii., p. 276, describes the system adopted by Mr. J. C. Downham, of Earl Soham, of ploughing the land in 53 ridges, and planting the cabbages on the top of each ridge. By this means the cart-wheels run in the furrow, and the crop is removed without injuring the land. The time of day chosen for putting in the plants is from four to seven, or eight in the evening, thus giving them the benefit of a cool night, and the cultivation is carried on between the rows with the common plough, only doing each alternate space, thus cutting off the roots on one side the plant only, and allowing four or five more elapses before cultivating the other side. Mr. Clare Sewall Read, in his prize report on the farming of Oxfordshire, says the Drumhead is the variety most commonly cultivated in that county, the seed being planted in August for planting out in October, and in February for planting out in May and June; that they are planted out a yard apart, requiring 5000 plants per acre, and that they commonly weigh 10 or 12 lb., but that several that season had reached 24 lb. In vol. xxi., p. 93, our friend Dr. Voelcker (who, by the way, has done more for farmers and modern farming than any other man in England) furnishes a paper on the analysis of Kohl Rabi and Cabbage, and says that they deserve to be more extensively cultivated than they are, and that the former crop stands the frost remarkably well, and far surpasses white Turnips as food for lambs. In vol. xxiv., p. 216, Mr. C. Lawrence, of Cirencester, has a good article on the growth of Cabbage. He recommends the Drumhead three-quarters of an acre, and says, "I find them invaluable for his lambs when they come off the Clover and before they go upon the Swedes. He estimates their weight per acre at 30 tons against 18 of Swedes and 22 of Mangels. Mr. John Chambers, in the second series of the Royal Agricultural Journal, vol. v., p. 376, describes the system he carries out of growing Potatoes and Ox-Cabbage in alternate rows, and also Savoy Cabbage. These gentlemen have only treated upon Cabbage as a general crop, and all of them allude more particularly to the Drumhead or Ox-Cabbage; but my principal object this evening will be to show its advantage as a summer crop; not that there will be much that is new to the members of the Club, but that, by the expression of your opinions in the discussion, it may be brought more prominently before the farmers of England, and receive more attention than it does at present. The value of the Cabbage was brought more prominently under my notice last summer from the fact that, as far as my observations went, those who had a good stock were enabled to get through such a critical season with far less serious consequences than those with none. I will point out—1st, its advantages as a summer crop; 2d, the different methods of planting and cultivating it; 3d, the time and mode of consuming it.

The Advantages of Cabbage as a Summer Crop.—Before entering upon this we ought, perhaps, first to discuss how the crop can be produced, and at what cost; but I purposely place this first, in order to show that, whatever the cost, Cabbage should be grown.

On the generality of farms the end of May is a critical time in the management of grazing land, for if sufficient stock is not kept to prevent the grass getting long, the stock do not care to graze it afterwards (especially the pastures on the lighter soils, where a quantity of Couch-grass is often mixed with the other herbage), preferring the bare patches; and thus the grass on a portion of the land is left over for winter. I admit this may be obviated by mowing a portion of this old grass each year, and then the stock will be content with the grass to be sown in the autumn. The difficulty of the grazier has to contend with is to have sufficient stock to keep the grass down, and at the same time not to over-stock, and so not to have enough food to keep the animals in a progressive state. It is at this period, therefore, that the farmer needs to be prepared with some early Cabbage, so as to be able to distribute a careful or

so each day amongst the stock upon these pastures, and thus be enabled to meet the above emergency. Very early draught sets in, and the winter gets so hard up for food in June and July, and August, that it is compelled to sell at a great sacrifice in consequence of shortness of keep, when a few acres of early Cabbage would have prevented such a sacrifice. This is an important point to be considered, for we tend to tear in mind that this is the time that affects whole districts, as if one farmer is compelled to sell off stock from this cause numbers of others are too, the fall in the value of stock is considerable, and the loss often great. To the sheep-farmer it is, perhaps, of still greater importance, as the Clover crop is a great preserver, and a great security, that he is often put to his wits' ends to know what to do with his stock so as to keep them in a progressive state, and in this case a load or two of Cabbage when the feed runs short is invaluable. In the case of his lambs, we all know that to rear sheep profitably they should maintain the fat made from their mother's milk, or in other words, be kept in a progressive state, for a check in the growth of a young animal not only undoes the work of weeks, but it often takes months to get the animal back to a thriving state, besides the question of loss of life, often very great with this kind of stock in October and November, the mischief being done in August and September, when a liberal allowance of Cabbage and artificial food would be a preventive of all these evils, as Cabbage is one of the best means that you can get to get the young of Ram breeders and farms producing prize stock are quite alive to its advantages, for at the Royal Agricultural and other shows you scarcely see a pen that is not fed with Cabbages, and it is with difficulty a lot of them can be brought to the notice of the judges as an auxiliary. If it is to the advantage of such men to grow Cabbage, surely there can be no question about its being so for those also who have to rear a flock of sheep. Whilst upon this subject, I would mention that there is one point of great cost right off, and that is that an animal in good condition consumes less food in keeping up the wear and tear of the body than one in low condition, unless subjected to violent exercise, as they lie down more, and are in a more contented state; consequently they must convert more of their food into flesh and fat, and thus the farmer can be brought to the notice of the judges as an auxiliary. If it is to the advantage of such men to grow Cabbage, surely there can be no question about its being so for those also who have to rear a flock of sheep. 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so, and could not find any difference between those put in straight, and those with the root doubled up. I have seen very few of the roots set out at all, and to water the plants in the bed, as they draw so much better, and the small fibrous roots do not get broken off. I know one gentleman near Ross, whose own description I will presently read to you, who has been a successful grower for many years, and who plants 100 per 1000, a man planting 500 per day; but I have never been able myself to get this done. The planter can get on much better by having a boy to drop the plants to him as he requires them. As they will have to be horse-hoed, it is necessary to have the rows planted tight, and this may be done by the use of a fork, or some plan of it, or a band may be put round the roll at the requisite distances, or something put to drag behind the harrows, care being taken to go straight; but the best plan is to put the coulters of the seed-drill the requisite width, and run it over level. Another, but more expensive mode, is to set them in every third furrow, taking care that the horses do not tread on them. They may also be set with a spade or a hoe, the trenches being first opened with a plough. When planted out with the rows 2 feet apart, and at a distance of 1 foot from each other, it will take in the row numbers 21,000 plants to the acre. These, if bought at 3s. 6d. per 1000, will cost £3 13s. 6d., and 6d. per 1000 for planting out will make the cost £4, or, to be on the safe side, say 9d. per 1000, which will make the cost £4 9s. 6d.; but as the whole cost of the plants if grown at home would be about £10, and 1 lb. of seed at 1s. will raise sufficient plants for an acre, and say 9d. for planting, the cost in this case would only be £1 6s. an acre. To this we should have to add cultivation of the land, say 30s.; rent, rates, and taxes, say £2; horse-hoeing, 8s.; and manure £2; making in total of £74 per acre. Another mode of planting that I have tried, and which is also tried, is to drill the seed as you would Turnips or Swedes, and fill in any gaps from the places where the plants are thick; by this means you also get a quantity of plants to sell to your neighbours, if you should be planting in the open field. I have never been successful with this system, and do not think it answers so well as the transplanting; for, in the first place, you have no land in July without sacrificing a crop of Turnips or Swedes; and in the next, the plant while young does not seem to thrive on the ridge, and it is not so good as the plants drilled on the flat, by doing which no doubt the plant is more protected than on the ridge, while in a tender state. On the other hand, in October you can plant after a corn crop, and it is a poor crop of Turnips or Swedes that is not worth the cost of sowing. The Cabbage plants, at 15s. 9d. per acre, and, I believe, the crop does better for being transplanted. Such has been my experience, and probably that of others too, as this mode has not been much followed that I am aware of. The Cabbage is also a most useful plant for filling up gaps in the rows of Turnips or Swedes. Turnips, if sown in the open field, are culty there is to get a crop of anything in these gaps if they are once there. They are also very useful for setting out in all sorts of odd corners, that are to be found on almost every farm. Sometimes it is requisite to water the young plants, but being set in the open field, in the case, as they stand a good deal of dry weather, and the nights are long in April and October; still, when planted in May and June, they must be watered if necessary.

Time and Mode of Consumption.—As I have already explained the *Mode of Cultivation* of a growing Cabbage, it is for the purpose of helping out other crops, and it should be ready to begin upon by the end of May, being used as required during June, July, and August.

The Cabbages should be cut off with a knife, leaving the three lower leaves on the stem, these being the best, and cut off separately and taken away with the Cabbage; this will allow the stem to shoot out, and you get a second crop in September and October, which comes in very useful for the lambs. If not required for any other stock. Should the Cabbage be cut off the stem below the leaves they will not sprout out so well, and often not at all; therefore the man who cuts the Cabbage requires to be looked after to prevent his cutting them too low, as to cut them low is only half the trouble of cutting the Cabbage and then the leaves separate, and the stem is left, and keeping for a second crop I consider the most profitable, but they are sometimes grown and consumed by being carted off, or by sheep upon the ground, and the land is afterwards ploughed up and planted with Rape or Turnips. I have no doubt that the Beans are the best plants for advantage, the crop in this case being sold for market. May before the Beans get very high; then the stems sprout again, and the Beans are out of the way in the beginning of August, so as to allow of the second crop of Beans coming in. So advantage to some persons make a very profitable mode of cultivation, and the crop is ready early, in May, when I have known them cut at the rate of £40 per acre, as at this season of the year most kinds of greens are getting scarce. The Ox or Drunken Cabbage, generally grown in a different manner from that already described, the seed being sown in the spring, and the plants set out in May or June, coming to a crop in October and November, and upon clay and heavy land they make a very valuable crop, especially on soils that do not grow Turnips and Swedes well, as they come in for the stock till nearly Christmas, and they are also good for lambs in the spring; and the stock generally thrives upon them. When grown in this way they take the place of a portion of the Turnip crop in the rotation, and are cut out in time to plant the land with Wheat, and I have seen fine crops of them being planted with it. About one plant per yard is thick enough, if the soil is in good condition and suitable for growing them of great size. It is advisable to plant them in rows of four, as they will repay a little extra trouble in setting out, if you will sow them in the rows, and they will be as well between the rows, for in this and in all root crops the point to be borne in mind is that little profit attends

the growth of roots themselves, but their great advantage is in preparing the soil for corn; and the more you find distance between the roots so much the more of the constituents of the soil are rendered available for the following corn crop, which at last is the paying crop. If, as has been shown in this room, the land naturally produces 15 or 16 bush, per acre every year, and that by taking a crop of roots you can grow the soil quantity (that is, 30 to 32 bush), every other year, and get a crop of roots to pay the expense of cultivation, you must be the gainer, as you save the seed and labour of the alternate crop of corn. If I may here allow to digress a little from my subject, I could mention I have made out an equal quantity struck with self, the result of Mr. Lawes' experiments, as he detailed them to us last year, when he showed that the land planted with Wheat every year produced naturally, without any stimulant, 15 bush, per acre; therefore we may take it as a fact that the atmosphere brought suit plant food of the soil into an available state for that amount of corn. With the simple employment of stimulants (nitrate of soda), he raised the crop half as much again; but, if he could spare one of his plots, he would confer immense advantage upon us if he would cultivate it perfectly, bringing fresh soil to the surface every two or three years, and only plant the corn upon it every other year for a series of years, and my belief is that he would then without any application of manure grow just as many bush every other year on that plot as he does on the unmanured soil. The subject of the soil being brought into many minds whether the present system of growing root or fallow crops every alternate year is not wrong, it would either tend to confirm that doubt or it would show (as I believe it would) that it is the right system, although it is not so much the growth of roots that confers the benefit as the opportunity afforded, and generally carried out, of thoroughly working and pulverising the soil; for we know, from analysis, that there is in most soils sufficient mineral matter to last for thousands of years, but the difficulty is to get the mineral matter to the surface, and this can be done by cultivation alone it will teach us to work our land with this object in view during the spring and summer, and not to undo all our work by treading and poaching the land (especially heavy land) with sheep, &c., and thereby throwing it back. The Ox-Cabbage is not so nutritious as the earlier and smaller kinds, but as a crop, they are valuable, and with a little attention may be grown with profit in all sorts of odd corners of the farm.

[Mr. CADLE then quoted a number of letters received from practical Cabbage growers in different parts of the country. These we shall give next week.]

Kohl Rabi is a variety of Cabbage that I will just mention in order to give any member who has had any experience of its growth an opportunity of giving us the benefit of that experience. For myself I have never grown any, and they do not seem to command so much favour in the West and North as in the East and South, and this is probably accounted for, in some measure, by the fact that it is a plant that delights in dry weather, so that a climate with only half the quantity of rain we have seems best adapted to it. This accounts for the fine specimens to be seen last autumn at our agricultural shows. It seems to be well adapted for the heavy retentive class of soils better than the Turnip, as, the bulb being above the ground, the nature of the soil does not interfere with its extending in size. It is planted and cultivated much in the same way as the Ox-Cabbage. Rape, although not strictly of the Cabbage tribe, is also a crop grown a good deal in some districts, and I have always lived in those where no locality has been given to it in growing roots, and therefore have only grown Rape as a catch crop, but I name it in case any member may be prepared to say anything about it.

Farmers' Clubs.

BLANDFORD.

The Science and Practice of Sowing.—At a lecture delivered some time ago before this Club, Professor BUCKMAN said:—

With regard to our crop plants some people entertained the idea that when man was originally placed on the surface of the globe all plants necessary for his existence were put on the earth with him, just ready to his hand, ready to cultivate and work upon. But he entertained a perfectly different opinion. He believed that all our farm plants were derivatives, that by experimental processes they had been derived from wild ones, and that in the inference that the esculents had been derived from cultivation, the forms and varieties gradually increasing and improving.

They would observe the important fact that plants thus derived required cultivation in order to keep them in the position in which they are found. If you had a good plant it was important to pay a deal of attention to its development and growth in order to keep it in its position. With regard to seed it was important that they should have good soil, and did not allow it to grow wild and scattered about the ground; they should adopt something like scientific processes in choosing that kind which they knew was the best for their purpose. Respecting the sowing of it, too, there were certain processes to be observed. They should take care to sow it sufficiently thin, so that one plant should not obtrude upon another; thus they would get those plants which would be the best for the different processes which they adopted. He believed that the chief object was to be careful in producing the cultivated Oat. He had cultivated some of

the wild Oats, and next year he found that they contained seeds; by the process of cultivation he obtained four or five ears of 30 lb. to 40 lb. per bushel. He was soon made aware of this fact when he examined some of the Oats grown under wild circumstances, grown round the Oat ricks—he found that they were not so good as the crop which he had sown. When he went into the market and found Oats 36 lb. and 38 lb. per bushel, he saw that some were thin in the berry, with some hairs at the base, showing that they were not the best kind, but Oats that had degenerated into wild Oats. There was every reason to believe that the wild Oats were the cause of our farms had in a great degree degenerated from the cultivated Oat. The inference was that, inasmuch as wild Oats were capable of being by cultivation, getting the best examples, improved to a cultivated state, so cultivated Oats would degenerate into wild ones. If they sowed Oats of a poor quality on poor land they would find that they would have a poor crop. He deduced, as already stated, this fact: that inasmuch as wild Oats were capable of care and selection, by being put in preparation for cultivation, and growing in the course of years to good cultivated Oats, so good cultivated Oats were capable of degenerating into wild Oats. As a general rule they would find, he urged, that the best seeds would, under all circumstances, be the best for sowing. It was a folly to suppose that filling up the measure would answer the end in view; small specimens produced but small results. It was the same with plants as with animals; if you had not a good sire and dam, you would be quite sure to have small results. He had some specimens of the wild Parsnip, which he put in a new bed; he selected the best seeds, planting them in prepared ground, and instead of having the forked roots, indicating the wild Parsnip, he had the larger esculent, which was at present in cultivation under the name of the Student Parsnip. They must select their roots. Selected roots are of the utmost importance. From all the experiments to which he had referred he concluded that all our garden vegetables, all our cultivated farm plants, were derivatives that they had all been derived from wild processes familiar to every farmer, and which he constantly carried out. The farmer had his change of seed; he got his seed from different localities—these were cultivative processes. His object was to point out the principles upon which those cultivative processes depended.

In the first place, the selection of seed was of the greatest possible importance. They knew very well that when they selected their seed, they endeavoured to get seed of a good quality. They wanted occasionally to change the sort of seed. Why was this? Because if they did not change the sort, if they kept the same place for sowing, they would be neglecting some of the cultivative processes by which the sorts they aimed at had been derived. They wanted not only to change the description of seed, but also to change the soil; they must go from one locality to another. From perpetual changes they obtained better crops. There was ample evidence to show that the cultivative processes must be paid attention to. If this were not done, no good results could be expected.

Next he would call their attention to the quality of the seeds. They all knew that the seeds of all their crops varied very considerably, but they were perhaps not aware of the amount of variation. He had experimented largely with reference to this question, and he had come to the conclusion that a great number of seeds were sold in the market which ought not to be sold, for they did not germinate; they were not a great quantity of weeds. It was of the highest importance to get the seed free of weeds. He had seen samples containing enough weeds to stop all growth. Such samples every right-minded and judicious farmer would repudiate. With regard to Wheat and Barley he had tried some experiments. He had seen samples of seed of which 72 per cent. failed to germinate. He had seen Barley of which 24 per cent. failed. Of some samples in his own neighbourhood the failure was 30 to 30 per cent. Persons sowing seed at the present time sowed in some cases a sack per acre. Now, before sowing they should try to do what he had always himself endeavoured to do—ascertain the germinating power of the seed. He never put into the ground a sample of Wheat or Barley until he had ascertained, if possible, what percentage would come up, how much per cent. would germinate. If it was possible to plan he adopted was to take a small flower-pot and fill it with the soil in, leaving the seeds even; he put say a hundred seeds in. If placed in a hothouse the seeds would come up all the quicker. Thus they would see the amount of germinating power. He had done this frequently. He had made three or four experiments with Barley. He had been much struck by some samples sent to him from the market. He remembered, for instance, receiving a sample of Turnips. It was represented to consist of selected bulbs, and 96 per cent. would, it was said, come up. He tested the germinating power for himself, and found that 26 per cent. would not come up, notwithstanding it was represented that 96 per cent. would be the yield. Regarding the quantity of seed to be sown, it must be regulated by various circumstances—not only by the quality of the seed itself, but by the climate, the soil, the kind of cultivation adopted, the forwardness of the work, and

other circumstances which it would be quite idle for him to explain before such a society as that. He would point out to them some experiments which he had made in his own district. When he entered upon his farm his neighbours questioned the expediency of using superphosphates and artificial manures; they thought that it was no use for him to try them. He, however, adopted his own course, and the result was that persons were now using some of those appliances which before they would not use because, as they imagined, of their intility. He did not think he had farmed to much profit; he had, however, endeavoured to effect and carry on improvements, to make certain experiments connected with the science of agriculture, and that was as much as should be expected from a young farmer like himself. He had determined to try experiments with regard to seedling. He had a superior manure—must not call him a baillif, because that was too swell a name. He found, respecting Barley, that his man was using for seed a sack of Barley per acre. He said to him, "That is too much. Suppose you take a tumbler, and put three Potatoes in it; you will find them too thick; or if you take a thimble, and sow three or four Barley corns in it, you will find them too thick." He showed him this with regard to the sack of Barley per acre he was doing pretty much the same thing. He, however, was at that time in a fresh district, and he had always respect for men acquainted with the district.

He was told that a sack per acre was not too much, and that his neighbour was sowing a sack and a half, which really proved to be the case. It was remarked: "If you don't put it in, sir, you cannot expect to get it out." In 1864 he tried the experiment of 4 bush of Barley; in the following year he tried 3, and he had a good crop—he thought quite as good as that produced by the 4 bush; probably better. In 1866 he again tried 3 bush, with the same satisfactory result. In 1867 he tried 2 bush, and in 1868 the same quantity, with favourable results. These experiments proved to him the advantages of thin sowing. He sowed in one part of the ground 6 pecks, and in another 4 bush; they were sown in the same field, and the circumstances were the same. As far as he had from the 4 pecks the most magnificent Barley. The result of the whole experiments tended to show that, the thinner the sowing, the better were the samples produced; and an improvement in the quality of the produce, with a saving in the amount of seed, surely seemed desirable. He recommended them to make these observations for themselves. They should record the germinating power of their various seeds; the dates at which they were sown, the dates at which they came up.

Offering some remarks by way of conclusion, the learned lecturer said he had endeavoured to point out certain principles from which certain facts might be deduced. He believed that the plants to which he had referred were derivatives. He had tried to show them the advantages of thin sowing where circumstances admitted it; if plants were so thickly sown, you never get anything like the crop you would otherwise have. A specimen of Wheat was on one occasion submitted to him for examination, when he observed that it was "smothered out by weeds;" or, in other words, that three or four times as much seed as was necessary had been sown—the greatest weed in a Wheat field, as was once well observed, being the Wheat itself. He found, he said, that he could grow Oats on his light soil with a good deal of success. The matter about the secure success, he must sow half the quantity usually sown, and the best seed could procure. He did not look at seed that did not weigh 45 lb. to the bushel; he had seen seed 48 lb. to the bushel. If he sowed light samples he had a perfect failure. He had concluded from all the experiments he had performed that, after all, the best seed they could get was the cheapest and was under any circumstances the matter about the price—the best, the plumpest seed could buy, was the best developed, the highest cultivated.

MORAYSHIRE.

The Breeding of Horses.—At the last quarterly meeting of this Club, the Chairman announced the following question for discussion—"In the breeding of farm horses, what is the opinion of members as to the best time for mares to foal; and whether it is more profitable for the Morayshire farmer to breed the horses required for his farm, or to buy them?"

Mr. ROBERT BRUCE, Newton of Struthers, thought from May 1 to the proper time to have foals in Morayshire. He believed many men in the county the Club would agree with him in saying that they had often felt inconvenience in Morayshire by the horses that travel the county leaving far too early. If they looked at the principal horse-breeding counties, such as Ayrshire, they would find that the time the mares foaled was the month of June. There were a great many reasons, which everybody connected with farming would know, why they should come sooner than the month of June. As to the other part of the question, he agreed with Mr. MacBey. On farms of from 300 to 400 acres, it was more profitable to raise horses than to buy them.

Mr. HARRIS, of Earnhill, said on the first part of the question he had no experience, but they must refer

to the most celebrated horse-breeding districts, where he found they entirely abandoned the practice prevalent in this county, and had their foals falling in June, long after the ordinary time for foaling in Morayshire had elapsed. A notable instance illustrative of this occurred some years ago, when a horse was brought to Morayshire at a very considerable expense, and broke down and was useless to them. That horse was sent back to his breeder, and his cover covered a number of mares with fruitful results, after they in Morayshire thought they had done with him. He did not think, on the whole, that Morayshire was a horse-breeding county; he did not think they could breed horses profitably. They had an exceedingly diversified soil, but still the prevailing character of the land was light, and consequently was not the kind of thing to give a horse a good understanding—that was to say, good feet. Another thing would show Morayshire not to be a good horse-breeding county, namely, that it was an excellent feeding county for cattle. When beef was 8d. and 9d. per lb. he thought they could rear cattle more profitably than horseflesh. Take a 3 or 4-year-old horse, and from £35 to £55 was the highest price one would get for it. What was a 2-year-old ox worth? Why, they reared him in one-half the time, with one-half the attention, and with one-half the risk, and got from £20 to £25 for him. Therefore, as to the question how they were to economise and bring the greatest value out of their feeding roots and stuffs, he thought they would do better to put them into beef than into horseflesh. He knew many men who bred horses said, that a horse bred on the farm had a better constitution, and seemed to work better on that farm than an imported animal; but still, balancing everything, and taking into account the valuable feeding properties of their roots, he did not think they should breed their horses in Morayshire.

Mr. WALKER, Altyre, agreed generally with Mr. Harris. He knew that, in southern counties, where they bred fine horses, they had their foals coming into season at such a time that they got through with their Turnips and heavy work before the mares were laid aside. He had observed that the horses bred in that way, though they might not be so good as foals, by the time they were a year old, came to be as good as earlier foals. As to the second part of the question, he could not speak, because, during his experience of Morayshire, he had not had any facilities for breeding good horses; they had had little to do in the county, and getting good sires to breed from; few good horses had been in the county to breed from; and he thought that was a question that should have come in along with this discussion. However, upon large farms where there was a good deal of keep that could not be better turned to account, if one had good mares and good horses to breed from, they could breed animals that would sell better to farmer's work, and give greater satisfaction than horses got in the market. It was well-known fact that people never sold horses without some very good reason for disposing of their property. They might buy a good young horse, but seldom a good old horse in a market.

Mr. LEITCH, Instally, said this Club had been rather lax on the question of breeding horses. They were not able, as in other countries, to give £40 or £50 premiums for bringing horses into the district; but he thought the Club could make a point of guaranteeing a certain number of mares to the best horse in the county at a price that would pay. They could guarantee, say 80 mares, at 25s. each, and that would be an inducement to bring in a good horse. It was not the number of mares a horse covered that spoiled him; it was the distance he had to go to make up his season that destroyed him. He bred as many horses as any man in the county, and he differed from Mr. Harris in saying that it would not pay. There were a great many people went upon the principle of taking a foal out of a mare when she was old, and done with for work. If they did not breed from good mares, they could not expect good foals. He had sold foals at from 20 to 50 guineas, and he had seen 3-year-old horses at from 20 to 80 gu. He had sold one as high as 100 gu.; and he would like to know if prices like these did not pay as well as any stock could? The mistake lay in their not selecting good horses. If they would guarantee a horse a certain number of mares, say 80, at 25s. each, which would give £200, there might be some inducement to bring in a good horse.

Mr. HUNTER, Dipple, said: Considering the great expense and trouble they were at in bringing up foals, he thought if they could secure the services of the mare, and afterwards give the foal a considerably shorter, but more constant, time with the mother, they would secure the same result as if the mare had been dropped earlier in the season, and only got chances of going now and again to its mother. If they had really good mares, and could secure a good Clydesdale horse, he thought it would pay to breed a few of them on a large farm. Where there was outlying marshy ground, they could be fed at little expense; but, if they had to be fed on good arable land, he did not think it would pay. He thought Mr. Harris was right when he said that, with beef selling at such a price as it is now, beef must pay better than horseflesh could do.

Notices of Books.

The Fortnightly Review, April 1. Chapman & Hall, 193, Piccadilly.

We refer to the current number of this periodical that we may direct our readers to the very interesting article in its pages on the Land Question, by Mr. C. Wren Hoskyns, M.P., who, with as much point and originality of illustration as ever, makes another effort to inform and to direct public opinion on this very important subject. The argument for and against the existing state of things as regards the large extent of land properties, and the consequent small proportion of the nation (less than one per cent.) who are landowners, is stated shortly thus. On the one side it is declared—

"That experience has shown that land can be farmed on a large scale at less cost per acre, through the use of an improved class of implements, the substitution of machinery for manual labour, the fewer homesteads and farm buildings required, larger enclosures, and other savings of expense; of like character so as to leave a larger net profit than on a small one; that here the political economist is plainly out of court, and must relinquish his theory of distribution so far as land is concerned; that the *petite culture* so much applauded by the utopian economists is a delusion, and that the capital of the yeoman, whose loss is so loudly and poetically bewailed by many, can be employed more profitably in the tenancy of a larger acreage than in the purchase, or retention, of a small one; that this, in fact, will mean the overthrow of the present landlordism, and absorption into the larger demesnes; that the much lauded peasant proprietors of Belgium, Switzerland, Bavaria, France, and latterly of Prussia and Austria, lead a wretched life of persevering but misapplied toil, and of horse-industry, and that the only way to improve the condition of the peasant is to give him the means, and efforts to add to their holdings, produce a penurious mode of living—a sort of land mania; that the wealth of England is so great that her limited territory must be regarded rather as the pleasure-ground of the rich than as a field of bargain and sale; a miserable system of property, less for the people, and more for the aristocracy, which, though raising a larger gross produce, does so at a greater relative expenditure of time and labour, which could be employed to more advantage in other pursuits; that, consequently, the plea for a wide and sufficient outlet for the surplus produce of the land is a backward instead of an advanced movement in economic science, practically refuted by our manufacturing system, where the saving of labour by machinery developed wealth, and employed far more hands than it displaced; that, as to the abolition of the fictitious distinction of real and personal property, such proposals, however seemingly plausible, are not intended to rest there, but are, in reality, the thin end of the wedge for the breaking up of estates; in fact, the *amorcelement* of the Code Napoléon, and aimed, as that avowedly was, at the destruction of the aristocracy.

To this the political economist rejoins, that the comparative advantage of large and small farms is an agricultural question, totally irrelevant to that of the unrestricted freedom of property in the land, and that the only occasioning as it does a general substitution of tenancy for ownership on a scale unknown to other European countries, postpones the fair trial of that issue, by reducing the comparison to the special condition of the more superficial and less permanent investment in that soil; that tenant-farming is a particular mode of conducting cultivation so as to obtain the largest net return, in the shortest time, at the least cost, and with the least investment of fixed capital; that this system may be found more successful on a large scale, and more profitable, but far more important trial of the same issue made under the condition of absolute ownership—just as in a race, where the swiftest horse might win a single heat, yet, for want of bone and staying qualities, would be distanced in the second or third. The state of cultivation, and value of land, in the Isles of Wight and Jersey, respectively, are cited in illustration, as offering a remarkable comparison of the opposite systems.* With respect to the thin-end-of-the-wedge argument, the economist instances the recent land reform movement in Russia—the *zemle-reforma*—the aristocratic and monarchical States of Europe,—to comfort his opponent's apprehension on that score, in case he should reject the axiom that of all conservative influences the extended proprietorship of land, a real stake in the country, is the only one that will stand the test of time. He then states the freed proprietorship has not interfered with the existence of farms, and the examples of spirited cultivation which they occasionally present."

With this extract, which states the controversy so fairly and so vividly, we refer our readers to the bright and lively pages of the essay in the Review.

Farm Memoranda.

FARMING IN THE NEW FOREST.—There are very contradictory opinions expressed as to whether the land of the Forest would pay for tillage. Mr. Thomas Hill, who has farmed for some years on the borders of

* "The most remarkable statistics come from the Channel Islands, where a land system prevails that distributes the land among a large number of small owners, who are happy and in perfect comfort to the square mile (Belgium, the most densely populated country in Europe, has only 160 acres of land when it is taken to the acre). The Isle of Wight, with 86,000 acres of land, has a population of 55,362, and scarcely any shipping or commerce; while Jersey, with only 28,000 acres, has one-third the population, and a population of 25,000, and 55,000 tons of local shipping, carrying on trade and commerce with the whole world."—"Our Uncultivated Lands," *Fortnightly Review*.

the Forest, writes in reply to some questions: "I do not think the Forest would pay to cultivate, except where the timber and the Furze grow, as most of the soil has been taken away for turf, but much of the heath land might grow Scotch fir." He adds: "The expense of grubbing the Furze would be £4 10s, the timber £6 10s, or, more, draining £4 10s, chalking or marling about £6, tillage and manures £4 10s, besides fencing, iron buildings, and cottages.

Mr. Dickinson, on the other hand, who has farmed at New Park and Burley Lodge since the land has been no longer required for the purpose of growing hay, &c., for the deer during the winter, entertains the most favourable opinions as to its agricultural capabilities. His opinions are derived from the results he has obtained at New Park and Burley Lodge, which he rents from the Crown. Mr. Dickinson, however, confesses that outside his own farms his observations of the New Forest have been mostly confined to the district around him. It is well-known that he has been particularly at New Park, some extraordinary roots and other green crops, particularly Italian Ryegrass, as well as grain; and it is equally well-known that the means he has put in force in raising them have been exercised with no lavish hand. The rent paid by Mr. Dickinson to the Crown amounts to £816 per annum, which, however, includes the interest of money expended in a steam engine, iron pipes for sewage, or rather manuring, irrigation, and the erection of some excellent buildings, and the maintenance of the formerly occupied by the chief officer in the Forest is included, it must be acknowledged that the rent is no doubt a just one. Moreover, it was open to public competition, and it was fairly taken. Mr. Dickinson is deserving of great credit for the spirited manner in which he has carried on the farm. Some 30 acres of the land at New Park are under the influence of sub-irrigation, the material for which is supplied by the drainage from the extensive cattle-sheds and stables, and is distributed through the iron pipes by means of the steam-engine, diluted by water from the stream which, coming from the centre of the Forest, passes through Burley Lodge and New Park on its passage to Brockenhurst and Lymington. It must not be forgotten that a good portion of the New Park Farm has been under cultivation for many years, but, for want of the same liberal expenditure, with nothing like the results that are now to be seen. It must also be borne in mind that the whole division of the New Park belongs to the most favourable for cultivation of any land in the Forest, viz., the fluviomarine, whilst the smaller farm at Burley Lodge is situated on the Barton Clay, the second best formation; and on these strata most of the Forest woodlands are found. With these facts before us, we are of opinion that whilst it would be absurd to adduce these farms as a sample of the whole of the Forest, or even as a specimen of the large scale, yet the great success which has there attended cultivation speaks strongly in favour of the climate of the Forest, and the natural capabilities of a large portion of its soil; and, I may add, affords a strong argument in favour of its more extended cultivation. It is in vain to point at the liberal appliances which are at the command of a wealthy man, for no one presumes that any portion of the Forest would pay for cultivation unless it was supplemented by liberal manuring and spirited treatment. There is one strong argument in favour of the Forest, viz., that, from experience, that is, at the smaller farm at Burley Lodge, consisting of 160 acres, only 60 acres were cultivated when he took the farm; the remaining 100 acres he has broken up himself, and with most favourable results. In the absence of other examples, with the exception of isolated spots and cottagers' gardens, I may be excused for directing special notice to this, the largest example of Forest land being brought into cultivation during the present century. Subjoined is a commentary from Mr. Dickinson received a short time since, in which he says:—

"The farm I hold here is 270 acres, and it is said that it has been cultivated many years, and ought to be the productive. You have seen the produce of it on several occasions, and know as much about it as I can tell you. I have another farm, 160 acres (Burley Lodge), 4 miles off. About 200 acres of this was forest land, growing Furze, Fern, and, in the winter, the growth of the Forest. The 200 acres I cleared, and have grown all good crops of every thing as I desire. The Carrots this year got the second prize at Birmingham; they were certainly the finest I ever saw. I will answer your questions about the acres not brought in. I do not think I can give you a very reliable opinion upon it. My journey to the Forest has been principally been from New Park to Burley Lodge and back. So far as I have observed, every portion of this is capable of being cultivated, and of producing good crops of all kinds of grain, roots, and grass. There is some land between Burley Lodge and Ringwood I have passed over a few times of indifferent quality—boggy; that would be rather more costly to cultivate, and not so productive; but I have an opinion that, if properly handled, it might be made to irrigate all that adjoining; and there is the first description of moribund land, and a good deal of it. The Forest has the most wonderful effect in stimulating the growth of grain and grasses.

"The cattle would well upon the Forest from May until August 1st; but the value is entirely out of the question, but if your animals are of a kind to make flesh, they do not at all matter. I am sure it is a good deal of keeping I cannot give you any intimation of. A few rides through the Forest would convince you of the

quality of the land. Thistles grow not unusually 6 feet high; Fern nearly as high; Oaks as straight as a ladder-pole, any length you would like to have them. It makes no difference to me what is done with the Forest, but I think it a scandal that such a tract of land should be unproductive, and that men should be driven away, or be obliged to do what they ought not, to get a living during the winter."

Mr. W. C. Spooner, in the *Journal of the Royal Agricultural Society*.

The Week's Work.

APRIL 8.—*Sainfoin*, if not sown, should now be got into the ground, as directed last month. The crop is natural to calcareous soils, and in such luxuriates when almost nothing else will grow to cover the ground. On dry Clover-sick soils it is sometimes successfully sown instead of Clover, but it is not so well adapted for growing along with Ryegrass for a hay crop as Clover, as the growth of any kind of grass is obnoxious to it. When grown as a forage plant, for soiling or for hay, it should be sown alone, and grown in drills, to permit of the land being hoed and kept perfectly free from weeds. If sown broadcast, the land must be weeded by hand. *Sainfoin* is a great consumer of lime and potash, and when these are naturally deficient in the soil in an available form, they may be drilled in along with the seed, or they could be applied as a top-dressing towards the close of the month, at the rate of from 2 to 3 cwt. of gypsum, and 2 cwt. of muriate of potash per acre, in moist weather.

Burnet is also natural to chalky downs and poor calcareous soils, and when the latter become Clover-sick it may be sown along with Ryegrass and other grasses. The crop stands the winter frost well, and when it covers the ground in autumn, the "rowen," as it is technically termed in some places, forms excellent food for sheep in early spring. *Burnet* was highly recommended by Mr. Gamp, as the best of the winter sown crops grown as spring forage for sheep than at the present day. But, although its cultivation is thus on the decline, from the greater breadth of roots grown, its peculiar merits and adaptation to certain soils should not be lost sight of. For a clean crop a bushel of seed is sown per acre, and 8 to 10 lb. as a mixture with grasses. It is sometimes sown half-and-half with Chicory, from 6 lb. to 7 lb. each per acre.

"*Flax*," according to the old rule, "should be sown when the season comes, as it is March, April, or May." The current season is favourable for getting the crop into the ground. It requires a comparatively dry and finely pulverised seed-bed, in order to get the seed evenly harrowed in, and the crop to grow uniformly of equal length and thickness, purposely to secure the finest quality of fibre; otherwise, if the crop is unequal, the quality will be inferior. To effect a fine seed-bed, the land should be well smashed, so as to retain the winter-made mould on the surface, and to prevent which the harrow brings to the surface should be carefully hand-picked off. Steam is far preferable to horses, as the pitting of the land with the horses' feet is very objectionable. To avoid this pitting, we have made the horses walk in the furrows or outcassings, the harrows being attached to a long yoke the breadth of the ridge; and at the time of pulling, if the Flax in the furrows was not fit for being mixed with that on the ridge, it was kept separate, as the manufacturer is apt to take the advantage of coarse fibre, and unduly reduce the price. Even when the crop is grown purposely for coarse fibre, it must be grown uniform in length and thickness. The seed should be fresh and free from Dodder, with which it is liable to be infested. For fine Flax, 5 pecks per acre are sown broadcast; and for coarse Flax about 3 pecks.

Gorse, if not sown, should now be sown, as directed last month. The crop cannot be grown with advantage at a greater elevation than from 800 to 900 feet above sea level, but below that it may be grown more extensively than it is on mountain sheep-farms. Some prefer the upright smooth or non-prickly variety, which grows more luxuriantly in many places than the common sort, and, being without prickles, it requires very little or no bruising for milch cows. This variety of *Gorse* is propagated both by seed and cuttings of young shoots—planted at this season. When grown as a forage crop, from 20 lb. to 24 lb. of seed are required per acre; for fence and shelter, according to the breadth and distance between. When sown for winter seed it is required, but the quantity depends very much upon soil quality.

Cabbage Seed drill for thinning out as Turnips, thereby avoiding transplanting. The land should be deeply cultivated and well manured in the autumn. The Cabbage plant is a larger consumer of potash than is provided in farmyard manure, and therefore about 3 cwt. of muriate of potash, with an equal weight of superphosphate and of rough salt, with from 2 to 3 cwt. of guano or its equivalent should be added to the tons of farmyard manure per acre. This may be thought heavy manuring by those who only give half the quantity, but it must be borne in mind that the larger the Drumheads grow the more food they require.

Hop Gardens.—Pole as soon as the bines begin to

rise rapidly, as they will now do in sheltered and forward situations. Of late the horizontal method of training the bine to wooden bars or galvanised wires, (as illustrated, figs. 28 and 29, p. 116), is being preferred to the old plan. Keep plantations and nursery beds free from seeds.

Spring Following for root crops attend to. Where manured in autumn the land requires little until the time of sowing, but when the work has to be done at this season the sooner it is performed for Mangel Wurzel the better. Some, however, prefer manuring and seeding at the same time. Much depends upon the weather, the manure, and the land. Very dry soils when manured just now retain more sap for braiding in May and June than when manured during the more drying weather of the latter periods. Much, too, depends upon the climate of the district; for in some moist climates of the west and in Ireland no difficulty is experienced, comparatively speaking, in getting the ground covered with healthy root crops. But whether the land is manured now or afterwards, the sooner it is ready the better, for working the land in the drying weather of next month is undesirable.

Plowing and Burning not unfrequently follow *Laity* Day entries in brick up grass land, and no time should be lost in yoking the plough and turning up the sods to the mercy of the weather. Should they be beat down by rain, a stroke of the harrows will raise them up to dry for burning. The ashes should be spread, and the land ploughed immediately with a shallow furrow, and so on.

Stifle Burning is nearly out of date, but there are exceptions to every rule, and the work should now be done—the sooner the better.

Farm Horses should now have a nourishing and cooling diet. The old April rule was a liberal allowance of Carrots, when grown. As much of the field work as possible should be done by steam, as the improved quality of the work done does more than cover the expense of the teams, granting that they are idle. In the absence of steam the current month is a heavy one to the teams, and they require to be cared for accordingly. The backward state of the grass, more especially in late districts, is against broad mares and young stock, consequently more artificial food will be required indoors, and attendance to health.

W. B.

Notices to Correspondents.

DRESSING FOR SAINFOIN: *Samy* asks for the best dressing for *Sainfoin* on a chalk soil. Probably 3 or 4 cwt. of crude potash salts might be of service—that as a contributor to the special wants of soil and plant, and 3 cwt. of guano as a contribution to general fertility.

Markets.

ENGLISH WOOL.

During the last week a fair business has been done, but spinners having stocked themselves pretty freely of late, are not quite so eager to buy at the advanced rates now demanded. We think, however, that when their present stocks are worked up, they will be forced to pay even more, as the supplies of all kinds of English and competing grades of foreign wools are smaller than for many years past.

HOPS.

BOROUGH MARKET, April 5.

Messrs. Patten and Smith report a somewhat improved demand for consumption for healthy grown samples, late quotations being maintained. The supply of choice Hops is very limited. Good Americans (1870) command a ready sale, but other foreign Hops are neglected.

HAY.—Per Load of 36 Trusses.

SMITHFIELD, Thursday, April 4.

Prime Meadow Hay, 130s. 10s. 17s.	... ..	135s.	142s.
Prime Meadow Hay, 120s. 10s. 17s.	... ..	130s.	126s.
New Hay .. ..	... ..	126s.	135s.
Straw .. ..	... ..	100s.	100s.
Straw .. ..	... ..	90s.	4s.

CUMBERLAND MARKET, Thursday, April 4.

Sup. Meadow Hay, 131s. 10s. 14s.	... ..	115s.	10s. 130s.
Prime cut do. .. ..	... ..	120s.	120s.
New do. .. ..	... ..	120s.	120s.
Straw .. ..	... ..	42s.	42s.
Superior Clover, 138s. 144s.	... ..	138s.	144s.

JOSHUA BAKER.

COALS.—April 4.

Hastings Hartley, 15s.; Holywell Main, 15s.; Tanfield Moor, 14s.; West Hartley, 15s.; Eden Main, 15s.; 6d.; Walls End Elliot, 15s. 6d.; Walls End Hutton, 15s.; Walls End Hutton Lyons, 15s. 6d.; Walls End, 15s.; 17s. 6d.—Ships at market, 55s. sold, 41s. unsold, 11s. at sea, 10s.

METROPOLITAN CATTLE MARKET.

MONDAY, April 3.

The supply of Beasts is again short, and the demand is good, consequently prices are rather higher for choicest descriptions. The number of Sheep is about the same as last week; choice qualities are very scarce, and are sold dear. Choice Lambs and Calves are also scarce, and

£2 16s. 6d., carriage paid.
22, Dorset Street, Baker Street, London.

Caro, Esq.	1	1	0
Caro, Esq.	1	1	0
Caro, Esq.	1	0	0
Caro, Esq.	32	13	6
	<hr/>		
£139	1	10	

FRENCH PEASANT-FARMERS' SEED FUND.

LIST OF SUBSCRIPTIONS—Continued.

Per W. Godley, Esq., Messrs. Mirk, 1 0 0 Miss Fetherston Collection in Chapel, Llathymmar, per Rev. Owen Evans, 1 14 7 Collection in Kirtton Church, per Rev. Granville Smith, 2 9 7 Corn Exchange Committee, 3d list. Amount previously advertised, 960 15 10 M. A. A., 1 1 0 Sanders, Esq., 2 0 0 T. A. du Croix, Esq., 5 0 0 S. Cornish, Esq., 5 0 0 S. W. Allen, Esq., 2 2 0 J. No. Aldridge, Esq., 1 1 0	A Friend, per H. Tre- thevy, Esq., 1 0 0 Offering in Whalton Plumtree, per Rev. W. The Guardians of Tod- morden Union, per J. Stansfield, Esq., 12 2 0 Thos. Sheldon, Esq., 2 0 0 Per W. H. Morrison, Esq., 1 1 0 Mr. and Mrs. J. E. Kaye W. H. Morrison, Esq., 1 1 0 R. B. Machie, Esq., 1 0 0 J. S. Depledge, Esq., 1 0 0 Per G. Terry, Esq., 1 15 0 Per J. Kaye, Esq., 2 11 6 Per J. Wilcock, Esq., 4 10 0 Sums under £1, 5 19 0	Collection in Actingham Church, per Rev. W. M. Farley, 1 0 0 Amersham Board of Guardians, per W. Lowndes, Esq., Chairman: Amersham Parish, H. Bedford, Esq., 1 1 0 E. A. Brickwell, Esq., 1 1 0 W. G. Carpenter, Esq., 1 1 0 J. Cheese, Esq., 1 1 0 W. Crouch, Esq., 1 1 0 E. Hailey, Esq., 1 1 0 Rev. G. Holloway, Esq., 2 0 0 T. Marshall, Esq., 1 1 0 Messrs. Welser, 3 0 0 Sums under £1, 6 1 6	Chalfont St. Giles Parish: T. N. Allen, Esq., 1 0 0 Mrs. Anthony, 1 1 0 C. H. Fern, Esq., 1 1 0 J. Gurney, Esq., 1 1 0 Mrs. T. C. Haden, 1 1 0 Mrs. Morten, 2 0 0 G. K. Priestly, Esq., 5 0 0 A. Turner, Esq., 1 1 0 Sums under £1, 15 0 0	Chesham Parish: W. Lowndes, Esq., 1 3 3 0 Colleshill Parish: J. Coleman, Esq., 1 1 0 Great Missenden Parish: G. Bong, Esq., 1 1 0 W. Callow, Esq., 1 1 0 S. Carter, Esq., 2 2 0 W. Child, Esq., 1 1 0 R. Child, Esq., 1 1 0 G. Darvell, Esq., 1 1 0 S. Hayward, Esq., 1 1 0 Rev. J. Greaves, 1 1 0 T. Honner, Esq., 1 1 0 S. Percy, Esq., 1 1 0 F. C. Rickards, 1 1 0 Rev. Lord W. J. Russell, 1 1 0 Wilson, Esq., 1 1 0 Sums under £1, 3 1 0	Pen Parish: T. B. Grove, Esq. (ad donation), 1 1 0 Sums under £1, 6 10 0	The Most Noble Marquis of Exeter (ad donation), 25 0 0 Baillif, Servants, 1 1 0 Farm Labourers on Marquis of Exeter's Estates, per J. A. Walton, Esq., 6 14 0
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Money Subscriptions will be received, and promises of Donations of Corn and other Seeds will be registered by

B. T. BRANDRITH GIBBS, } Hon. Secs.
H. M. JENKINS,
W. H. DELANO,

Salisbury Hotel, Salisbury Square, London, E.C.

Donations of Corn and other Seeds should be forwarded, addressed to the Secretaries, care of JAMES ODAMS, Esq., Plaistow Wharf, Victoria Dock, E.
Subscriptions may also be remitted to the account of the "French Peasant-Farmers' Seed Fund," JAMES HOWARD, Esq., M.P., Treasurer, at the Head Office and Branches of the London and County Bank.

The Great Western and the Great Eastern Railway Companies have liberally promised to convey over their lines, en route to Plaistow Wharf, any donations in kind bearing the label of the French Peasant-Farmers' Seed Fund, which will be supplied upon application to the Honorary Secretaries, whilst a certain amount of tonnage will be carried free to a port in France by the South-Eastern, London, Chatham, and Dover, London and South-Western, and London, Brighton, and South Coast Railway Companies.

WINDOW GLASS, SHEET LEAD, PAINTS, &c.

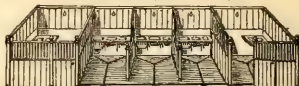
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BARTON'S PATENT STABLE HARNESS
ROOM FITTINGS, BRACKETS, &c



Patronised by H.H. the Viceroy of Egypt, the King of the Belgians, the King of Italy, the King of Holland, by the principal Nobility of the Kingdom, and adopted by the first Architects and Builders of the Kingdom and the Continent. Illustrated Catalogues sent on receipt of six stamps.

For ALTERATION of STABLES a competent person can be sent to any part, to inspect and give Estimates.
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THE "ARCHIMEDEAN" AMERICAN LAWN MOWER.

The only Lawn Mower that Cuts Wet or Long Grass
(as well as dry) without Clogging,

Leaving the Cuttings in small particles, evenly scattered, never looking untidy, serving as a Mulch to Protect the Roots from Heat and Drought, and Fertilising the Sod, which cannot fail to invigorate and beautify the Lawn. Perfectly adapted to SLOPES, UNDULATING LAWNS, RIDGES and VALLEYS; and for the CROQUET GROUND is invaluable.

NOTICE.—GREAT REDUCTION IN PRICES for 1871.—We have great pleasure in stating that owing to the unprecedented success our "Archimedeian" Lawn Mower met with last year, we have increased our facilities for manufacturing, and notwithstanding that several important improvements have been made in the machine, yet we have made a large Reduction in Prices for 1871.

"Far superior to any of ours."—*Vide The Field.*

"We feel bound to recommend it to our readers as one of the best Mowers we have as yet made acquaintance with."—*Vide Floral World.*

"Remarkably easy to work."—*Vide Gardener's Magazine.*

"The quickest, most simple, and most efficient Mower ever used."—*Vide Gardener's Chronicle.*

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12 Gallons .. £3 0 0
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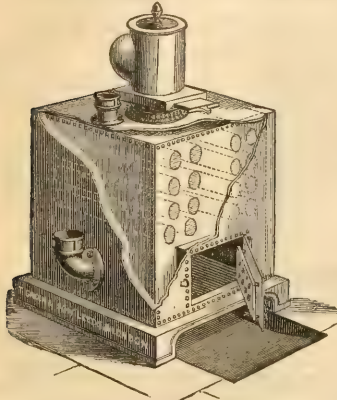
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Manure, £2 16s. 6d. Two-inch
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 3. They take up little room, and can be put in places inaccessible to other boilers.
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 7. The chimney is made of cast-iron, which can either be taken through a roof or turned into a flue, to meet the convenience of the situation they may be placed in.
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 They are warranted to be the most effective and durable boiler ever invented.
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THE BEST, SIMPLEST, AND MOST DURABLE MACHINES.



They leave no ribs in the Grass, and are unsurpassed for keeping a Lawn or Croquet Ground in first-rate order.

They will either Collect the Cut Grass in the box according to the approved English method, or leave it on the lawn, by taking the box off. They are fitted with the best wheel gearing, the best steel-edged knives, and hardened steel pivots and bearings.

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PORTABLE ENGINES, from 4 to 30-Horse Power.

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PATENT ROLLED STEEL RIBBED BEATER PLATES (Gray's Patent).

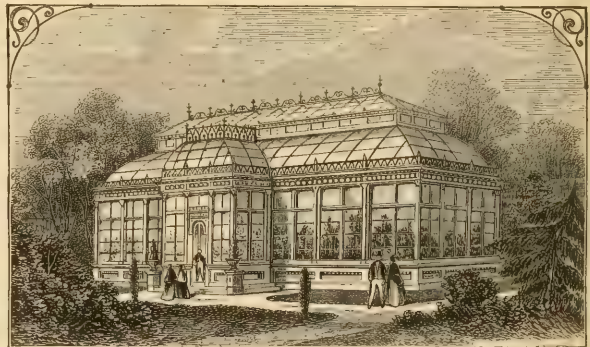


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These Plates have been thoroughly tested, and are found to wear more than three times as long as the Malleable Iron Plates previously in use. C AND S are prepared to supply Threshing Machine Owners and the Trade in any quantity; and they would caution purchasers against spurious imitations in Cast-steel, which, from their brittleness, are exceedingly dangerous to use. CAUTION.—Infringers of this Patent, whether makers or users, will be immediately prosecuted. A Free by Post on application to

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NEW OVAL TUBULAR BOILER.

Acknowledged by practical judges to be a great improvement on every form of Tubular Boiler yet introduced. It has proved itself superior to all other Boilers for quickness of action and economy of Fuel, doing its work with one-third less the amount required by any other.

Extract from Report in GARDENERS' CHRONICLE of International Exhibition, May 24, 1862, page 476.

"The upright form of Boiler is usually made on a circular plan, rather than a square, it seems feasible that the Boilers on the oval but the oval form given to Mr. GRAY's variety of it is said to be burning fuel, and this being so, the change, though a slight one, with the fire. The usual form of a furnace being a parallelogram is no doubt an improvement."

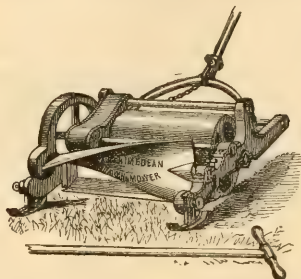
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LATEST IMPROVEMENTS.

REDUCED PRICES



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12-inch, " a Lady or a Boy	4	0	0
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DELIVERED CARRIAGE FREE TO ALL RAILWAY STATIONS IN THE UNITED KINGDOM.

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THE MOWER IS WARRANTED TO GIVE SATISFACTION,

And if not approved of may be returned within a month and Exchanged for a Machine by any other maker, or the amount will be refunded.

The very great success which attended the Sale of the "Archimedeon" during the past season, encourages the Advertisers again to draw the attention of the Horticultural Public to this most useful invention. During the recess some improvements have been made in points of detail which add materially to the efficiency of the Machine. It can now with confidence be recommended as the Simplest, Strongest, and Lightest Lawn Mower yet produced.

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"We feel bound to recommend it to our readers as one of the best mowers we have as yet made acquaintance with."—*Vide Floral World.*

From A. F. BARRON, Esq., *Royal Horticultural Society, Chiswick Garden, W.*

"Gentlemen,—We have now had your 'Archimedeon' Lawn Mower in use several months, and without hesitation I can truly say it is the best and most efficient implement of the kind we have ever used."

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"The Rev. PORTESCUE PURVIS begs to acknowledge the receipt of the 'Archimedeon' Lawn Mower forwarded by Messrs. Carson, and to say that on trial it has proved most satisfactory. Mr. Purvis's gardener thinks it far superior to other mowers, especially as regards the ease with which it is worked and managed. Mr. Purvis will certainly recommend it as the most efficient Lawn Mower in use."

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Package included. Terms cash. Post-office Order on Gravesend. Cemetery Nursery, Gravesend.

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OF PLANTS for 1871 is now ready, and may be had on application. It contains the best and most improved varieties of
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PRINCESS LOUISE.—It is of dwarf bushy habit, growing from 6 to 8 inches high. The flower stems are short but stout, and carry the trusses of the above the first selected stock, and are very compact; the blooms, which are larger than those of any other yellow bedding Calceolarias, being closely set together. Colour, pure sulphur-yellow, very effective.
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H. AND S. HARRIS are now enabled to make a special offer of the above Seeds, comprising TURNIP, CABBAGE, CARROT, MANGEL WURZEL, GARDEN PEAS and BEANS, &c., grown from the finest selected stock, and free from adulteration of any kind. They are all harvested in splendid condition. Seed Growing Establishment, Wisbech.

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Seeds. This is the only preventative of bleeding in the Vine.
By Royal Letters Patent.
JAMES GIBBS AND COMPANY, Sole Manufacturers of the AMMONIATED FERTILIZER, GUANO, &c., the cheapest and best Manure in use. Guaranteed to be genuine from the finest qualities of Peruvian Guano, Government Guano as imported, weight for weight and money value the results are superior to Peruvian Guano "Unmixed." Applicable to all crops for which the "Unmixed" Peruvian Guano is used, and many to which it is not usually applied—e.g., Turnip, Mangels, and Potatoes. Warm consumers that none is genuine unless it is so marked, and is secured with a leaden seal.
"PATENT AMMONIATED PHOSPHATE" specially adapted for the Potato.
BEECH, and Hope. Also manufacturers of BONE, BLOOD, and SPENT MANURES of first-rate quality. Particulars of JAMES GIBBS AND COMPANY—Works, Victoria Dock; Offices, 16, Mark Lane, London, E.C. 1 or their authorised Agents.

THE LONDON MANURE COMPANY
(Established 1840), have now ready for delivery, in fine dry condition,
PURE DISSOLVED BONES.
CONCENTRATED AMMONIACAL MANURE, for Top-Dressing.
FURBER'S BONE TURNIP MANURE.
SUPERPHOSPHATE OF LIME.
SUPERPHOSPHATE OF POTASH.
MANGEL, HOP, and POTATO MANURES. Also
PERUVIAN GUANO—Guano of the Vulture, Bonar (E.C.), NITRATE OF SODA, SULPHATE OF AMMONIA, &c.
16, Fenchurch Street, E.C. EDWARD FURBER, Secretary.

MILLER AND JOHNSON
(Established 1855)
Manufacture the highest quality of
ARTIFICIAL MANURES for ROOT, CORN, and GRASS CROPS.
35, Mark Lane, London.

REES AND CO'S BIPHOSPHATED PERUVIAN GUANO (Registered Trade Mark, Flying Albatross), is now ready for delivery in quantity and in fine condition. It is believed to be the best Artificial Manure yet used in the Peruvian Government Guano; it contains at least 20 per cent. of Soluble Phosphates, and 10 per cent. of Ammonia. It is guaranteed to be pure. Voecker, Dr. Anderson, Professor Wey, Mr. Upton, and Mr. Sibson. Delivered in cwt. bags, each of which is secured by a leaden seal, bearing the Albatross Trade Mark. The Works, Victoria Dock; 32, King William Street, London, E.C.

REPORT AND ANALYSIS by DR. A. VOELCKER.
Consulting Chemist to the Royal Agricultural Society of England.
"Analytical Laboratory, 17, Salisbury Square, 17, Fleet Street, E.C. 4."
London, January 15, 1870.

"Sir,—Enclosed you will find the results of a careful analysis of a sample of your Biphosphated Peruvian Guano. These results speak for themselves. I need therefore hardly add anything in commendation of the high fertility of the Guano. The results of the analysis of the samples examined by me contained only 10 per cent. of moisture, and fully the percentages of solid matter and of the elements of preparation. The more generally this Manure will become known to agriculturists, the more it will be appreciated by them.—Believe me, Sir, yours respectfully."
"AUGUSTUS VOELCKER."

"The Secretary, REES AND CO'S Biphosphated Peruvian Guano Company, Limited, 32, King William Street, London, E.C. 4."

JOHN BENNETT LAWES.
Office: 10, Abchurch Lane, London, E.C. 4.
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LAWES' PATENT TURNIP MANURE.
LAWES' DISSOLVED BONE MANURE.
LAWES' SUPERPHOSPHATE OF LIME MANURE.
LAWES' WHEAT, CORN, GRASS, and MANGEL MANURE.
These Manures can be obtained at any of the above addresses, or through any of the appointed Agents throughout the United Kingdom. **PERUVIAN GUANO, NITRATE OF SODA, SULPHATE OF AMMONIA**, and other Chemical Manures, are at market prices.

SALTER'S NEW JAPANESE CHRYSANTHEMUMS

NOW READY.

SALTER'S AND OTHER

NEW CHINESE or LARGE-FLOWED CHRYSANTHEMUMS

NOW READY.

For CATALOGUE, with descriptions and prices, apply to
WILLIAM BULL, F.L.S., ESTABLISHMENT FOR NEW AND RARE PLANTS,
KING'S ROAD, CHELSEA, LONDON, S.W.

AMERICAN POTATOS, JUST IMPORTED.

JAMES CARTER & CO.
Have just received a splendid Consignment of the following POTATOS from America:—
The Early Rose, Bresee's Prolific | Bresee's Peerless,
Bresee's King of the Earlies, Climax.
Prices on application.

JAMES CARTER AND CO., SEED GROWERS, 237 and 238, HIGH HOLBORN, W.C.

NEW PLANTS FOR 1871.

BENJAMIN S. WILLIAMS

Begs to announce that on the 1st of May he will offer to the Public

THE UNDERMENTIONED SPLENDID NOVELTIES.

Adiantum Capillus-Veneris crispulum (Moore).
This is a fine robust form of the species; the fronds are upwards of a foot long, very broad, with large crisp bright green pinnae. It forms a very ornamental plant, and is amongst the most distinct and beautiful of its class; succeeding admirably in the cool fernery.
Price 7s. 6d. each.

Fuchsia Empress of Germany.
Habit of plant compact, branching, and very free blooming; tube and sepals bright waxy-carmin; the latter well reflexed; corolla very double, being made up of broad even petals, which are pure white.
Price 7s. 6d. each.

Fuchsia Harry Williams.
A thoroughly distinct variety; it is a compact growing plant, and a profuse bloomer; tube and sepals deep rich waxy-carmin, the latter well reflexed; corolla very double, formed of even and regular petals, which are intense violet, tinged towards the base with carmin.
Price 7s. 6d. each.

Fuchsia Princess Louise.
An elegant dwarf compact variety; tube and sepals large and well reflexed, rich waxy-carmin; corolla large, single, and pure white, formed of broad even petals of good substance.
Price 7s. 6d. each.

Ixora Prince of Orange.
A very beautiful and valuable addition to this genus. It is of free compact habit, the trusses are large and dense; flowers rich red, tinged with violet towards the centre. This variety is distinct in colour from any of the other kinds, and will become a superb plant for home decoration or public exhibition.
Price 3s. 6d. each.

Ixora Williamsii.
This is a superb free-growing plant, and an abundant bloomer, producing immense fine flowers, which in colour are of a distinct and pleasing reddish-salmon. The profusion of bloom, added to its distinctness of colour, will cause this plant to take first rank amongst the many beautiful forms of this ornamental family.
Price 3s. 6d. each.

Passiflora Inesii.
This superb hybrid Passion-flower is a valuable addition to this exceedingly ornamental genus. The stem is quadrangular, smooth, and narrowly winged. Leaves broadly ovate, about 6 inches long by 5 inches broad; sepals and petals nearly 2 inches long, white, the latter densely dotted with red. The corolla is composed of many rows of long thick filaments, white banded with red at the base, and spotted and mottled with violet above. The flowers are 2½ inches in diameter, petals broad and of good shape, ground colour mauve, with narrow yellow edge, surrounded with circles of violet, radiating from the centre.
Price 2s. 6d. each, 24s. per dozen, 70s. per 50 plants, £5 per 100.

Viola cornuta Enchantress.
The present variety is worthy a place in every garden; it is entirely distinct from any other form, and will become one of the finest plants for spring and summer gardening. It is dense, compact, and free-branching in habit, growing from 4 to 6 inches high, leaves from 2 to 3 inches long. The flowers are 2½ inches in diameter, petals broad and of good shape, ground colour mauve, with narrow yellow edge, surrounded with circles of violet, radiating from the centre.
Price 2s. 6d. each, 24s. per dozen, 70s. per 50 plants, £5 per 100.

Pelargonium Lord of Lorne.
A first-class variety, of free yet compact habit, producing large trusses of very double and regular flowers, which stand well above the foliage, and are deep scarlet shaded with crimson. One of the best of the double-flowered kinds.
Price 7s. 6d. each.

Pteris serrulata corymbifera (Moore).
An extraordinary and very handsome variety of the well-known P. serrulata. It grows some 12 inches high, fronds erect, pinnae all much shortened, forming a dense, crisp, bright green corymbiferous head. This variety is not only the farthest removed from the normal type of the species, but is one of the most handsome Ferns in cultivation, and will become invaluable for general decorative purposes, especially for the Wardian case or dinner-table.
Price 4s. each.

Selaginella rubella (Moore).
This is a very beautiful species, entirely distinct from any other previously introduced. It is a close creeping plant, never becoming erect, but densely covering the ground with its branches and bright dark green leaves. It is eminently adapted for Wardian cases, or for forming edgings to walks in the Store.
Price 10s. 6d. each.

Toxicophis Thunbergii.

After repeated but unsuccessful attempts to introduce this superb Stone flowering plant to our gardens, I am at last enabled to offer it to public notice, and in doing so I have no hesitation in saying it is one of the choicest of modern introductions. It belongs to the family Apocynaceae, and in habit and general appearance very much resembles an Ixora. The leaves are opposite, elliptic, and dark green; the flowers are tubular, with a spreading five-lobed limb, pure white, deliciously fragrant, and produced both in large terminal corymbs and in smaller ones, thus forming a dense raceme of bloom, frequently upwards of a foot in length. It will undoubtedly become as general a favourite as Ixora.
Price 6s. each.

Viola cornuta Enchantress.
The present variety is worthy a place in every garden; it is entirely distinct from any other form, and will become one of the finest plants for spring and summer gardening. It is dense, compact, and free-branching in habit, growing from 4 to 6 inches high, leaves from 2 to 3 inches long. The flowers are 2½ inches in diameter, petals broad and of good shape, ground colour mauve, with narrow yellow edge, surrounded with circles of violet, radiating from the centre.
Price 2s. 6d. each, 24s. per dozen, 70s. per 50 plants, £5 per 100.

NEW PLANTS.

MR. WILLIAM BULL

IS NOW SENDING OUT FOR THE FIRST TIME

ACHIMENES ADMIRATION
ACHIMENES MASTERPIECE
AGAVE BULBOSA
NEW BERTOLONIAS
BIGNONIA ROZILLANA
CAMPSIDUM (TECOMA) VALDIVIANA
DRACONTIUM ELATUM
ERYTHRINA COMPACTA
GASTRONEMA SANGUINEUM FLAMMEUM

GLADIOLUS CRUENTUS
JONIESIA DECLINATA
LIBONIA PENRHOSIENSIS
MACKAYA BELLA
MUSA AFRICANA
MUSA ASSAMICA
SYNGONIUM ALBO-LINEATUM
TACSONIA TOMENTOSA SPECIOSA
TYDÆA DISPLAY

For Descriptions and Prices, *vide* Mr. William Bull's New Catalogue, just issued.

New Coleus.

The following new varieties are now offered for the first time. They are a small selection made from Mr. W. B.'s Seedlings. They are all exceedingly handsome, and will be found to be as desirable as the kinds previously sent out from this establishment.

ARCHETTE
CECILIA
CORINTH
EUSTACE
HERMIT
LILLIA

MIRANA
POLLIS
ROVER
SYRINA
TEMPLAR
VILLETTE

For Prices, *vide* Mr. William Bull's New Catalogue, just issued.

New Fuchsias.

AUTOCRAT
BEACON
BRIGADE
DICTATOR
GRENADIER
LEAH

LEONARD
MONARCH
ORACLE
STANDARD
TREASURE
UMPIRE

For Descriptions and Prices, *vide* Mr. William Bull's New Catalogue, just issued.

New Double-flowered Petunias.

DAWN
ENCOUNTER
GRENADIER
NYPH

PERSUASIVE
RAMBLER
SEBASTIAN
VIVACITY WINNER

For Descriptions and Prices, *vide* Mr. William Bull's New Catalogue, just issued.

New Single-flowered Petunias.

CAPTIVE
EUSTACE
MINNIE
PLAUSIBLE

SOCIAL
TROJAN
VILLETTE
WISDOM
ZELINDA

For Descriptions and Prices, *vide* Mr. William Bull's New Catalogue, just issued.

New Verbenas.

AMBASSADOR
BRIGANTINE
CECILIA
FLAME
RENE
JOY

JUSTICE
VILLETTE
REBECCA
ROVER
TEMPLAR

For Descriptions and Prices, *vide* Mr. William Bull's New Catalogue, just issued.

New Striped Verbenas.

ACME
MAY DAY
PASHA

PHOEBE
SABINA
SYRINA

For Descriptions and Prices, *vide* Mr. William Bull's New Catalogue, just issued.

New Ivy-leaved Pelargoniums.

"Pelargonium latifolius."

Extract from the *Gardeners' Chronicle*:—"Mr. Bull has sent us a very interesting set of blossoms of seedlings of Ivy-leaved Pelargoniums, some of which will be acquisitions for the purposes to which these plants are adapted. They vary in tint from bluish white, through many shades, to deep bright rose blue, and are sometimes marked with a bar or flame outline along the base of the veins of the upper petals, sometimes with a bright spot in addition. We have here an indication that the Ivy-leaved group is likely to become an extensive one—a matter of congratulation, seeing that the plants are useful in many ways for decorative gardening, especially for cultivation in vases and suspended flower baskets."

CASSIDY
FASCINATION
FLORENCE

LURLINE
PERCY
TROPHY

For Descriptions and Prices, *vide* Mr. William Bull's New Catalogue, just issued.

New Double-flowered Zonal Pelargoniums.

Mr. William Bull begs to intimate that he has been fertilising and raising a very large number of the Double-flowered Zonal Pelargoniums, and has been directing attention to this section, from the impression that, ultimately, the double varieties will take a very important part in decorative horticulture, especially for bedding, for cultivating in pots or vases, and also for every use to which cut flowers can be applied.

The principal reason why Double-flowered Pelargoniums will become so popular, is that the blossoms, from their duplicity, do not shed their petals; hence they remain for a long time in flower, and are useful in a variety of ways where the single kinds are almost unserviceable.

ASTEROID
BOUQUET
BRILLIANT
BULLION
COMET
DRAGON

HERONIE
JANTHE
IMPERATOR
MURIEL
PLACIDA
RED CAP

For Descriptions and Prices, *vide* Mr. William Bull's New Catalogue, just issued.

New Golden Tricolor Pelargoniums.

BUTTERFLY
STAR
WELCOME
For Descriptions and Prices, *vide* Mr. William Bull's New Catalogue, just issued.

New Silver Variegated Pelargonium "Silver Ray."

For Description and Price, *vide* Mr. William Bull's New Catalogue, just issued.

New Golden-leaved Bedding Pelargoniums.

ARCHETTE
LINA
For Descriptions and Prices, *vide* Mr. William Bull's New Catalogue, just issued.

New Bronze and Gold Pelargoniums.

AGATHA
BENJUE
BETA
LEONIE
CORINTH
DECIMA
For Descriptions and Prices, *vide* Mr. William Bull's New Catalogue, just issued.

Pelargoniums with Finely Shaped Flowers. Bronze and Gold Section.

The flowers in the Bronze and Gold Section of Pelargoniums have not as yet been remarkable for quality. The following varieties, however, are offered as much for the perfection of their flowers as for the beauty of their foliage. The petals are of thick wax-like substance, and the flowers of excellent symmetrical form, equal to some of the best in the Zonal class, and infinitely superior to anything before offered in the Bronze and Gold Section.

ACUSIL
BOOKWORM
CECY
JANUS
LEONIE
MAYWITCH
META
MONA
ORAN
POMPEY

For Descriptions and Prices, *vide* Mr. William Bull's New Catalogue, just issued.

Pelargoniums with Blossoms of New Colours In the Bronze and Gold Section.

Hitherto the flowers in the Bronze and Gold section of Pelargoniums have rarely been of the ordinary scarlet and carmine colours. The following varieties are offered as a group of pretty light flowers, embracing those beautiful shades of pink, blush, salmon, and rose colour so rare in this class, but which form such an admirable and telling contrast with the richly marked foliage of this highly popular and useful section of Pelargoniums.

ALICIA
BEPEO
CASILDA
ETHEL
JUANITA
LILLIA
MYSTERY
MARCIA
OPAL
PHYLIS
PRISCILLA
ROSEHUE

For Descriptions and Prices, *vide* Mr. William Bull's New Catalogue, just issued.

New Zonal Pelargoniums.

Extract from *Gardeners' Weekly Magazine*:—"Mr. William Bull, of King's Road, Chelsea, has sent out more good Zonal Pelargoniums than any other cultivator in this country."

AGRIPPINA
BOHE
DAY DREAM
DON PASQUALE
GRAND MONARCH
GRAPHIC
IA VIVANDIERE
PEACOCK
ROMOLA
STRICKLANDER
TOURBILLION
VILLETTE

For Descriptions and Prices, *vide* Mr. William Bull's New Catalogue, just issued.

New Nosegay Pelargoniums.

The varieties in this class, from their flowers being produced in huge trusses and in the greatest profusion, are admirably adapted for bedding purposes.

ASTEROID
CRACKER
DEVICE
GIRANDOLE
NORAH
SALVO

For Descriptions and Prices, *vide* Mr. William Bull's New Catalogue, just issued.

New Spotted Pelargoniums.

AMBASSADOR
COMMONER
HARMONY
MAGNATE
PATRICIA
TEMPLAR
For Descriptions and Prices, *vide* Mr. William Bull's New Catalogue, just issued.

New Fancy Pelargoniums.

ANGELIC
ASSEMBLY
BEWITCHING
COMPACT
PLEASANT
PURSUIT
SATIRE
SONNET
VALENTINE
For Descriptions and Prices, *vide* Mr. William Bull's New Catalogue, just issued.

E. C. HENDERSON & SON

RESPECTFULLY OFFER

THE FOLLOWING
NEW BEDDING PLANTS.

AGERATUM, WHITE TOM THUMB.

This fine miniature variety is an exact counterpart to the Ageratum Blue Tom Thumb, sent out by E. C. HENDERSON & SON last year. It forms a remarkably neat growth, from 4 to 6 inches in height.

The dense clusters of white bloom rise above the leaf growth, and forms a conspicuous and beautiful effect in contrast to opposite flower or leaf tints of a chocolate, or dark crimson, violet, or violet-purple, maroon, or marine-blue colour. As a front row plant for ribbon lines or belts, marginal edgings to circular flower-beds, or entire groups for parterres or terrace borders, it will be found the most effective and long-continued white flowering plant in its class yet offered, retaining its verdure and renewing its bloom until late autumn. It is also admirably adapted for pot-culture, as reserve stores for portable effect in succession beds, or summer lawn flower-baskets, &c.

WHITE "IMPERIAL DWARF"
AGERATUM.

This variety is an excellent companion front-row plant to the Blue Imperial Dwarf Ageratum of last season. It forms a neat compact growth, with rich green foliage, and dense terminal clusters of silvery-white bloom above the growth. It is also well adapted for a good second or third row in select ribbon borders, in contrast to back or front lines of opposite colours in Lobelia, Iresine, Alternanthera, or Perilla, and equally suitable for self groups, or for pot culture in reserve stores for succession beds.

Plants of the above Ageratums,
3s. 6d. each.

Can now be forwarded by Post, and in the bedding season at the usual bedding price.

ALTERNANTHERA MAGNIFICA,

1s. each, 9s. per dozen.

Awarded a First-class Certificate by the Royal Horticultural Committee of last season.

FOR THE
BEDDING PANSY

OF THE SEASON,

"QUEEN OF SCOTS,"

See previous Advertisement of April 1.

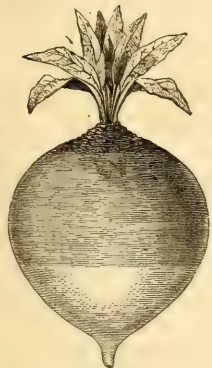
USUAL TRADE ALLOWANCE.

ESTABLISHMENT FOR NEW and RARE PLANTS, KING'S ROAD,
CHELSEA, LONDON, S.W.WELLINGTON NURSERY, ST. JOHN'S
WOOD, LONDON, N.W.

As Supplied to
 **SUTTONS'** 
 HOME-GROWN Prince of Wales
FARM SEEDS,
CARRIAGE FREE.
 SAVED FROM CAREFULLY SELECTED
 TRANSPLANTED BULBS.

TO LARGE PURCHASERS OF FARM SEEDS.
 SPECIAL QUOTATIONS WILL BE GIVEN.

SPECIAL QUOTATIONS GIVEN FOR LARGE
 QUANTITIES OF FARM SEEDS.



SUTTONS'

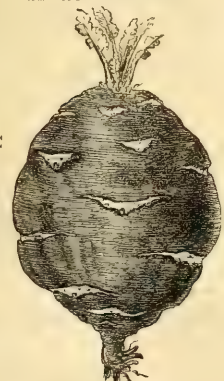
SELECTED YELLOW GLOBE MANGEL.
 A Very Heavy Cropper and Splendid Quality.
 Price 1s. per lb., cheaper by the cwt.

The Best Swede in Cultivation is



SUTTONS' CHAMPION.
 Price 1s. per lb., much cheaper by the bushel, carriage free.
 Other varieties, 9d. to 1s. per lb.

The Best Kohl Rabi is



SUTTONS' IMPROVED LARGE GREEN.
 Price 3s. per lb., much cheaper by the cwt.
 Ordinary kind, 2s. 6d. per lb.

For further particulars of SUTTONS' GRASS AND FARM SEEDS,
 see SUTTONS' FARM SEED LIST for 1871. Gratis and Post Free.

SUTTON AND SONS,
 SEEDSMEN TO THE QUEEN, READING.

"COMPARISON" "INVITED."

"THE ROYAL SEEDSMEN"



GENUINE SEEDS.

DESCRIPTIVE LISTS
 GRATIS, POST FREE
 5 PER CENT DISCOUNT
 FOR CASH.

CARRIAGE FREE

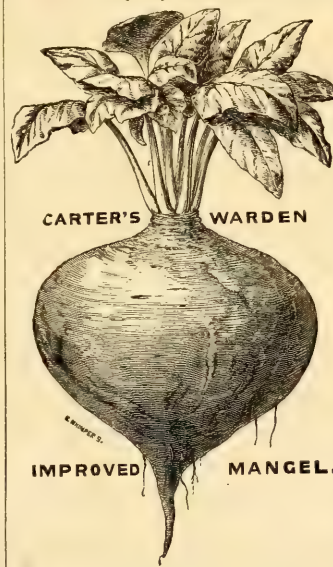
237, & 238, High Holborn,
 LONDON.

CARTER'S PRIZE MANGEL

AND SWEDE SEEDS,
 HARVESTED ON THEIR OWN SEED FARMS,
 FROM CHOICE PRIZE STOCKS.

YELLOW GLOBE MANGEL	Per lb.—s. d.
CARTER'S WARDEN PRIZE YELLOW	0 7
GLOBE MANGEL (see Illustration) ..	1 0
CARTER'S IMPROVED MAMMOTH PRIZE	1 4
LONG RED MANGEL	1 4
CARTER'S NEW CHAMPION INTERME-	0 10
DIALE MANGEL	0 10
Ordinary stocks at reduced rates.	0 8
LIVERPOOL SWEDE	0 10
CARTER'S IMPERIAL HARDY SWEDE ..	0 10
CARTER'S LONDON SWEDE	0 10
SKIRVING'S IMPROVED PURPLE-TOP	0 10
SWEDE	0 10
CARTER'S CHAMPION GREEN AND	0 10
PURPLE-TOP HYBRID TURNIP	0 10
CARTER'S IMPROVED PURPLE-TOP	1 0
MAMMOTH TURNIP	1 0
Ordinary stocks at reduced rates.	

Much Cheaper by the Bushel or Cwt.



Per lb. 1s., cheaper by the cwt.

THE FINEST GLOBE VARIETY.

CARTER'S GRASS SEEDS

FOR ALL SOILS, CARRIAGE FREE,
 As used at Aldershot, Chatham, Woolwich, Hilsae,
 Bristol, Nutley, &c., &c.

FOR PERMANENT PASTURES.

FOR ORDINARY SOILS, best quality, 27s. to 30s.
 per acre; second quality, 20s. to 24s. per acre.
 FOR HEAVY SOILS, best quality, 28s. to 31s. 6d.
 per acre; second quality, 20s. to 26s. per acre.
 Reduced Rates for quantities of more than ten acres.

For full descriptions see CARTER'S ILLUSTRATED FARMER'S
 CALENDAR, sent Gratis and Post Free.

JAMES CARTER AND CO.,
 237 and 238, HIGH HOLBORN, LONDON, W.C.

New and Unadulterated Seeds.

MCCLELLAND AND CO.'S
 SPRING CATALOGUE is now ready. In addition to the
 General Lists of Vegetable and Flower Seeds, it contains Select
 Descriptive Lists of all the new Vegetable and Flower Seeds of the present season. Sent free and post paid on
 application
 72, South Row, Covent Garden Market, London, W.C.
 Established upwards of a Century.

Russell's Pyramid Primula.
 GEORGE CLARKE has secured a quantity of this very fine strain, in excellent condition, which he
 recommends, feeling assured that no other possessors such a robust
 character, with really splendid flowers. Mixed, Red and White,
 at 6d. per pkt. Instructions for raising and growing sent if required.
 Nurseries: Streatham Place, Brixton Hill, London, S.W.; and
 Mottisham, Kent, S.E.

TROPÆOLUM, MINNIE WARREN.—A beautiful
 variegated plant, of the highest excellence for the decoration of
 the flower garden. The leaves green, bluish and bronzed
 with pale cream. Habit dwarf and compact. Proved of the highest
 merit, by receiving three First-class Certificates in the past season.
 To be sent out in May next at 10s. 6d. each, or five plants for 45s.
 Orders booked and executed in strict rotation. A Coloured Plate may
 be had on receipt of 1s. in postage stamps.

JOHN CATTLE, Nurseryman, Westerham, Kent.

Botanic Nurseries, Biggleswade, Beds.

NEW PINK, the FLOWER OF EDEN (white forced).
 —This is one of the greatest novelties ever offered. It has
 received the highest Certificate of the Royal Horticultural Society of
 London, and similar Certificates from most of the leading Horticultural
 Societies of England. It is a pure white, for five plants for 45s.
 flower. Size enormous, measuring 6 inches in circumference. Will
 flower any month in the year. Plant now ready, 7s. 6d. each, or
 5 for 30s.

EDWARD SHENTON.

R. CHILDS has about 60,000 of the following to
 offer—SCARLET GERANIUMS: Venusius, Excellent, and
 others, in thumb pots, 6s. per 100.
 VERBENAS, LOBELIAS, and Chater's Imperial Dwarf AGER-
 ATUM, 12s. per 100, in thumb pots.
 GOLDEN PYRETHERUM, strong seedling plants, from the seed
 pans, 3s. per 100.

Nursery, 65, Rye Lane, Peckham, Surrey, S.E.

New Catalogue.



MR. WILLIAM BULL begs to intimate that his
 CATALOGUE of NEW PLANTS for 1871 is now ready.
 Establishment for New and Rare Plants, King's Road, Chelsea,
 London, S.W.

THE ROYAL NATIONAL TULIP SOCIETY
 will hold its NEXT MEETING in conjunction with the Great
 National Horticultural Exhibition at the MANCHESTER BOTANI-
 CAL GARDENS, on MAY 15th, NEXT. Upwards of SIXTY
 POUNDS in PRIZES. ENTRIES CLOSE APRIL 23. Special
 prizes for Maiden Growth and Seedlings of 50 varieties, for
 setting varieties to them. For Schedules and particulars apply to the
 Hon. Secretary, MR. SAMUEL BARLOW, Stakelhill, Chadderton,
 near Manchester.

The Gardeners' Chronicle

SATURDAY, APRIL 15, 1871.

MEETINGS FOR THE ENSUING WEEK.

WEDNESDAY, April 19	(Royal Horticultural (Fruit and Floral Committees), at S. Kensington ... 11 A.M. Ditto (Scientific Committee) ... 1 P.M. Ditto (General Meeting) ... 8 P.M. Linnean ... 8 P.M.
THURSDAY, — 20	Royal Horticultural of Ireland (Spring Exhibition).

WE have recently noted some curious effects
 of the doings of the FROST AMONG THE
 ROSES. Occasionally one is taken and another
 left, in apparently the most capricious manner.
 Examples of this kind are, however, common
 enough after all severe winters, but more note-
 worthy is the fact that some varieties seem
 wholly destroyed. It is a common practice to
 classify Roses, and to assume that each in-
 dividual in the class is alike hardy. This seems
 a mistake of considerable practical importance;
 for example, Hybrid Perpetual Roses are accepted
 as a hardy class. But there are exceptions
 notably Mons. de Montigny and Reine du
 Midi—which seem to be well nigh destroyed,
 alike as dwarfs, grafted, and on their own roots;
 and as standards, Baron Adolphe de Roths-
 child seems the next in order of tender-
 ness. Again, among Bourbons, Acadiale
 and Souvenir de la Malmaison are dead
 while Sir Joseph Paxton is uninjured; Tri-
 omph de Rennes we observed healthy
 and vigorous after an experience of years, while
 such Noisettes as Céline Forestier, Lamarque,
 and Solfaterre were quite dead. The crowning
 glory of this class, Maréchal Niel, seemed
 harder than most of them, but almost wholly
 destroyed as standards or dwarfs in the open.
 Amid Tea Roses, also, we observed considerable
 degrees of hardness. In very few cases was
 Gloire de Dijon injured in the least. Next in
 order of hardness seemed Devonians, while
 the climbing variety so-called of this most
 exquisite Rose was mostly killed dead.

We should be glad to hear from our large
 rosarians on these points. Of course among
 Indian Roses we expect tender constitutions;
 but the point on which more light is needed is,
 not the tenderness of classes, but the exceptional
 hardness or tenderness, as the case may be, of
 the individual members of all or most of the chief
 divisions of Rosa's grand family.
 Another query, of even greater practical

moment, is the determination of the most vulnerable part of the Rose to the attacks of cold. Where does the penetrating shaft hit with most destructive force?—their heads or heels, tops or bottoms? Most cultivators would probably answer—heads, of course. But this seems by no means certain. We have seen several large examples this spring that seemed to point to the opposite conclusion. Large breadths of Roses have been totally destroyed, and others have almost wholly escaped injury. In most instances the latter had their roots protected with a thin spread of dry litter or dung. The roots have not been frozen, as the tops are alive and well. This is another point well worthy the attention of our large Rose growers. Dung mulchings are capital practice, independently of their protection to the roots; but if it can be shown that by preserving the roots from frost the safety of the top is insured, though compelled to fraternise with zero, no fact could well be of more importance to cultivators. We are inclined to think that the freezing of such bare plants as the Rose, may proceed from the ground upwards, rather than from the top downwards. The comparative safety of mulched plants is certainly strong proof to this effect. But there is other evidence. Often frost-bitten plants will break and begin to grow at the extremities, as if they were all right, until arrested by injuries near the base of the stems or roots. It may be thought that this is hardly applicable to Roses worked on the Dog Rose, or other hardy stocks, but it is so to a great extent. The lower portion of tender Roses, the thick branches near the stock, are frequently more blackened than those less matured, and consequently, one might suppose, more tender branches at a higher elevation; and besides in severe winters it is no uncommon thing for even Dog Roses to perish in the open uncovered ground. Has any one ever lost any stock of fair quality and properly or timely planted, in November say, that had their roots mulched over with from 4 to 6 inches of litter? More facts in regard to such matters are much wanted. It is often forgotten that hardy plants are only such in their natural state. Under artificial culture we often subject the roots especially to a much lower temperature. In a state of Nature the roots of the Dog Rose are seldom frozen through. Decaying grass, weeds, and fallen leaves, to say nothing of brushwood and sloping banks, keep them warm, and hence to a great extent their hardness. When we deprive them of their natural protectors, we ought to give them an equivalent in the form of mulching. By so doing we simply restore, between root and branch, the equilibrium of exposure established by Nature. The roots were not endowed with the same cold-resisting powers as the top, and if by surface planting and a covering of bare earth only we unduly try them, we must risk the legitimate consequences of our deviation from Nature in the weakness, disease, and death of our favourites.

Another fact in favour of the doctrine that plants are often frosted from the top upwards is, that the ground line is the point of intensest cold. The tops of standard Roses have the advantage of several degrees more warmth than their surface roots—since it is no uncommon thing to find standards of such Roses as *Devo-niensis*, *Maréchal Niel*, and *Céline Forester* stand uninjured through weather that kills every dwarf of these and much harder Roses.

One more point for our rosarians, great and small, and we have done for the present—that is, the marvellous protective force of the smallest shelter. A few sprays of Fern frond, tied loosely on to the tops of the Roses, so as to protect the base of the scions, will carry the whole of them through such winters unscathed. Spruce or other boughs are perhaps best for groups of Tea or other dwarf Roses; but for standards, a handful of withered bracken is at once a panoply of safety to the top; and if plentiful, and the Rose roots do not need feeding with juicy manure—which, however, they always do,—no better, neater or warmer covering can be found for the roots. Its dry, sprayy fronds proclaim to heat and cold alike “no thoroughfare.” The water passes through it instantly, the first breeze or gleam of sunlight dries its surface. Nothing can be more permeable to fluids, few things worse conductors of air; and these two qualities eminently qualify Fern fronds to preserve the roots of plants in a uniform state of moisture and temperature throughout the winter. With these simple expedients, which are within reach of all,—for

where bracken is unattainable, dry straw, though not so neat, will do equally well,—we have the authority of largish Rose growers for stating that the loss from stress of weather in winter should never exceed from 2½ to 5 per cent.

—We gladly give insertion to the following communication relating to the forthcoming BAZAAR in the ROYAL HORTICULTURAL GARDENS:—

“There are one or two points connected with the approaching Bazaar on which, with your permission, I should be glad to say a few words. With Paris in its present state it would be useless to think of offering any immediate help to the wretched inhabitants of the city itself, but it is otherwise with the environs. Here—where there is now nothing but havoc and desolation—the market and nursery gardeners of Paris formerly plied their peaceful trade, and they at all events may well claim our sympathy. With the view therefore of rendering them all the aid we can, a stall will be set apart for the sale of plants, which it is hoped will be liberally furnished by their more prosperous English brethren. Its entire proceeds will go to the suffering French horticulturists. There will also be a stall for the sale of cut flowers and bouquets, to which both nurserymen and private individuals are earnestly invited to contribute. The proceeds of this stall will go to the general fund of the Bazaar. As to the general fund itself, it is proposed to divide it into two nearly equal portions, one of which will be given to the French Protestant Schools in Bayswater and other parts of the metropolis; while the remaining portion will be devoted to the relief, without distinction of creed, of the most urgent cases of distress in the French provinces, under the superintendence of the most trustworthy agents of the well-known Sociétés Evangéliques. Allow me, in conclusion, to remind your numerous readers that saleable articles of every description will be most thankfully received by any ladies of the committee named Mr. Richards, secretary of the Bazaar, at his office in the gardens. *James Bateman, J., Hyde Park Gate South.*”

—In recent numbers of the *Gardener* a correspondent has alluded to some alleged cases of GRAFTING of the Elm on HORNBREAM. The trees in question are in Lord PETRIE'S Park, Thorndon Hall, Essex. The Editor of the *Gardener* has examined specimens of scion and stock, “which leave no question about the matter.” We should like further information as to the particular way in which the grafting was accomplished, by inarching or otherwise, and if the scion is completely free from any connection with the soil. Without being credulous, we may safely say that we see nothing absolutely impossible about such a graft; as we know far too little of the sympathies and antipathies of plants to dogmatise on such matters.

—Dr. VOELCKER calls attention to the use of spongy iron as a DEODORIZING MATERIAL of greater potency than animal charcoal. Sewage water passed through a filter of this substance is completely purified, and this filtered water, after having been kept six months protected from the air, was perfectly sweet, and free from any Fungus growth. The spongy iron is obtained by calcining a finely divided iron ore with charcoal. Mr. SPENCER, whose name is connected with the discovery of the electrolyte, has for some time been advocating the use of a filter of this description. Its power of rendering water beautifully transparent, and apparently free from all organic matter, is its strong recommendation.

—The old-fashioned DOUBLE DAISIES, which are returning to popularity, and the growing taste for “spring gardening,” are subject to strange mutations of colour, and on this account are not likely to be favoured by the advocates of ribbon bordering. According to the *Revue Horticole* of a year or two back, this mutation was remarkably noticeable in two Parisian gardens only a short distance from each other, and under the same circumstances of soil, situation, and aspect, in one of which red Daisies invariably became white, while in the other white Daisies as invariably became red, and that in the course of a single year.

—The countries of Southern Europe have suffered so severely from the improvident DESTRUCTION of FORESTS, and the climate has so materially deteriorated from the baneful effects thereof, that any effort to supply timber, and the most, must needs be hailed with unmixed satisfaction and approval. The publication of the “*Estudios Forestales*,” by D. H. RUIZ AMADO (Tarragona), is a welcome sign that the Spaniards are alive to the vital importance of forest conservancy, and that the subject is likely to receive due attention in a country which has suffered as much as, if not more than, any other in Europe, from reckless felling of timber. The once forest-covered hills which bordered the rich garden of Murcia in Moorish times, are now masses of arid rock.

—The following note refers to the WORM exhibited before the recent meeting of the Scientific Committee by Mr. E. J. LOWE:—

“I have compared the specimens with the species I described a year or two ago. I am inclined to think it a distinct species, though resembling a good deal the one I mentioned as having been found in some of the pine cones (p. 442, 1869). I should propose to call it ‘*Megascolex (Pericheta) rigida*,’ and would describe it thus:—

“Rings of body about 120 in number, two last simple, not possessing the circle of hairs round the ring. The first

6 or 7, round, short, the circle of hairs prominent in the middle of the segment; next 6 flatter, longer, and with one or two rather deep sulci, on each side of prominent circle of hairs. Body altogether stouter, and much more rigid than in diffingens, of a vinous brown on upper surface, and of a pale yellow underneath. The worm is not brittle as diffingens, but has the same peculiarity as in touching itself below the surface of the litter, and is very remarkably sensitive to the least touch. Length (in spirits) nearly 1 inches.”

“The habit is remarkable. The only species of the genus *Megascolex* (or *Pericheta*), found previously in Great Britain, and named by me M. (P.) diffingens, was found in three different gardens in Epsom, but in a hot stove; this threw some doubt on its being a true native, but the species lately found in an open Fern bed would make it quite clear that the genus is a true native of this country. *W. Baird.*”

—Among the curiosities of horticultural literature we may mention the UTAH POMOLOGIST, some numbers of which are before us. It is a sheet of four pages, containing much local gossip, which may be specially acceptable in long 113° 7' and lat. 37° 22'; and three sheets of advertisements, and some trade advertisements, amongst which those relating to a nursery at Bellevue, Kane County, Utah, latitude and longitude as above, are interesting from the novelty and variety of the Rocky Mountain plants there enumerated. The motto of the *Utah Pomologist* runs as follows:—

“To till the soil, to prune the spreading Vine,
To raise the Olive—prune the gushing wine;
That fruits, most luscious roots, and rarest flowers
May bless our homes and beautify our bowers,—
That be our aim, and this our recompense.
We'll dig and prune by science and by sense.”

Any little shortcomings of typography, or the like, are thus apologised for:—“Our patrons will pardon our delinquency for two months, when we tell them it was unavoidable from absence and sickness of CHARLIE, our foreman and compositor.” We sincerely hope CHARLIE will keep his health, and be the means of making known to us Europeans the treasures of the Rocky Mountain flora. Success to the *Utah Pomologist*.

—The Tulip mania, with which different parts of Europe were afflicted towards the middle of the 17th century, had a parallel in what Dr. DARLINGTON calls the “*MORO-MANIA*,” which visited the White Sulphur Springs, New Jersey, in 1860. The White Mulberry (*Morus alba*) had been introduced into Chester County, Pennsylvania, and other districts, many years previously, with a view to sericulture, but the project was soon abandoned. At the time of which we are speaking, however, a variety of this tree, of smaller stature and with much larger leaves, was introduced under the name of *M. multicaulis*, as being much better adapted to the feeding of silkworms. The rage for cultivating it became general, and everybody was eagerly buying and planting the new variety of trees to sell, without stopping to inquire where they could be sold, or who would be likely to buy them. Of course it was not very long before the scheme fell into comparative disfavour; but at some future day, and under different circumstances, it is possible that sericulture may become a profitable business in the United States.

—THE MAXIMUM TEMPERATURES of the AIR in England during the week ending April 8 ranged from 60° at Portsmouth and Manchester to 49° at Newcastle, with a mean of the extremes for all stations of 55° 2; and in Scotland from 60° at Perth to 50° 2, with a mean for the several stations of 54°. THE MINIMUM TEMPERATURES ranged in the southern part of England from 32° at Newcastle, to 27° 6, with a mean for all stations of 28° 2, this being 3° below the mean for the several stations in Scotland, where the extreme low night temperatures ranged from 27° 6 at Aberdeen to 40° at Edinburgh. MEAN TEMPERATURES.—These values in England ranged from 45° 4 at Portsmouth to 38° 4, showing a difference of 7°; and in Scotland from 43° 6 at Edinburgh to 38° 8 at Aberdeen, showing a difference of 4° 8. The mean for the two countries were—England 41° 9, and Scotland 41° 7. The mean for the two countries which was registered at any station was 0.30 inch at Leith, the next in order being 0.28 inch at Leith, 0.27 inch at Leeds, and 0.26 inch at Aberdeen; the only station throughout the two countries at which no fall took place was Paisley. The mean for all stations in England was 0.09 inch, and for Scotland was 0.19 inch. (See Mr. GLAISHER'S Tables in our present issue.)

—A composition for mixing with white-lead and other colours, to form an INODOUROUS PAINT, in lieu of using linseed-oil, turpentine, and the usual driers, has lately been brought out. According to the *Journal of the Society of Arts*, it possesses the following advantages:—It dries very quickly, so that in less than half an hour after application it is sufficiently dry and hard to receive another coat. It is perfectly inodorous, so that a room can be used the same day it is painted, and thus it is peculiarly adapted for painting offices, counting-houses, stairs, and all work where time is an object. It cleans readily, and is not affected by soap or alkalis. It is economical in use, though the composition is in itself necessarily, from the materials employed, dearer than linseed-oil. In consequence of the body contained in the compo-

sition, three coats of paint mixed with it are equal to four of ordinary paint; and the great saving in the time always lost by workmen in going from one job to another, or waiting until such paint is dry, is more than sufficient compensation for the greater original cost. For example, a street door, which requires the attendance of a workman on five several days to complete the painting and varnishing, can, by the use of this composition, be painted with four coats and varnished in one day. The material consists of methylated spirit, shellac, and castor-oil; and the composition is patented.

— Amongst East Indian Medicinal Plants, the *Galuncha* (*Tinospora cordifolia*, Miers) has been considered of sufficient value to be placed in the new Indian Pharmacopoeia. The roots and stems are the parts used, and their properties are tonic, antiperiodic, and diuretic. They are used in cases of general debility after fevers, in rheumatic affections, &c. and are administered either in the form of tincture, infusion, or extract. It is called *Penawar Sampei* (all-sufficient medicine) in Borneo, and is in daily use amongst the natives as well as by many Europeans. The plant is very tenacious of life, a portion of a stem hung up in a dry room for more than twelve months, without touching earth or water, having been known to throw out roots during the whole time.

— The use of the petals of various flowers by bees is generally known, but it is not so well known that wasps remove the stamens and pistils of *Fuchsia* for their own use. When this species appears some uncertainty, but the fact of their removal is chronicled by M. CH. MORREN, who states that, having frequently noticed that the stamens and pistils of certain *Fuchsia* were removed by some unexplained means, he set a watch, and it was then ascertained that the wasps were the culprits. That they are employed by them for some purpose seems evident from the fact that the wasps were observed flying about the garden with their legs full of pollen. M. MORREN has noticed that *Vespa nidulus* is the species which acts in this manner, as in localities where this wasp does not occur the flowers remained intact. It would be interesting to ascertain whether a similar phenomenon has been noticed in England.

New Garden Plants.

BOMAREA CHONTALENSIS (*sp. n.*), *Scem. in Herb. Mus. Brit.*

Caulis volubilis teretis; foliis sparsis minus verticillatis lanceolatis v. ovato-oblongis acuminatis, subtus glaucescentibus, utrinque glabris; umbellulis laxis; pedunculis racemosis, 4-6-floris; foribus tubularibus; pediculis pedicellis ovario pubescentibus; perigonis subequali foliis 3 exterioribus ovato-oblongis obtusis exsertis pubescentibus bracteato-maculatis, sinu albis; perigon. foliis 3 exterioribus spatulatis breviter apiculatis integerrimis pallide flavidis sinu bracteato-maculatis; ovario triangulari pubescentibus; capsulis subglobosis. — *Hab.* Outskirts of woods, Chontales Mountains, Nicaragua, 2000-2300 feet above the sea. (Scemann in *Herb. Mus. Brit.*)

A graceful plant, which ornaments the outskirts of woods in the Chontales Mountains of Nicaragua, where it supports itself by twining around the stems of shrubs and young trees. The umbels, surrounded by a whorl of leaves, and composed of several peduncles, each bearing from four to six nodding flowers, are larger and more spreading than in any other species of this genus. The flowers themselves are extremely elegant, of a waxy look; the three outer perigonal leaflets being outside of a fine pink colour, with a few brown dots at the apex, and whitish inside, whilst the three inner perigonal leaflets are pale yellow, with deep brown dots inside. They are tuberous, as in congeners. *B. chontalensis* is allied to *B. edulis* and *B. miniata*, but the flowers are double the size of those species, and the peduncles are instead of 2-florous. Living plants of it are in the hands of Mr. W. Bull. *Berthold Seemann.*

A NEW SYNOPSIS OF ALL THE KNOWN LILIES.—III.

Subgenus 2. *LILUM* PROPER.—Bulbs squamoid; stigma a thick head to the style, with three blunt lobes.

Group I. *EULIRION* (Funnel-flowered Lilies).—Perianth funnel-shaped, horizontal, or slightly drooping; its divisions broader than the middle, narrowed to the base, spreading only in the outer quarter when fully expanded. Filaments and style all parallel with one another, slightly curved upwards towards the tip.

- Key to the Species.
- Leaves cordate-ovate, long-stalked. 3. *CORDIFOLIUM*.
 - Leaves linear or oblanceolate sessile. 4. *LONGIFOLIUM*.
 - Leaves never whorled.
 - Flower shaped like a funnel, with a distinct neck. 4. *LONGIFOLIUM*.
 - Flower shaped like a funnel, without a distinct neck. 5. *JAPONICUM*.
 - Leaves 12-20; flowers 5-9 inches long, with divisions 15-25 lines broad. 5. *JAPONICUM*.
 - Leaves 20-30; flowers 3-5 inches long, with divisions 15-25 lines broad. 6. *NEPALENSE*.
 - Leaves 60-100; flowers 2-3 inches long, with divisions 6-12 lines broad. 7. *CANDIDUM*.
 - Leaves arranged in regular whorls. 8. *WASHINGTONIANUM*.
 - 3. *L. cordifolium*, Thunb.—This first species of the

Eulirion group is at the same time the largest and most distinct of all the true Lilies, being completely different from all the rest in possessing long petioles, and in the shape and nerving of its leaves. Thunberg, who was the first of the post-Linnaean botanists to gather and describe the plant, placed it originally in *Hemerocallis*, but on better second thoughts changed his mind, and admitted it into *Lilium*. Salisbury, long ago, made for it a distinct genus, which he called *Saussurea*, but by a genus Salisbury meant something quite different to what we usually understand by the name. Kunth and Endlicher place it in a section by itself, which they call *Cardiocrinum*. There are two geographical groups, or subspecies, of the one which inhabits Japan, and the other the Himalayas, and all recent authors, following Zuccarini in Siebold's "Flora Japonica," speak of these two distinct species. He gives, and Kunth adopts, comparative diagnoses, in which a contrast is made which applies to several parts of the plant, but I find hardly any of the characters relied upon hold good throughout a wide range of specimens. As the Himalayan subspecies has been cultivated in England, and is better known to us in its native country, I give a detailed description of this, and then compare the other with it.

L. cordifolium, Thunb., subsp. *giganteum* = *L. giganteum*, Tenore, Tent. 2, 2, 1. *Nepalensis*, (Tenore, Tent. 2, 2, 1. *syn.*); Kunth, Enum. iv. 268; Hook. Bot. Mag. t. 4673; *L. cordifolium*, D. Don, Prodr. Fl. Nepal. p. 52, non Thunberg.—Bulb as large as an Apple, clothed with fleshy, ovate, subparallel scales. Stem straight, erect, terete, 4 to 10 feet high, 2-2½ inches in diameter in the lower part, growing gradually more slender upwards, glabrous, like the rest of the plant. Leaves, all except the uppermost, distinctly stalked, the lower ones half a foot apart, with broad channelled petioles a foot or more long, clasping the stem broadly at the base, the more proximal ones reaching a foot or even 18 inches in length, acute or acuminate; the basal lobes 2-3 inches deep, with a sinus between them broadly rounded at the top on each side, the texture thinly coriaceous, the upper surface a bright dark green, the lower paler and duller, the basal lobes not at all elliptical; the main veins, except at the base, spreading from the midrib at an angle of 45°, the veinlets between them copiously reticulated; upper leaves growing gradually smaller and closer till those just beneath the raceme are not more than 3-4 inches long, with the basal lobes not produced, with a broadly-winged petiole, under an inch long. Flowers 6-12 inches long, the lower spreading or slightly drooping. Pedicels 3-12 lines long, very stout, all finally ascending. Bracts ovate, membranous, 8-2½ inches long, falling when the flower expands. Perianth funnel-shaped, 5-6 inches long, white, slightly tinged with green on the outside, and with purple in the throat, measuring about an inch round at the base, saccate, especially on the lower side, and 5-6 inches round the neck when fully expanded, the divisions spreading only at the very tip. Segments oblanceolate, bluish, the outer ones 9-12 lines, the inner 12-15 lines broad, narrowed gradually to the base from five-sixths of the way up, the claw not at all hairy or papillose. Ovary clavate, 12-15 lines long; style straight, 12-15 lines long; stigma a thick head, 3-4 lines long, 6-8 lines; pollen yellow; capsule obovoid, 4-5 inches long, bluntly angled, the coriaceous valves 12-15 lines broad.

Extends in the Central Himalayas from Gurwal and Kumaon through Nepal to Khasia and Sikkim, at an elevation of from 5000 to 10,000 feet, in the rich black mould of the forests of the temperate region. Flowered at Edinburgh by Messrs. Cunningham in the summer of 1852, and drawn at the same time for the "Botanical Magazine."

L. cordifolium, subsp. *cordifolium* proper = *L. cordifolium*, Thunb., Linn. Trans. ii. p. 332; Kunth, Enum. iv. 268; Zuccarini, in Siebold Fl. jap. fasc. 3, p. 33, t. 73, fig. 2, and t. 74, non D. Don; *Hemerocallis cordata*, Thunb. Fl. Jap. p. 143.—The following are the characters on which Zuccarini and Kunth rely to separate this from the Himalayan plant:—

- | | |
|--|---|
| "GIGANTEUM." | "CORDIFOLIUM." |
| Leaves ample, ovate acute, the lower ones with long petioles, cordate with a rounded sinus at the upper subsessile, rounded at the base. | Leaves ovate, deeply cordate, the angle of the sinus cuneate-truncate, acute, with long petioles. |
| Flowers shortly peduncled, 8-10, arranged in simple umbels, the funnels with subulate bracteoles. | Flowers sessile, 2-3, subspicate. |
| Valves of the capsule unicate. | Bracts lanceolate, spatheaceous, persistent. |
| | Valves of the capsule tricarinate. |

Comparing the specimens now before me, I find the leaves of the two and their petioles quite correspond, both in the upper and lower part of the stem, and that the sinus is broadly rounded at the top in the Japanese as well as the Himalayan plant. According to Mr. Wilford's note in the *Kew herbarium* this reaches a height of 3 or 4 feet. The flowers are racemose, as in the Japanese as well as in the Himalayan plant, reach up to eight in a raceme in a wild specimen now before me, and are arranged and peduncled in a precisely similar manner, and I cannot see any difference in the bractea-tion. I have not seen good specimens of the fruit of the Japanese form, but doubt very much its having three distinctly marked seeds. The only material difference that I can detect between the two is that the segments of the perianth of the Japanese form are uniformly narrower, varying from 6 to 9 lines in width at

the broadest part, and that the anthers are rather shorter and thicker. The flowers of the Japanese specimens now before me vary from 4 to 6 inches long. According to Kunth this extends through the whole of the Japanese Islands, occurring in shaded woods at an elevation of 400 to 600 feet above sea level, and extends northward to the Kurile group. Wilford speaks of it as "not common," and as a "fine species, growing in moist situations." I wish that some one would grow Japanese and Himalayan specimens side by side, and tell us what, under such circumstances, the difference between them really amounts to.

4. *L. longifolium*, Thunb.—Here we have a wide range of forms, several of which are well known to cultivators, which are only regarded as subspecies and varieties in a broad botanical sense. I give first a detailed description of what I understand as typical *longifolium*, taken from wild Chinese and Japanese specimens, and the garden plant as figured in the "Flora des Serres."

L. longifolium, Thunb., subsp. *longifolium* proper = *L. longifolium*, Thunb., Linn. Trans. ii. p. 333; Kunth, Enum. iv. 267; Bot. Reg. t. 500; Spac. Mon. p. 13; Flore des Serres, t. 4. Stem 2-4 feet high, erect, terete, like the rest of the plant. Leaves 20-30 at the flowering time, the lower ones cordate, erect, patent, 3-5 inches long, linear, 3-6 rarely 9 lines broad about the middle, narrowed gradually upwards to an acute point, and downwards to a rounded base; moderate firm in texture, dark shining green above, distinctly 3-5 or rarely 7 nerved beneath, the upper ones laxer, and growing gradually shorter, often pressed against the stem, or at any rate much ascending. Flowers 12-20, horizontal or slightly drooping; perianth 5-7 inches long, pure white within and without, shaped like a funnel with a neck (that is, suddenly narrowed from the neck to a tube about a couple of inches long, which is narrowed very gradually from its neck to the base); divisions oblanceolate-spatulate, all bluish at the point and faintly only near the base, the outer ones 12-15 lines broad three-quarters of the way up, permanently valvate in the lower half, the inner ones 15-18 lines broad, both spatulately narrowed to a claw, which is about one-eighth of an inch broad an inch above the base; style only nearly near the tip, not at all hairy or papillose. Ovary clavate, 12-15 lines long; style 3½-4 inches, curved towards the point. Filaments white, 4-5 inches long; anthers linear, 6-9 lines long; pollen pure yellow.

Long known in Japan, whence it was described by Kempter and Thunberg, and introduced into Europe in 1819. Gathered also in China by Fortune and others; in the Loo-Choo islands by Capt. Beechey and Mr. C. Wright; in Formosa fully recorded by Messrs. Wilford and Oldham, and in Hong Kong by Colonel Urquhart and Captain Chamberlain. Thunberg at first called it *candidum*, and Loureiro has a plant in his "Flora of Cochinchina" under the name of *candidum*, which is very likely the same.

Var. eximium = *L. eximium*, Court. Mag. Hort. No. 300; Spac. Mon. p. 14; Flore des Serres, t. 283-4; *L. jama-jurii*, Siebold et De Vries, Tiniboun Flor. vol. i. p. 319, t. 11; *L. Takeima*, Duchartre, Gard. Chron. 1871, p. 420. Stem 4-4½ feet high. Leaves sometimes 3-4, reaching 8-9 inches long. Style, filaments, and anthers longer in proportion, the latter sometimes an inch long.

Respecting these plants I cannot do better than refer those interested to M. Duchartre's remarks at the page quoted. Looking at them from the botanical point of view, these three names seem to me to represent only forms of the eastern or Japanese-Chinese subspecies of *longifolium*, more or less improved by cultivation.

Subspecies 2. neilgherrense = *L. neilgherrense*, Wight, Linn. Plant. Ind. Or. t. 203-4; *L. tubiflorum*, Wight, Linn. t. 2033; *L. Wallichianum*, Wight, Linn. t. 2035, non Roem. et Schultes; *L. neilgherrense*, Lemaire, Ill. Hort. x. t. 353; *L. Metzii*, Steudel in Hohen. Pl. Ind. Or. No. 954.—Stem 2-3 feet high, stouter than in true *longifolium*. Leaves 20-40, broader than in true *longifolium*, lanceolate, erect-patent, the lower ones 5-5 inches long, 6-12 lines broad at the middle, narrowed to a broader base and upwards to an acute point, very distinctly 5-7 nerved on the lower side. Flowers 1-3 in the wild plant, ascending or horizontal. Perianth quite similar in shape, varying from 6 to 8 inches in length. Filaments of the funnel 2½-3 inches long, outer divisions as in the other, 12-15 lines, inner 18-21 lines broad three-quarters of the way up. Ovary, style, filaments, anthers, and pollen the same.

Gathered in the Neilgherries in the neighbourhood of Ootacamund, at an elevation of about 8000 feet, by Dr. Wight, Gardner, G. Thomson, & many other in the same, and now in the Neilgherry territory, by T. Lobley. The range of form which it presents in the breadth of the leaves and size of the flower may be seen by Dr. Wight's three figures. It is quite as variable as the Japanese-Chinese subspecies, and though such a striking form, has been almost entirely neglected by cultivators. I have never seen it growing, but suspect strongly that in the plate in the "Illustration Horticole" the colourist has been much too liberal with the yellow.

Subspecies 3. Wallichianum = *L. Wallichianum*, Schumacher, fil. Syst. Veg. vii. p. 1699; Kunth, Enum. iv. 267; Bot. Mag. t. 457; Lindl. et Paxt. Flow. Gard. 1850, p. 120, cum icon; Spac. Mon. p. 13; Lemaire Jour. Fleur. t. 105-6; Flore des Serres, t. 612; *L. Batavia*, Hamilton MSS. (1802); *L. japonicum*, Don, Prodr. Fl. Nep., p. 52, non Thunb.; *L. longifolium*,

Wallich, Tent. Fl. Nep., p. 40, t. 29, non Thunb.—Stem reaching 4–5 feet high, half an inch thick at the base. Leaves 30–40, always narrow, linear, ascending, the lower reaching 8–9 inches long, 3–5 lines broad below the middle, narrowed very gradually to an acuminate point, 3–5 nerved beneath, reaching up so that the highest overtop the peduncles. Flower usually solitary, casually 2, ascending or horizontal. Perianth 7–9 inches long, the neck of the funnel 3–3½ inches long; outer divisions 16–18 lines, inner 21–24 lines broad three-quarters of the way up, all sub-acute. Ovary 16–18 lines long. Filaments 5–6 inches. Anthers 12–14 lines. Pollen bright yellow.

Perhaps this might fairly be placed as a species of full rank. Both for the height of the stem and size and fragrance of the flower it is the prince of the forest of the longiflorum series. It inhabits the Himalayas of Nepal and Kumaon, at an elevation above sea-level of 3000 to 4000 feet. There is an excellent figure, by Fitch, in the "Botanical Magazine," drawn from living specimens introduced by Major Madden from Kumaon in 1850; and this plate was copied into the "Jardin Fleuriere" and the "Flore des Serres." In all the descriptive books, from D. Don down to Spae, the synonymy is more or less confused with that of Chinese-Japanese forms. The history of the plant is as follows. It was first sent, in the dried state, to Europe about 1802, by Dr. Hamilton, under the manuscript name of *Lilium Batisua*. There are specimens of this date in the herbaria both of Sir Joseph Banks (at the British Museum) and of Sir J. E. Smith (at the Linnean Society). "*Batisua*" is its vernacular Nepalese name, but was never published with a diagnosis. In his "Prodomus" of the Nepalese Flora, Prof. D. Don published it as "*japonicum*," with a diagnosis that applies to the real japonicum, but not to the Nepalese plant. Wallich next, in his "Tentamen," gave an excellent figure and full description of it under the name of "*longiflorum*," and upon the information which he furnished the younger Schultes separated it as a distinct species under the name of "*Wallichianum*," which both Kunth and Spae adopt, though without understanding clearly the true state of the case—that this is the sole Himalayan form of the longiflorum series, and that it is restricted to the Himalayas, and that both japonicum and longiflorum proper belong exclusively to Japan and China.

Comparing together these longiflorum forms it is very interesting, from a geographico-botanical point of view, to note that we have here, as in cordifolium, an extremely distinct species, represented in Japan and Hindostan by barely distinguishable forms. In cordifolium there are but two of these what I have called subspecies, one Japanese the other Himalayan. In longifolium the conditions of the case are more complicated. We have three subspecies, one with a much wider area in the extreme East, a second Himalayan, and a third belonging to the mountains of the Indian peninsula. Another curious point to note is, that the Neigherry subspecies comes appreciably nearer to the Chinese-Japanese one than does the Himalayan form. I should like much to direct the attention of cultivators more to this beautiful and easily obtainable Neigherry Lily, and should much like to know if all the forms could clearly be separated when grown in European gardens from the already known forms of the Chinese-Japanese plant, four of which, as I have said already (longiflorum, ximium, jama-juri, and Takesima) are now passing about in our gardens under specific names.

My notes on these two species have extended so far that I must postpone a notice of the four other species of the Eulirion group to another issue. *J. G. Baker.*

BOTANY FOR BEGINNERS.—II.

THE first thing a beginner has to do is to familiarise himself with the appearance and position of the parts of the flower, and to make himself acquainted with the names given to them. To help him in this matter we propose, by the aid of woodcuts, to explain the conformation of common flowers, beginning with those of the simplest construction and gradually advancing in complexity. We chose the Willow and the Poplar for our first lesson, p. 449, on account of their simple structure, and at the risk of being thought tiresome, we recommend the beginner to make sure that he understands the structure of those flowers before he proceeds further. When, by the aid of selected illustrations, we have put the pupil in the way of examining for himself and of recognising the principal variations in the conformation of flowers, he will the better be enabled to understand the general principles of floral construction, in themselves very interesting, and which, once mastered, all the rest becomes comparatively easy. A general knowledge of the work done in and by the parts of the flower is also absolutely essential to a young gardener, and lends a charm to the flower itself that those who, so to speak, only study its dry bones can never appreciate. But these, again, cannot be understood till the alphabet of floral construction is thoroughly known.

With these remarks to justify the elementary character of these lessons for beginners we pass on to the consideration of the flower of the Ash. The Ash is just now in full bloom, and may perhaps be the little gem of its prime in the southern counties. Like the trees already mentioned, the Ash produces its flowers before the leaves are unfolded. At present the latter organs are

carefully stowed away in those black leathery-looking knobs which may be observed on the ends or sides of the branches, there we may leave them for the



FIG. 91.—Twig of Ash, showing terminal and axillary buds and inflorescence.

present, merely stating that the black knobs in question are the buds, and that their usual position is at the ends or on the sides of the branches. In the



FIG. 92.—Portion of inflorescence of Ash, natural size.

latter case they spring from the side of the branch in the angle formed between it and the leaf or leaf-stalk. This angle is technically called the *axil*;—a leaf-bud in



FIG. 93.—Five flowers of the Ash, slightly enlarged, showing the stamens and pistil.

this situation is thus spoken of as an *axillary bud*, while that which is placed at the end of a shoot is appropriately called *terminal*. Although at this time our Ash shoot is leafless, it is yet easy to see where last year's leaves were placed by reason of the very large horse-

shoe shaped scars left after the fall of the leaf which are placed on the sides of the twigs and above which may be seen the axillary buds just alluded to (fig. 91 A). It is possible then from a glance at these scars to ascertain the position of the leaves, even in the absence of those organs. It will be observed on looking at an Ash twig that these scars occur in pairs, the scar on the one side is placed at the same level with a similar mark on the other side of the twig. Such an arrangement is described as *opposite*. The leaves then, and the buds axillary to those leaves are, in the case of the Ash, *opposite*. If the beginner will examine a Willow twig, or failing in actual specimen the figures given at p. 449, he will see that the buds are not placed at the same level on different sides of the stem, but one above another; such an arrangement is spoken of as *alternate*. As these positions of the leaves, or failing the leaves of the leaf-buds, are very serviceable in enabling foresters and gardeners to distinguish trees of various kinds one from the other, in the absence of the leaves, they should be carefully noted. As we go on we shall endeavour to show how such apparently trifling details are in reality very significant.

Passing now to the flowers of the Ash, we find them grouped in bunches, emerging from the sides of the stem, each bunch opposite to its fellow. Indeed, as the bunches are really axillary to the leaves, and we have seen that the leaves are opposite, it follows that the bunches of flowers, the *inflorescences*, must have the same relative position as a rule, though there may be exceptional cases where the rule is apparently broken through. On comparing this inflorescence with the catkin of the Willow or Poplar the beginner will at once notice, that while in the latter case the flowers were densely crowded, here in the Ash they are somewhat loosely massed (fig. 92); moreover, he will notice in the present case that each little flower has its own separate stalk, by means of which it is attached to the main branch forming the axis or central stem of the inflorescence. In the Willow, on the other hand, at least in the male flowers, each flower springs directly from the main axis without the intervention of any secondary stalk. In fact the inflorescence of the Ash is *branched*, that of the Willow is *simple*. It is not

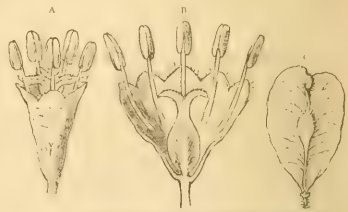


FIG. 94.—A, Single flower of the Elm, showing the perianth and the stamens; B, The same cut open, showing the origin of the stamens and the pistil; C, Seed vessel of the Elm.

necessary to dwell any longer on the differences in the inflorescence of the plants we have selected as illustrations. We may have something more to say about them as we proceed. Thanks to the loose branching character of the inflorescence in the Ash, the examination of the flowers becomes a very easy matter.

It is simply necessary to separate a flower from its fellows with the point of a penknife, remembering always to take a young-flower in preference to one that is advanced in development. Supposing the flower properly detached, its structure is seen to be of the simplest character (fig. 93); there is no bract, as in the Willow or Poplar, but there are stamens, and there is a pistil. The stamens are two in number, opposite, like the leaves, with short filaments or threads, and fat oblong anthers of a purple colour, each splitting by two long narrow chinks which open on the side of the anther farthest away from the pistil,—a fact worth noting, as we shall have to allude to its significance by-and-by. In the centre between the two stamens is the pistil, made up of an ovary so flattened as to fit in between the two stamens and surmounted by a thread or column—the style, and this again ending into a notch separating two little lobes or stigmas one from the other. The existence of these two stigmas may be taken as evidence that the ovary which, as in the Willow figured at p. 449, fig. D., appears simple, is in reality made up of two *carpels* joined together throughout the whole of their length with the exception of the stigmas. In the illustration of the fruit or seed-vessel of the Poplar at fig. H., p. 449, the two carpels are seen separating one from the other, and thus demonstrating their mode of construction, but the Ash has not this obliging habit of revealing its structural peculiarities. The ovary of the Ash ripens into an oblong leafy seed vessel, which every schoolboy knows as the "key," and which does not split when ripe. By cutting across the young ovary with a penknife and examining the cut with the magnifying glass, the beginner may be able to make out that the interior of the ovary is divided by a partition into two halves, so that the section would be not unlike a figure of 8. Should his eye, however, not yet be sufficiently educated to observe this circumstance readily, he may content him-

self by counting the number of branches into which the style divides—in this case two—which indicates the number of carpels constituting the ovary. In the flower of Ash, then, we have neither bract nor perianth; in so far, it is simpler than the Willow even, but on the other hand it has both stamens and pistils in the same flower. In the Willow and Poplar the flowers are *unisexual*; and the mowers, the flowers of different sexes are the produce of separate trees. In the Ash the flowers are *bisexual*; and the two sexes occur not only on the same tree but in the same flower.

It is getting rather too late in the season to examine the flowers of the Elm satisfactorily, but with the help of the illustration enough may be made out to show what we are dealing with at present. In the Elm the flowers open before the leaves, as in all the previously-mentioned trees, and their structure is so simple that a very few words will suffice to explain their peculiarities. From within a membranous funnel-shaped perianth (fig. 94 A, B), the margin of which is divided by shallow notches into five rounded lobes, spring five stamens, of essentially the same structure as those of the Ash. The five notches indicate that the perianth is made up of five pieces, partially united together. In the centre is the pistil, consisting of an ovary with two styles, and to which, therefore, what was said of the Ash applies equally. This pistil, too, ripens into a membranous or winged seed-vessel (fig. 94 C), different in outward shape, indeed, but otherwise very similar to that of the Ash.

HORTICULTURAL BOILERS.

To all who are interested in the economical heating of glass and other structures, the subject of boilers is a very important one; and whatever may be said for or against any particular form of boiler will not fail to interest a large portion of your readers.

There is no item in garden expenditure so thoroughly objectionable to me as a large bill for fuel, and to reduce such bills to a minimum should always be the gardener's aim; for, apart from the crime of waste, the consumption of fuel brings no credit to the gardener, but, on the contrary, a troublesome accumulation of dirt which it requires labour to hide.

Except the most modern of modern forms of boilers, there are few with which it has not been my lot to be practically acquainted: saddles—single, double, corrugated, and flued; tubulars—vertical, horizontal, and locomotive, in various shapes; cannon boilers, retorts, cruciforms, and Cornish boilers, with many others, have each had a share of my attention, and amongst them many excellent boilers are to be found; but that which I found most free from fault was the old Cornish boiler, and to improve this, and make it more powerful and economical, was a task that I set about some four years ago.

The qualities which I consider ought to be possessed by a horticultural boiler are:—

Economy of fuel in action, and freedom from sudden breakings.

Durability, and capability of heating 100 or 1000 feet of piping with equal economy, and three times that quantity if emergency require it.

Simplicity of construction and setting, so that there be no liability to get out of order, and so that cleaning, &c., may be done with facility.

The mere selling price of one boiler by comparison with another ought never to influence us, if ultimate economy is desired; for, if a boiler is so constructed as to put down a small boiler to do a large amount of work. In this respect my experience is directly opposed to that of Mr. Fish, inasmuch as I have always found a quick draught and fierce fires, a most expensive mode of heating by hot water.

Horticultural boilers are, as a rule, advertised, and made to do more work than they can perform, economically; for with most boilers there is a point in fuel economy ends, and waste begins; and it should be the duty of a gardener to find out that point, and add more heating power accordingly; for it is a fact, that whenever we begin to "push" fires, economy in heating ends, and waste of fuel and labour begins.

Instead of fierce fires under small boilers, the sure way to economical heating will be found in large boilers and small fires. So thoroughly has my experience in stoking convinced me of this, that some four years ago I began to overhaul the heating in this garden. Where I found a pair of 5-feet saddle boilers, I replaced them with 6-feet Cornish boilers of my new pattern, and the saving in fuel and labour was at once evident. Instead of being compelled to burn good coal, I could now do the heating required much more satisfactorily with common slack, at little more than half the price of coal, and less than half the quantity; and this was not all the saving, for I found that these boilers consumed all the ashes that were made, and my stokehole by could in future be dispensed with, as nothing but a few "clinkers" required clearing out of the stokehole, and this at long intervals.

Under these circumstances I felt it my duty to enlarge the principal stokeholes, and otherwise rearrange them as rapidly as possible, so as to get the benefit of my new boiler, and the result is that I have been able to reduce the expenditure for fuel from an average of about £350 per annum to £170, although we have more heating to do at Trentham now than we ever had before.

I find, however, that to continue my remarks will occupy too much of your space, but if you think it at all interesting I should be pleased to add to them on a future occasion, and also to send you a sketch of my boiler. *Z. Stevens, Trentham Gardens.* [Please do both. Eds.]

DIAGONAL AND VERTICAL PEAR CORDONS.

I HAVE just finished two more walls, composed of Pear trees trained as single cordons, the one being diagonal and the other vertical. We had before two diagonal cordon Pear walls, one of which is now in full bearing, and is, I think, the oldest in the country. Some fine young Pears grown from the trees this year were much admired in Covent Garden for their remarkable colour. These were grown on a double cordon tree, which I prefer for walls under, say, 10 feet. The other sorts on this wall were Chaumont chiefly, which are always very good from cordons. We had besides, formerly, Cherry cordons, but these are apt to grow too vigorously, and so were removed. This is the one obvious advantage in cordon training, for the blank spaces are soon filled in. Other trees were choice Plums, and these are also good, though nothing equals Pear trees for diagonal or vertical cordons. In the latter case the wall should be 12 feet high, and especially the soil should not be too young, and of a too stimulating quality, or this style of training will be baffled. In diagonals there is not this risk; for the trees being at the natural angle formed by a branch with the stem from which it proceeds, the close packing of the spurs and shoots is considerably favoured throughout the length of the cordon, and gross or rampant shoots seldom give trouble, with ordinary care. One point must, however, be observed, and on this mainly depends the success of the whole, and that is—after the first year of planting, when the cordon is shortened according to its growth, and for some other reasons, such as quality of soil, exposure, local climate, &c., after this first winter regulation—always to a front that is short, and the shortening should be attempted. The formation of blossom-buds should be encouraged, and a moderate crop taken, not exceptionally but regularly, and the leader will accommodate its growth to the demands of the whole tree. I mean that if it grows too vigorously then the shoots will also be found to be unfruitful, and will require other attention and thought. There is considerably less risk of this vigour in diagonal than in vertical cordons. My reasons, therefore, for planting small walls as verticals was that the height was considerable, and that the soil is the reverse of stimulating. Trees in other gardens often make twice the growth that mine do, but mine are eminently fruitful.

The trees comprise the newest and best sorts. Many are in pairs, and can be easily tested by planting one on a south aspect, and another on an east. Varieties standing thus side by side are readily and fairly compared. Opinions are formed by the newest of amateurs, and the most experienced cultivators see for themselves if of immense future use in selection. It has always been to me a source of wonder that trees trained in these styles are not more adopted in places where the gardener has a constant demand on him for the newest and the rarest sorts, and for a succession of either. It is obvious that if he require much of one particular kind that he can obtain it by planting any number of these cordon trees, not to speak of the old well-known Pears, which one always expects to see from largely-developed fan-trained trees, and which can be grown also. But how is the gardener to have that great variety which is a requisite of the present time, if he restricts himself to these immense trees? Standards, no doubt, furnish a great and varied supply, but can never be relied upon for numerous indispensable kinds of Pears, nor will standards bring many other kinds to that perfect state in which walls trained in these styles can be put. How often, too, will not an old favourite, largely occupying our best wall space, fail to equal its former powers, and eventually have to be removed. This leaves a blank space unprofitable for years, and unsightly, while in a line of cordons any removal is scarcely noticed. There is no doubt, moreover, that these trees come into bearing sooner than more developed forms, and this to an amateur, as well as to others, is a very important consideration. If several seasons old, carefully planted, will produce without delay a fair crop: it is easy to judge if they be true to name, and ready comparisons are within the reach of proprietors of small gardens.

Nor can any objection as to quality of fruit be held, for it is rather notorious that a single fruit left on each of, say one dozen cordon trees, will excel another dozen taken from a single huge tree, in every particular which is required for show. As to appearance, it cannot surely be argued that a wall of diagonal Pear cordons is inferior in beauty to any other. Some people think it much more interesting. A number of the Pear trees I had from Mr. Rivers were double grafted, and have done well. The vigour of naturally weak sorts seems increased.

In short, of all styles of cordon training—and my experience is not small therein—nothing is so general and so equal to the diagonal cordon. I believe I began with this style—on a line of Pear trees at Rouen they say; however that may be, it is to him that we owe

the original idea of planting a number of trees side by side at this natural angle (one may call it) of growth and production simultaneously.

For training after all, covering, a good space of wall when used with double or triple leaders, or when the walls are lofty with a single leader, which is the purest form, and the easiest to manage. *Th. C. Bréhaud, Richmond House, Guernsey.*

CISSUS DISCOLOR.

THERE are few plants to which this most beautiful member of the order Vitaceæ yields the palm for gracefulness of habit or beauty of foliage, the latter being exceedingly rich and effective in colour. Its style was second to none in freedom of growth and general adaptability to the requirements of the cultivator. When well grown, and the full tone of its many-tinted velvety leaves is brought out by affording a proper amount of shade during the growing season, it will safely "hold its own," even when compared with such gems as the *Anæctochilus*, which require so much nursing and attention. Not only is it a valuable plant for affording striking contrasts on account of its foliage, but its quaint white flowers, which are sometimes produced in clusters, are by no means to be despised.

I have already alluded to the kindly manner in which it thrives, with only a moderate amount of cultural skill and attention, but its beauty and proportions become magnificent when it receives treatment corresponding to the natural conditions of its distant island home. What these conditions are I will endeavour to say. The climate of Java is characterised by great richness of organic life, enjoying a mean annual temperature of 77°–79°, and being within the tropics it has its periodical rains during one half the year, the other half being mainly dry. During the dry period we surmise that the *Cissus* goes to rest more or less, like other deciduous plants.

It is this incessant rainy period to which I would more particularly draw attention, when, amidst alternating shades of light, the *Cissus* grows rapidly, and assumes such hues as we may, perhaps, get some idea of from the extreme beauty of the best coloured specimens produced under artificial culture. As, in the tropics, rain seldom falls by night, so should we dispense with syringings overhead, save during the day, by which process we may be able to imitate more nearly the native markings of these inimitable leaves. It is not advisable to retain old plants past the fourth year, and it is better still to propagate fresh ones annually, and to grow them on rapidly. They propagate readily, either from old wood, without layers, or by means of firm short-jointed young shoots. These latter should be placed under a hand-glass, the former need no such attention. The soil they thrive best in is a porous admixture of very fibrous loam, peat, sand, and well pulverised cowdung, with broken charcoal in admixture. In regard to potting, small shifts alone should be afforded, always plunging the pots into bottom-heat if convenient. When the plant grows freely, endeavour to encourage the shoots to grow tall, themselves, to some tall support; permitting them to grow up perpendicularly, without let or hindrance, even until they reach the top of any high structure, leaving ulterior training until the whole growth has been made. When twisted carefully around proper trellised support, it can be trained with immunity from injury into almost any conceivable shape, as the leaves will quickly right themselves when exposed to a proper degree of light on all sides. When the roots are shown, wash them, wash the roots with tepid water, and adopt such a generous regimen in all other ways as the more favourable conditions of their native habitat suggest, even to affording a complete season of rest. *William Earley, Valentines, Ifjord.*

ASPHALTING GARDEN WALKS.

SOME of your correspondents have been asking for information respecting the asphaltting of their garden walks, and from the nature of the answers given I cannot help inferring that they have been misled from indifferent sources. Now it is well known that no one is right in practice where he is wrong in principle. I would therefore beg your readers to bear in mind one important fact, which is no crotchet or idea of mine—I had to pay for it, and I made a note at the time of so doing that it was likely to be worth the money it had cost.

The chemical lecturer addressing us, said, very simply,—"Gas-tar is not soluble in water." Make a note of this, for it is the chief point in asphalt works—roads, tanks, walks, roads, and the like. As with night you attempt to mix tallow with water, so with asphalt you will, and hence the importance of all articles being dry that have to be united with gas-tar. I must beg the reader's indulgence whilst I name another important item, not to be overlooked or forgotten. Some things look dry when they are not, and few people would know water when it puts on a strange coat. Now when you get lime from the kiln, and slack it nicely by adding a large amount of cold water, or even stone of lime, the mixture will neither be cold nor wet, as one would think it ought to be, but fiery hot and apparently dry, and yet there is no disputing the fact that into this dry powder you certainly did pour real water by the gallon, and it must be there now in some shape.

Chemists tell us that when fluids assume the solid form heat is evolved, and although we may not recognise the presence of water, the gas-tar will; so that in all cases where slacked lime is mixed with gas-tar it is a grave error, for water is there, and "gas-tar is not soluble in water." But if you wish to get at the secret of asphalt making, pound the new lime and pass it through a fine sieve, and mix this with coal-tar and see the result. I was shown a large Flax factory that was roofed with paper, and coated with gas-tar and lime in this way, and the proprietor said, "this was done as you told me when we travelled together from Whitehaven, and answers admirably." He had tried the slacked lime, and wondered at its failure.

The intelligent workman will now know, from what I have stated, that he should boil his gas-tar to get any moisture out of it, and having his pounded lime ready, he can add to suit his circumstances. The composition of bone is the point to be aimed at, for the bone-earth by itself would be hard but not tough, and the gelatine would be tough and clammy, but not hard enough; mixed together in due proportions they are perfect.

Mineral pitch used in paving is very well for street work, when the sun is powerful, and it is quite fluid; not so is the pitch when lime has been added, and as a small sample tried will give the proper proportion, there can be no excuse for having melted pitch adhering to the shoes of the passenger. Lime is able to do the master-stroke, but must do it in its own way. If the carriage-way or footway is to be a permanent way, its levels must be rightly set out first, and good hard materials used to make up the levels; while fine dry gravel, pebbles, or cracked stone may be tarred and levelled and rolled just as would be done if no tar were used, but when the stone or gravel is tarred they absorb none, whereas the lime has united with the tar and the compound is quite different from either of its parents. We see constantly about any of our large towns heaps of cinders and clinkers (scoriae) being mixed for making footpaths, the gas tar poured on or over at random, the finer parts being left to make a smooth finish. This is good enough for parish business, and is, moreover, cheap; but whoever has seen first-class asphalt in London and elsewhere will allow that it is very nearly all that could be desired for walks or roads.

The colour of the gas-tar is always bad, and when it gets white specks of Derbyshire spar dotted over it it reminds one of the white dots formerly made all over the coffin lids of young people in Scotland, and called "tears;" the contrast with green grass, or, indeed, with anything, is grievous to behold; but if the subject is a garden walk between two lines of green grass, get a yellow ingredient to hide the black, such as the "grog" of the Staffordshire potteries—pounded "saggers," a species of yellow fire-brick, very hard, of a lively colour, and cheap; and as the yellow colour is one of the component parts of green, it will always be pleasing, and never look in violent contrast to its neighbours.

The cinder footways, so common near all manufacturing towns, are rapidly disappearing, and asphalt is taking their place, and stable-yards and cellar floors are asphalted everywhere; but the garden walk is quite another affair from this class of asphalt, and should always be coloured, like the best Kensington gravel, of a reddish-yellow, and they will then be not only useful but essentially ornamental. *Alex. Forsyth.*

Home Correspondence.

Peziza lanuginosa.—It may be worth recording that the specimens of this Fungus which I exhibited at the last meeting of the Scientific Committee of the Royal Horticultural Society, were gathered under, or in the immediate vicinity of Cedar trees in the beautiful grounds of Mr. Hewitson, in Oatlands Park, and that the individuals described in a late volume of the Transactions of the Linnean Society were found in a similar situation in the Duke of Devonshire's grounds at Chiswick. *J. O. W.*

Doronicum austriacum.—I can fully endorse all that your correspondent "R. D." writes about the beauties of *Doronicum caucasicum* (p. 416), but would strongly advise him and others to get *D. austriacum*, which grows a little taller, and has a greater profusion of flowers. Each bloom is fully 3 inches across, the ray-florets being of a brilliant yellow, while the eye, which is just an inch in diameter, is of a rich gold colour. It is now in bloom at Mr. Parker's nursery at Tooting, and is quite hardy. *W. Z.*

Violets for Distillation.—Presuming, from the Rev. M. J. Berkeley's remarks at the Royal Horticultural Society's meeting at South Kensington on the 5th ult., that the gathering and preparation of Violets by women and children for the above purpose is not generally known, I thought it might prove interesting to them, by way of supplement, that in this neighbourhood it is customary for both women and children to gather immense quantities for sale to the chemists and druggists, and that these "comparative anatomists," in addition to the gathering of the "heads" as they are termed, have to perform the somewhat tedious operation of plucking the petals from the calyx, the former alone being the portion required for distillation; and

hence it is obvious that it takes several pounds of the "heads" to produce a pound of "anatomised" petals or "pips" as they are provincially termed, and for which the chemists allow 4d. per oz. It seems that this selection of the petals only is analogous to that of Roses when gathered for the process of converting them into attar, conserve, essential oil, and "pot pourri." *W. Gardiner, Gr., Lower Eatonington Park, Stratford-on-Avon.*

Xylaria pedunculata.—We are indebted to our valued correspondent, Mr. Henry Mills, for a sketch of this somewhat rare and curious Fungus, found by him in abundance in the gardens at Enys, Cornwall. Our figure is considerably reduced, the original from which it was taken measuring no less than 8 inches in height; indeed, Mr. Mills informs us that some of the specimens attained the extraordinary length of 18 inches, 16 inches being buried in the soil, and some 2 inches only protruding. In the Enys specimens the sclerotized bases were no less than 2 inches in diameter. As it is by no means a common Fungus, we have reproduced Mr. Mills' drawing to a smaller scale, so that the plant may be recognised if detected by others. Its habitat is in gardens and on rich soil, mostly attached to dung; it is frequently found in masses of cowdung, with the knotty base only developed. When perfectly fresh, the odour attached to the plant is very fetid, especially when cut or broken. As great interest is attached to the reproduction of these curious plants, we have added some details of the fruit. It will be



FIG. 95.—XYLARIA PEDUNCULATA.

seen from our figure that the branches of the Fungus gradually become club-shaped as they emerge from the ground (at the ground line, A), and that the club-shaped heads are externally dotted with a few minute projections, more clearly seen in the enlarged figure, B. The small black projections are the mouths of the perithecia, or bottle-like receptacles which contain the sporidia, or reproductive bodies somewhat analogous to seeds. The perithecia are clearly seen in the section C. To see the sporidia by which the plant is reproduced, the higher powers of the microscope are necessary, but with a quarter inch objective they can be readily made out. With the point of a sharp penknife pick out an atom of one of the perithecia, lay it on a slip of glass with a drop of water and crush it with a circle of thin glass such as is commonly used for microscopic purposes. If this crushed atom be now viewed with the quarter inch objective the fruit of the plant will be seen. It consists of innumerable minute sporidia, arranged in long transparent sacs, or asci, always eight to a sac (D), side by side, with immature asci (E), and transparent jointed filaments, named paraphyses (F), which are usually considered to be abortive asci or spore-sacs. When the sporidia are ripe the ascus bursts at the apex, and the spores rush out, first from the minute ascus itself, and then through the orifices of the perithecia seen in fig. C. Should these bodies fall upon unsuitable materials, they perish, but should they light upon a suitable nidus, such as cowdung or rich earth, they germinate and throw out mycelial threads or spawn: this spawn, instead of at once reproducing the *Xylaria*, grows into the solid knotty mass seen at the base of our figure, this is the

so-called Sclerotium, which will at times rest for a considerable period before it produces fruiting stems, and we have more than once had it thus rest for the *Gardeners' Chronicle* office for determination. *Sphaeria stercoraria*, of Sowerby, is probably a stunted and imperfect condition of this plant. We believe that excellent specimens of our *Xylaria* were sent from Enys to the Royal Herbarium, Kew, and to the Botanical Department of the British Museum. *W. G. S.*

Gardeners' Discount.—If the *Gardeners' Chronicle* succeeds in putting a stop to the dishonest and disgraceful system of discount, it will call forth thanks from the respectable portion of the trade. Nurserymen and gardeners are alike interested in discontinuing the practice—gardeners to a greater extent than many of them seem to be aware of. I am sometimes employed by gentlemen to find a suitable person to take charge of their gardens, and this custom is so well known by many to exist as to receive more than its due weight in the consideration of wages. The fact speaks for itself, and if it and others which could easily be called forth is not effectual in putting an end to the detested thing, no amount of argument can have any effect. I know well that some nurserymen are often in a puzzle to know whether the discount should be given to the house-steward or to the gardener; from the one he receives the order and from the other payment for the work, and he is short by having to distribute the award between them. I could name many nurserymen and gardeners who have never given way to the common practice, although, by silence and restraint, there are very few who have not connived at it. Let us hope, now that the subject has been brought before the general body, that some means may be found to put a stop to it. *J. R.*

The Variegated Watercress.—At p. 450, a correspondent, in writing about this plant, calls it a variegated variety of the common Watercress. I think it a mistake, and that it belongs to the *Barbarea vulgaris*, or Winter Cress. It is certainly a nice plant for edgings, especially in shaded places. I find, if too much exposed to light, that it gets too much tinged with green. It is a fine pot plant for the greenhouse, where its tints become more delicate. It comes quite true from seed, and I think was first sent out by the Messrs. Veitch of Chelsea. *J. Scott.*

Pelargonium inquinans.—The following extract from the journal of a horticultural tour through Flanders, Holland, &c., undertaken in 1847, at the instance of the Caledonian Horticultural Society, by Messrs. Neill, Hay, and Macdonald, will interest some of your readers in these days of *Pelargonium* fever:—"We may here notice that an ornamental variety of *Pelargonium inquinans*, with double flowers, is very common at Ghent, no fewer than ten different competitors having exhibited flowering specimens of it at the last festival; this variety, we believe, has not yet reached Scotland." *J. G. Nelson, Aldborough Rectory, Norwich.*

Flowers for Ladies' Hair.—Under this heading (p. 416) are some remarks by your correspondent "F. W. B.," upon which I should like to be permitted to comment. He says that blooms of *Phalenopsis* may be mounted upon "thin copper wire." It would have been clearer if he had stated what, or about what, size of wire he means, when he speaks of thin wire. Professional florists use two kinds of soft iron wire, both of which are very easily bent; the stouter sort (size No. 21) they call "stubs," and they use it for artificial stalks to flowers which come into their hands with very short stalks, or without any stalks. The finer sort (size No. 28) they call "binding wire," because it is principally used for binding flowers together in making up bouquets. Besides these, they have a hardened iron wire (size No. 28), which is like steel wire, and which they call "Camellia wire," because of its being the best kind to use for that flower. "F. W. B." recommends this "thin copper wire" because it "has the advantage of being more easily bent than the common hairpins." Now hairpins are usually made of a soft wire, size No. 19, which is readily bent even by ladies' fingers; there is, therefore, no need for using copper wire or that account, the more so since copper wire, when bent the same way as steel wire, and which they call "Camellia wire," is so much thicker and clumsy, while copper wire of hair-pin size would be too soft and pliable for use as a hair-pin. It may possibly be useful to some of your readers if I explain the way in which blooms of *Phalenopsis* and some other Orchids are mounted for the hair. Take a piece of stout wire, No. 11 or 12, and bind round it a piece of Camellia wire, which on being slid strength to bend it as a hairpin in the same way as the off from either end of the stout wire, you present the form of a hairpin. The number of turns in the form of a hairpin must vary from 10 to 20, according to the weight of the flower to be mounted, and the corkscrew should be only about an inch long. The flower, deprived of its stalk, should be firmly secured with the finest copper or soft iron wire to one end of the corkscrew, and the wire at the other end should be bound round or securely fastened to the head of a common hairpin. This is the plan to which I referred at p. 270. I fully agree with your correspondent in the utility for the hair of the plants he mentions, and could give a long list of other flowers, particularly

amongst Orchids, which I have had the pleasure of mounting for the fair for various friends, but I never remember any objection being raised to *Ceologyne cristata* on account of its odour. If not well mounted, it is somewhat apt to look like white rags, but when each bloom is supported by wires and the spray nicely arranged over a front of artificial foliage, &c., it is one of the most effective head-dresses I know of. *W. T.*

Fruit Exhibitions.—The suggestions proposed by your correspondent, Mr. Dell (p. 449), regarding fruit exhibitions will, I am sure, receive the approbation of all exhibitors. I am surprised that Mr. Dell, being one of the local committee at Nottingham for the forthcoming exhibition of the Royal Horticultural Society, did not bring forward his excellent suggestions at one of their meetings; had he done so when the deputation from London met the local committee at Nottingham, I think probably arrangements would have been made by which the disgusting condition of the fruit spoken of at Manchester would be avoided at Nottingham, and the success of the exhibition enhanced. Why have waited until everything is arranged and the schedule issued? *Committee-man.*

The Potato Tournament.—Last year Mr. Earley and others set the ball rolling for a great Potato show, but, alas! some of the exhibitors were not allowed to drop, which I think was to be regretted, as the Potato deserves much more attention at our hands than we now generally give it. I therefore take the liberty of asking, through your columns, if it is not possible to get up a show during the coming autumn, which I feel confident, if carried out spiritedly, would contribute largely to the attraction of the show tables at South Kensington, and be no mean item in the revenue of the Royal Horticultural Society. I would like my mite and stage a collection, not that I think for a moment that I am able to compete with our champion growers, but then these are few and far between, and my object in opening this project is to induce all classes of growers, from the humble cottager with his few rods of garden to the farmer who grows his dozens of acres for market, to pay more attention to the Potato. These and all the intermediate growers could (better cultivated) afford to grow a few of the best, and I do not hesitate to say very much better crops, finer samples and better in quality than we now see daily in our markets; and this in the end would pay them a very much better percentage on their outlay than they get at present. To encourage the growth of the finer smooth-skinned shallow-eyed varieties, and to discard the deep-eyed coarse sorts now so commonly grown, would be the first step in that direction, and to do this the growers would be to stage as many as possible against each other; let them be fairly and honestly judged by men competent to do so, and we should soon find a demand for the best varieties. Should any of your more experienced correspondents fall in with my views—and I hope I may induce some of them to give the subject a little attention—I think it would not be much trouble to get up a committee to carry out the project, and I leave it to those better versed in the matter to be suggested by me. High growers could be induced to contribute towards its first and second fair prizes, I think that several classes should be arranged so as to give all growers a chance of winning honours, say 50 varieties for our largest growers, 25 for the next, and 20, 15, 12, 10, 6, &c., so that those who grow only a very few may be able to compete. For the larger collection, 12 tubers of each sort would, I think, be enough; for the smaller collections, 20 or 25 tubers of each sort would be quite as many, but in framing the schedule care should be taken to specify the exact number in each class, and no deviation should be allowed either way by exhibitors or judges. I think it should also be clearly understood how they are to be staged, so that all may be put up as nearly alike as possible, which I consider in this matter a point of importance. I hope to see the matter well investigated by your correspondents, and may then be able to arrive at some definite point, and now that the planting season is at its height gardeners generally would be a revival of the question be stimulated to lend their assistance. I have paid a great amount of attention to the Potato for some years, and feel greatly interested in its cultivation, my system of which I hope to give you at some other time. *John May, Westfield, Havant.* [Any information tending to improve the culture of the Potato will be useful. *Eds.*]

The Advantages of Growing your own Seed cannot be overestimated.—Such are the words of "Kitchen," at p. 418, who appears to be no little gratified with the idea that his own harvested seed is superior to that purchased elsewhere. Such may be the case; but why condemn the one on the ground that it was later in coming up? Do not the different varieties of Onions vary in the time of coming up? I think so. I have found in most cases that the Nuneham Park variety is the first to appear above-ground, and it was so with me again this year, but not on account of its being seed of my own sowing. I don't believe in the practice, and I think the majority of your readers will agree with me, and be ready to exclaim, "I have no time for sowing seed, and when I find it should be afforded for the purpose, what do I gain by it? Perhaps some will say, "Good, new, and genuine seeds." To such people I would say, "Go to a reliable source,

and you'll get seeds to your heart's desire, without the loss of time, trouble, and expense, and as well as anxiety incurred in saving your own seeds." Again, look at it from another point of view, and, thinking of the old phrases, "Live and let live," "Every one to his calling," what would become of your seedsmen if one and all cherished the practice, and more than that, what would become of our seeds? why, they would get into such terrible confusion, that we should, in the course of time, get produce from them only fit for the rubbish-heap. *E. Morgan, Harrow-on-the-Hill.*

Breeding Gold Fish.—My experience about gold fish corresponds exactly with that of "K. L." My pond is not more than 2½ feet deep, and was frozen about the bottom in 1860-1; also this winter, when the thermometer stood at 2° below zero not many yards from it. I never break the ice, as I consider it keeps the fish warm. *J. Scott.*

Severe Frost for the Season.—In this locality, in North Notts, the frost on the mornings of the 7th and 8th was very severe for the season, the thermometer registering 5° and 7° of frost respectively. In a lower situation, near the Abbey, 11° of frost was registered on the morning of the 7th, and I hear that at Thoresby and Rufford it was a degree or two lower still. I am afraid the Gooseberries and Currants are much injured, for they are just in flower, and the flowers, which were not yet expanded, are killed by the frosts. The Apricots, Peaches, and Nectarines unprotected will likewise be in great danger of setting a very thin crop. Pears, Cherries, and Plums are not far enough advanced to be much hurt, except on south walls. Until this frosty period set in the spring was very favourable, and vegetation kept back later than usual, but this untoward change in the weather is disheartening to gardeners in trying to raise early vegetables, and nearly all are alike in having a short supply of Broccoli or Sprouts of any kind at this date. *William Tillyer, Wethick.*

The National Show at Manchester.—The Council of the Manchester Botanical and Horticultural Society has recently issued its schedule of prizes to be offered for the National Exhibition of Plants, Flowers, and Fruit, to be held as usual in the Society's beautiful grounds at Old Trafford near Manchester, on the Friday before Whitsunday. The show is to continue during part of Whit-week, viz., from May 26 to June 2, both days included. I have just run up the figures roughly to see what is the money value of the prizes offered, and I find that it runs up to £790. It is therefore very evident that the Council are determined to maintain the liberal name they have so well deserved in past years, and they are backed by gentlemen amateurs who have offered special prizes for subjects showing superior skill, and for botanical rarities. What would the old time exhibitors think of such a schedule as this? I well recollect the time when the grand exhibitions of the Horticultural Society of London at Chiswick were got up by the Council, and for the first prize. Here we have £30 offered for 16 stove and greenhouse plants, and £50 for a score of Orchids. Only imagine a dozen British Ferns bringing the successful exhibitor a prize of £5, and a group of 80 succulents £9. Should the weather prove favourable this show promises to surpass all its predecessors, as the exhibitors are not limited to place; the Irish cultivator will get "a thousand welcomes," and the wary Scot may reasonably hope that a short journey to Scotland will be well repaid, while all have the greatest confidence in the sterling honour and honesty of the Council, and those of their able curator, Mr. Bruce Findlay. Intending exhibitors will do well to notice that the entries close on May 16, and that all necessary information may be had by letter addressed to the curator as above. The city of Manchester is the centre of an immense population, and, come what may, the people will keep holiday in Whit-week. So will be the position of society seek for high-class amusement, and will come a long way to the menade in the seclusion of the Botanic Garden, where the half-guinea entrance on the opening day ensures the select character of the visitors. The charms of the plants and flowers, added to the sweet strains of music from a couple of military bands, and the array of youth and beauty in gorgeous apparel, leaves little to be desired in the way of enjoyment. In no other city, except the city of London, could such a show be attempted, for we are surrounded by merchant princes who have large collections of plants suitable for exhibitions, and strange exhibitors find that their rare plants are duly appreciated and often meet with a ready sale. *A. Forsyth, Salford.*

Syringing Peach Trees.—Allow me to corroborate all that Mr. Simpson has said about syringing Peach trees when in blossom. About six or seven years ago, when examining some Peach and Nectarine trees in the month of February, I found the air in the house very dry, and the earliest blooms looked much shrivelled, and dropped off with the least touch of the finger. Thinking how well the fruit used to set on the open wall, at a place where I formerly lived, having no protection but the open air, I began syringing in front of the trees, and the blossoms were saturated with water, and I was induced to syringe the blossoms in

the Peach-house very lightly on bright days. I was very cautious with it the first two years, but I found it answered so well that I have the houses syringed every afternoon (except on very dull days) from the time the buds are well swelled until the last swelling of the fruit commences. I have also, for several years lightly syringed Muscats when in flower. It has answered me well, although I have not tried the experiment, that it would be an advantage to syringe the Pear and Apple blossom in very dry weather, provided it were done early in the afternoon, so that they might get dry before evanishing in case of frost, as we sometimes lose our crop of fruit from want of genial weather when the trees are in blossom, even although we escape frost. *A. Forfarshire Gardener.*

Narcissus Sabini.—Any one interested in these pleasant spring flowering hardy bulbs can now see in one of the newly formed herbaceous borders at Chiswick, on the north side of the large conservatory, this somewhat rare species in bloom, with its pretty pale yellow blossoms and deeper coloured centre. Its somewhat dwarf growth, apparent free-flowering property, and a certain distinctness of character, stamp it as being well worthy a place in collections. *R. D.*

Dinner Table Decoration.—It may not be uninteresting if I endeavour to trace the causes which in my opinion have led to the present style of arranging dinner-tables, as explained by your correspondent "D. Deal," (p. 451). The fashion of decorating dinner tables with flowers, which formerly was only done on special occasions, has now become such an everyday affair, that what used to be a pleasure to the ladies of the house, has been repeated so often that it is now regarded in the light of a bore. Hence the employment of professional decorators, and of gardeners, for this purpose. But the fact of a man being a good grower of flowers does not by any means ensure that he must also be a good arranger of flowers. Neither does the fact of any one setting himself up as a professional decorator ensure that he will be a good employer that the table entrusted to him will be tastefully arranged. The truth is, as I believe, that the demand has been greater than the supply; that remuneration has (as usual in such cases) risen in proportion, and that consequently many incompetent persons have started as table-decorators. To artists of this description—particularly if they happen to be gardeners—the plants, the flowers, and the fruits, are the only matters which supply their mind, and which have been such to have been their first consideration; the comfort and requirements of the diners, is never thought of. To such artists we find ourselves occasionally indebted for a fine pot of Maidenhair in a silver loving-cup of huge dimensions, or a pile of fruit surmounted by a tall-crowned Pine, or pyramids of gaily-coloured bonbons and crackers, all of which are sure to be raised to such an imposing height as to prevent either seeing or conversing with your opposite neighbour. No wonder, then, that a protest began to arise against such evidences of bad taste. No wonder, also, that employers, despairing of making such artists understand what they require, passed a rule, intelligible to the meanest capacity, that nothing more than 1 foot high should be placed on the table. From these remarks it probably will not surprise "D," if I take the liberty of doubting his assertion, that "an immense change has come over the taste of the upper ten thousand in this matter." I believe that they have been driven into this present style, not led into it either by taste or fashion. *W. T.*

Araucaria imbricata.—The large *Araucaria Arauca*, near Montrose, is making either flowering cones or catkins at the points of the branches. They look like cones, being about 2½ inches long and fully 1 inch through; there are three in a cluster. Would you kindly say if the tree is male or female? If female, has it flowered, or will it flower yet? Of course if male the catkins will come out. No person here has ever seen the cones or catkins, although I see in the *Gardeners' Chronicle* of 1865 that the trees at Bicton bore cones and catkins regularly. *A. Forfarshire Gardener.*

Effects of the late Frosts.—I am afraid the frosts of Friday and Saturday last, must have had a very baleful influence on the Plum blossom, especially in low-lying and damp localities. I was at Chiswick on Saturday the 9th inst., and with Mr. Barron examined some of the expanded flowers on the pyramid Plum trees. The blossoms appeared perfectly fresh and unharmed at the first sight, but on laying bare the young fruit it was found to be in a putrid state, and completely destroyed by the influence of the frost. All the most advanced flowers appeared to show this. So there is reason to fear much damage has already been done to the crop. Happily there is an abundance of blossom, and many may have escaped unscathed in the battle of the elements. *R. D.*

Grapes Shanking.—My experience quite coincides with that of Mr. Simpson respecting the cause of Grapes shanking, viz., impoverishment. A case which I once had the misfortune to deal with, clearly proves this. Several years ago I undertook the management of a gentleman's garden in Yorkshire. Amongst the houses were two vineries—one an early house, the other later; the first was cleared of fruit when I went there, but the second was not cleared, and I found it to put me in bad heart with

my undertaking. The roof was literally covered with bunches, all that showed having been allowed to hang. They were small, as also were the berries, which, by the way, could not swell, for the scissors had been as sparingly used as the knife. The shoots were tied together in handfuls, and where the leaves had become too crowded they had been cut off, many of the shoots being entirely denuded of foliage. The crop was then ripening, so that I could not act in the manner I wished. Fully one-half (according to my expectation) shrank, basketsful of bunches had to be thrown away, while those that remained had to be cut and hacked till they were as lean as a worn-out roadster. I was given to understand that this over-cropping system had been followed for the three or four years previously, everything that possibly could be spared in that time being sent to market. After the usual attention to ripening the wood, pruning, dressing, &c., they started pretty well in the following year, and showed a fair crop of Grapes, and all went well until they began to ripen, when a wet season set in, lasting, I may say, from July to November. The first bunch stood very well, but the second shrank in every bunch; I do not think that all the sound berries I could collect would weigh zolb. I suspected that something was wrong besides the previous bad top management, so I proceeded to examine the border late in the autumn. I was told by my employer that nothing could be wrong there; the border was made at a great cost, all the soil was carted from a great distance, bones, lime, and manure were added in exact proportions, according to the best authorities; the bottom was also prepared in the same orthodox style, so why, "Oh why," was there such a failure? I had a trench carefully thrown out at the extremity of the border; we dug down nearly 2 feet before there were any signs of roots, and when we came to them it was only to see them pass through into the walk, some of them as thick as my little finger. Now I quite agreed with my employer that the border was everything that it should be, and if they had been content to stay there I should not have had this failure to record; but they strayed into forbidden ground, and disastrous was the consequence. The border itself might be about 15 feet wide, and in front was a very wide walk, so far as I remember, of about the same width. I had a trench thrown out at the first side of it, and there we found them again, from 3 to 5 feet deep, in a cold dead stiff clay, about the size of small quills. Some of the largest were traced as far as possible, while the smallest were cut; and then commenced a most tedious operation. The difficulty in tracing a mass of Vine roots through a 3 or 4 feet bank of clay, and about 15 feet wide, can be easier imagined than described. It was eventually got through, but with fewer roots than we commenced with. I doubled them back in the border, and, lest they should go astray again, had the soil changed underneath the walk. I am glad to say that this operation had the desired effect. Although this occurred several years ago, I hear that little or no shanking takes place there now. The roots of the Vines in the first viney were more confined to the border, which made me think that they had been similarly operated upon, although I never could ascertain that such was the case. This little episode taught me a lesson in Vine growing which I shall never forget. It is astonishing how often this mistake occurs in making Vine borders, even by experienced gardeners. Great pains are taken in making the bottom right, and in procuring the proper material, while little or no provision is made to prevent the roots from roaming beyond it. It is supposed that to make it the same width as the length of the rafter is enough, and that the roots will work there; but no greater fallacy can exist. Vine roots grow as fast as the shoots, and while you cut the latter back every year—keeping them in control and check—the roots will continue to grow, and continue to throw out this year where they finished last; and it is surprising what a length they will go if left unchecked for 12 or 15 years. A clergyman told me the other day that he found the roots of his Vines—ay, and strong ones, too—60 feet away from the viney, when making some Asparagus beds; how much farther they went he did not know. I have planted a viney here lately, but the soil being such as I consider suitable for them, I shall not cut the roots so large. I have disposed with a walk that went along the front of the border (as usual). The subsoil is dry, the soil deep, light, and good; I shall trench a piece every year, and incorporate it well with some "good things." This I resolved to do, as I intend ultimately to adopt the extension system; and in my opinion it is only under such circumstances, where the natural soil suits Vines, that that system will answer. I can conceive that if it is a border made, and proper precautions are taken to prevent their extending beyond it, that a limited space like this can properly answer after a long term of years. The restrictive system, I believe, will always answer best with the restrictive border; and if I could have my own way I would not keep them any longer than eight or ten

years. I believe gentlemen would find that it would pay them better (in the majority of cases) to have an extra house, beyond what is required to supply the family, for this purpose. I fancy I hear some of the great fruit growers deprecating the idea. But I never knew any of these great men, on entering a new place, if the Vines did not suit them, who did not advocate planting afresh, for they knew that by so doing they would best show their strength. It is seldom any of them care to renovate old ones. *A. Yorker.*

Cannell's Boiler.—Mr. Dunbar, at p. 419, admits that there is plenty of room still left for improvement in hot-water boilers, so as to combine simplicity of construction, large heating surface, strength, and durability. Such an expression of opinion from one who has had such immense experience, who has incessantly worked dampers, and various kinds of boilers with all sorts of fuel, and who has seen a thousand boilers at work in different parts of the country, is sufficient to weigh heavily on the minds of those who have long coal bills to pay, and occasionally the expense of a new boiler, yet who depend on the supply of artificial heat to bring to perfection the exotic fruit

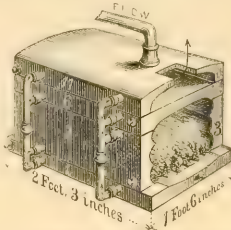


FIG. 96.—CANNEL'S BOILER, WITH ONE FLUE.

and flowers of English gardens. But how your correspondent can rest contented to see two hot-water apparatus exactly alike in different parts of the country, one doing about double the work of the other, without seeking to find out the cause of the difference, I cannot understand. Mr. Dunbar asks several questions concerning the working, &c., of my boiler. He will see by fig. 97, showing it in various sections, that it is

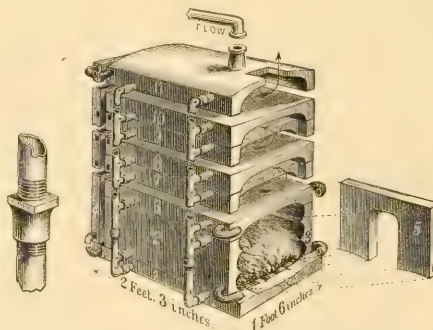


FIG. 97.—CANNEL'S BOILER, WITH SEVERAL FLUES.

easily put together or taken apart, and with less trouble than he imagines. I will take his questions *seriatim*. Where can the boiler be seen? There is no boiler yet cast, but a model has been submitted to some hundreds of gardeners, all of whom have expressed their belief that it possesses immense capabilities. Up to the present time, therefore, its merits are purely imaginary, but several are now being manufactured, and I have no doubt they will stand up boldly and tell their own tale at the Nottingham show next June. And should the Council of the Royal Horticultural Society put up a few thousand feet of 4-inch piping, Mr. Dunbar shall then have actual proof of the immense improvements in this boiler. It is absurd to say that the return-pipe enters at the hottest part of the boiler, as a glance at the engraving will show that the fire rests on the hollow bars or basement casting at the front, and gradually rises as it goes toward the back, and passes in above and through No. 6 section; in fact, the back casting, No. 4, stands on the part at which the return or cold water enters, and if there is one part cooler than the rest, it must be this. Again, the hollow fire-bars do not extend the whole length of the boiler, as is too often the case, thereby admitting more air than is actually required; they scarcely extend two-thirds of the length of the basement casting: the remaining

hollow blank part answers for what is usually called a dead-plate, and there the fire, escaping the draught, will lie for several hours in a dormant state, which is well known to be a great convenience to those who actually have to attend to fires of this kind. How Mr. Dunbar can question that the exit pipe should be on the highest part of the boiler I cannot tell. As regards the draught of the boiler becoming stopped, surely no one else would have so much to say about it, and I am sure that, when the back of the apparatus was distinctly stated.

As regards the complicated castings, my critic is in a more reasonable mood, but he admits that the less complicated the various parts are the better, since a more regular thickness can be obtained, which forms one of the most prominent features in my boiler. Inquiry is made also as to the depth required for stoehole, that it depends upon how many flue sections are to be employed, and the size of the boiler; at all events, fig. 96 will show that one form of it requires but a trifle more depth than the old saddle-back. Further, as to the consumption of fuel no correct idea can at present be formed, but it is the opinion of many practical judges that it will require far less than any other boiler. A small one to heat only 1000 feet of piping will be placed side by side with another where they can be easily connected with or detached from the above pipes, when I hope to give a correct report of what they are, and I should also be glad if your correspondent would come and take statistics. Mr. Dunbar asks, What difference is there between my large fire-place and the one under a well-set saddle? The answer is simply this:—Nineteen saddle-backs out of a hundred are necessarily set on a fire-brick on edge, to get sufficient fire space, which is, perhaps, one of the most wasteful methods ever adopted; and certainly such a system ought not to be continued any longer. Now, as regards the damper, if Mr. Dunbar were a practical gardener he would hail with pleasure the fact that there was to be some improvement in this necessary regulator, for those at present used are really no better than makeshifts. I know of nothing about a gentleman's place or nursery that more bewilders one who is not daily accustomed to them. It often takes two or three weeks for a fresh stranger to place confidence in his dampers, so that many a night he may be kept leaving them at midnight; and I can truthfully say the old dampers have kept me many an hour out of bed during sharp nights, waiting to see whether the fire would burn enough, and not too much, so that I might rest in comfort. If Mr. Dunbar had had a few years in the botany, where the head gardener was determined to have a place for everything and everything in its place, I do not think he would have doubted the utility of a better kind of damper than the one we are now obliged to put up with. Again, when they are placed so far above the boiler, the hottest air is beyond the boiler, heating the brickwork, which is one of the greatest mistakes which can possibly be made. *H. Cannell, F.R.H.S., Woolwich.*

Muscari racemosum pallens.—I met with this variety last week at Mr. Parker's nursery at Tooting, and think it worthy of the attention of those who cultivate these interesting little bulbs. Its flowers are of a rich deep blue colour, intermediate in shade between those of *M. racemosum* and *M. botryoides pallidum*; and they are very sweet-scented. *W. T.*

The Robin Redbreast.—During winter he becomes very tame, for which he is petted and fed with crumbs of bread, while less tame though more deserving birds are starving. Little, perhaps, does the bountiful hand think when feeding robins that they are the most pugnacious of all birds, for except during pairing time two cannot meet without a fight, perhaps even with opposite sexes. The hatred of robins toward their kind is known to close observers, and even there are tales of their picking out each other's eyes. The following, however, will show the deadly animosity of robins to their own species. During the late severe winter I sheltered some starving birds in a hothouse, all of which lived in harmony except two robins; these were always at war, which ended in one killing the other. I watched the slayer, and observed him most wantonly drag the dead one about, picking at the head and eyes in the most disgusting manner, and attacks other birds in their own kind, and robins seem to lay their own species merely through hatred. I may remark that some writers blame kingfishers for the same kind of cruelty; but their warfare seems to proceed more from jealousy about food or favourite fishing haunts than any natural hatred of their kind. Among the other sheltered birds were two hedge sparrows. These harmless birds are generally seen in pairs, hence it is not surprising that they keep together even after the breeding season; but however that may be, hedge sparrows are not gregarious, nor do they increase like common sparrows. I may also mention, that there were two tomtits and a brown wren, because these are so useful in picking insects off plants; and it is really amusing to see how adroitly they do it, without injury to the plants. Perhaps if

insect-eating birds were more encouraged, especially in winter, among plants in hothouses, we should have no nostrums or preparations for destroying insects. The hedge sparrows called a duncock, a name new to me till lately, when I found that the duncock, or hedge sparrow, is classed among insect and fruit eating birds; but as far as my own observation goes, I consider this harmless bird to be wrongfully accused. *W. Wighton, Cossey Park.*

Societies.

ROYAL CALEDONIAN HORTICULTURAL: *April 5*.—The grand Hyacinth spring show of the Society was a better day than has ever been seen at the same period in Edinburgh. Usually there has been but a limited show of miscellaneous plants; and the promoters of the prize schedule, in order to induce a greater display, offered prizes to nurserymen for the best table of plants to fill a space so by 3 feet. This brought out four or five companies, who contributed lined and principal walls of the building. Their lots comprised what is usually seen in our greenhouses and stoves in flower and for decorative purposes at this season of the year. In the Messrs. Thynes' Glasgow group, which took the first prize, was a remarkably well-grown Todea Warcewiczii (T. cocinea), with over 20 well-developed heads of bloom; a Todea superba, with fronds quite to inches long, and in superb health; a really well-managed plant of the superb scented *Trichophila* (T. suavis), with 18 expanded blossoms; a large lot of the Todea Warcewiczii, and several, and well-managed plants of the new *Drapacens* Guilfoylei and reginæ. Messrs. Methven & Sons had a very good lot of miscellaneous articles, prominent among them being what may be considered, from a cross-breeding, a very remarkable *Rhododendron*: it was named *Duchess of Buccleuch*, and was said to be a seedling of R. Edgeworthii, crossed with the pollen of R. Gibsoni (formosum). There can be no doubt that it bears evidence of the blood of both parents; it is like R. Gibsoni in the foliage, and like the Todea, and the flowers are similar to those of the seed-bearing parent also, only they are a little more coloured at the points of separation from the floral envelope. It has, moreover, the fragrance of the one in question. In habit it is well adapted for the hanging pot, and is like both parents. Some of our best hybridists, including Messrs. Isaac Anderson-Henry, and it would be desirable to know what his opinion is respecting the seedling, which he would probably have an opportunity of seeing. Messrs. Deansons & Co. were there with a very good lot of plants, and cross-breeding, and have effected a very good cross between *Eranthemum pulchellum* and *Eranthemum sanguinolentum*. The seedling is most like its seed-bearing parent, sanguinolentum, but the infusion of the blood of the other parent has induced the seedling to come with the same partly-coloured leaves, though it has lost all the dense tomentose hairs. It would be interesting to know what character the flowers take, as if they be after their pollen-bearing parent this would be a decided acquisition. And another new plant, from the Green House, from Mitchell Innes, the raiser of the Passion-flower bearing his name. There were 24 plants in pots, shown in a case, quite as varied in colouring, and vastly easier to cultivate than Alternantheras. In the state we saw it, it was not a very good specimen, but a capital decorative indoor plant, as it was rising out of a garnishing of *Lycopodium denticulatum*. The general collections of plants were of the usual stamp, Mr. John Paterson (Milbank), Mr. Wm. Thomson (Dalkeith), and Mr. D. Marshall (Kingston Grange), taking the first prize in the order in which they are placed. In the first-named stand was the best flowered plant of *Dendrobium fimbriatum* oculatum we ever saw, bearing between 20 and 30 drooping racemes of its golden and crimson-tinged blossoms. Mr. Marshall had a capital *Vanda* and *Heaths*. Mr. Currie, of Salisbury, had an *Orchid* with a score of flowers of rather small size, which beat a *Phalaenopsis Schilleriana* of a poor variety as to flower, but having five leaves, the largest measuring 18 inches long—a beauty fully cultivated plant, from Paterson. The usual Fern and foliage group contributed. *Azaleas* were brilliant enough, but trained far too formally. It is really time some action were taken in this matter, for so long as juries will prize these things, the standard will be raised, and the quality of the plants will be raised. It was a relief to turn from these to one or two standard plants which, though a little formal, were very much better than those that occupied the post of honour on the two principal tables; but for the very few of the group which were really good, and which were up by Messrs. Peter Lawson & Son in the orchestra, they would have been positively painful. *Heaths* were in fine condition from Mr. McKay, The Glen; and Mr. Colin McFarlane showed some excellent *Cinerarias* and *Violas*, and a very fine lot of *Violas*, and *Deutzia gracilis* were well managed, as they have always been at this show—Messrs. Paterson, C. McFarlane, and J. Gordon, Midshire, taking first in each of the classes. The *Cyclamen* were really beautiful, and in good condition. They were very good, but not so many species among them, as they interested freely. C. persicum being the most showy, and C. Cremon following, although some of the plants showed clearly an interfusion of both. Messrs. Currie, Gordon, and Marshall had a very good lot of *Violas*, and a very good lot among the group. *Mignonette* was good, but not equal to some of the examples of former years. Herbaceous plants were few, but still we were bound to notice the beautiful variety of *Primula cortusoides* in so great profusion throughout the hall, and the less interesting *Trilium grandiflorum*. This has fine trifoliate leaves with ovate segments, and being of a pale green cast, show off the pure white flowers to great advantage. *Roses* were much better shown than ever we have seen them

north of the Tweed, and it is an agreeable diversion with a mass that carries a universal suffrage—Messrs. Paterson and Gordon taking best places in the prize list. *Rhododendron* trusses were, as usual, good from Mr. Pirrie, Dysart House. Messrs. Downie's bouquet was after the new style of bouquet table, and got first place with a very good group of those who were, especially their careful disvelled condition as a retrogression in the art of building.

Hyacinths were never so poorly tabled in Edinburgh. They wanted that style and finish which we were accustomed to see at the single novelty worthy of exhibition. All the old sorts that have taken position year by year were there, and if we were to turn up a list of the winning sorts of four or five years ago, we should not be wide-a-field in our report. Messrs. Downie & Co. took 1st, and Dicksons & Co. 2d, among the Hyacinths. Mr. Gordon, Mr. Currie, Mr. Martles, Niddry Mansie; Mr. Paul, Gilmore Place; Mr. Walker, Rossell House; and Mr. Young, the assistant-secretary of the Society, took the chief positions. The best single in bloom was from Schiller, in Messrs. Downie's stand, and the best double, a corner semi-double, it might to have been, was Kohlrort, in Mr. Currie's stand.

The fruit was really a most creditable and effective exhibition. It was arranged in the ante-room between the assembly-room and the music-hall, and was crowded with a large and varied lot of artificial and other flowers, arranged on a table with a dazzling screen as a background, decorated in the same way, from Latta & McQueen, Princes Street. Pines came from Mr. Gordon, Mr. Currie, and from Mr. Fowles, Ford House. Both these growers had magnificent fruit of Smooth Cayenne, quite 7 lb. weight. Grapes came from Mr. Temple, Balbrinie, who has been successful in Lady Downie's for some years, and really the fruit might have been sent down to the show, and not only so, but so plump and well bloomed were the berries. Mr. McTaggart, Armistead, had samples, but not well finished. Mr. Thomson again showed two good-looking bunches of White Lady Downie's; he also exhibited from his weed vine, a sample of the good seedling, *Pargolanum*, naturally affected in colour by a certain description of soil. So much was this the case that it will be hazardous to certificate so-called new varieties. The Keens' Seedling Strawberries, from Mr. Anderson, Oxenford Castle, were the type of perfection in the culture of the strawberry, and the fruit was of the best quality, and the plants, as well as Pears, were splendid in condition from Mr. Cumming, Arnisfield. There was not the slightest wrinkling on the skin, all being smooth and glossy as a maiden's cheek. They deservedly received the first prize. The other varieties of Strawberries, *Blenheim*, *Blackmore*, *Baltimore*, and *Yorkshire Greening*, were conspicuous. Mr. John Brunton, gr. to Sir D. Kinloch, had also good samples, and so had Mr. D. Ross, St. Martin's Abbey, and Mr. Alex. Ingram, Castie Howard, Alnwick; *Globe*, *Barrie*, gr. Saltoun, had 24 lots of good fruit. Vegetables in collections came from Mr. Gordon and from Mr. Temple. The former had good new Potatoes, Mushrooms, Broccoli, Brussels Sprouts, Seakale, Asparagus, French Beans, and Rhubarb. Air Cucumbers came from Mr. George Greig, and excellent Mushrooms from Dalkeith.

SOUTH OF SCOTLAND HORTICULTURAL: *April 6*.—This Society has frequently had a summer and an autumn show, but never before a spring show. It was held on a date, when a grand Hyacinth and spring flower show took place in the Mechanics' Hall, Dumfries, and which for a first attempt was most successful.

On the platform were arranged a fine assortment of evergreens, and a large lot of spring flowers. In the centre, in front, a noble specimen of *Dendrobium nobile*, in splendid bloom, was staged by Mr. J. McGeorge, gr. to Mrs. Simpson of Dalwoodie. The whole of the table on the north side of the hall was appropriated to the display of the same, and the plants, which were exhibited by Mr. J. Forbes, gr. to Mr. Hyslop Maxwell, Esq., of The Grove, and which made a most effective display. The collection included excellent specimens of rose, scarlet, and white-flowered *Azaleas*, trained in pyramidal form, and covered with compact masses of bloom; scarcely a leaf being seen. *Rosa grandiflora*, light rose; *Yervana*, white; Sir Charles Napier, rose; *indica* alba, white. A specimen of *Aucuba japonica* in this group was an object of great attraction, from the large clusters of bright scarlet berries which it bore.

The centre table was set apart for greenhouse and stove plants, and the best collection of these was contributed by Mr. Farquharson, Broomlands, which included *Deutzia*, *Azaleas*, *Crotons*, *Cinerarias*, &c. Mr. Farquharson's collection was a very good one, and which contained a greater variety than the first prize lot, but which were not equal to it in the size and appearance of the specimens. For 3 *Azaleas* only two competitors entered—Mr. Farquharson taking the 1st place with very good specimens, and Mr. Hyslop Maxwell, Esq., gr. to Mr. P. Mooy, Haarlem, was gained by Mr. Milligan, with beautiful examples. The best hand bouquet was contributed by Mr. Milligan; it was very tastefully arranged; and Mr. Wm. Kerr, the secretary, to whose indulgent criticism the success of the show is due, took the 2d honours with a very neat specimen.

For the best 2d Hyacinths in the gardeners' class, the 1st prize was awarded to Mr. James Vair, Mable, who had a splendid lot, perfect in form, and were considered as Edinburgh specimens, and the best of the present year, superior to anything shown. The *Polyanthus Narcissus* were very good. Mrs. Grierson, Chapelmount, was 1st for *Epacris*, and for four *Cinerarias*; and was, indeed, successful in almost every section in which she competed. *Cyclamen* were somewhat of a novelty here; those shown were very pretty.

For the most tastefully arranged *epergne* or dish of flowers for the dinner-table, Mr. Huntly, English Street, offered a very elegant solid silver cream jug, which was

shown in the evening under a glass case, and which was won by Miss Kirkpatrick, Mrs. Kerr coming in 2d.

ROYAL BOTANIC: *April 12 and 13*.—A cloudily, cheerless morning, with a cutting north-east wind, on Wednesday, threatened to materially affect the success of this— the second spring show at the Royal Botanic, but towards noon the clouds broke up, and the sun shone brightly, rendering it at all times gladdening presence especially pleasing on this occasion. The exhibition in itself was of above the average merit of former years, the Rose decidedly contributing the largest share of beauty and interest. In none of the classes was the competition at all brisk, and in several only one or two exhibitors put in an appearance, but such as was staged, in most cases was of a very creditable order. To Mr. Turner was adjudged the 1st prize in the nurserymen's class for 9 roses in pots, Messrs. Paul & Son running him very close at the 2d. The 1st prize flowers were remarkably fine, and fresh in condition, as were several in Messrs. Paul's collection, notably a specimen of Madame de St. Joseph, a finer than which is very seldom seen, and which the judges awarded the 1st prize of a Special Certificate. From the two groups we selected the following varieties, as being first-rate in size, form, and colour:—Anna Alexieff, Marie Baumann, La France, Princess Mary of Cambridge, Miss Ingram, Victor Verdier, Charles Lefebvre, John Hopper, and Dr. in the class of the 1st prize. From the 2d group we selected the following varieties, as being first-rate in size, form, and colour:—Anna Alexieff, Marie Baumann, La France, Princess Mary of Cambridge, Miss Ingram, Victor Verdier, Charles Lefebvre, John Hopper, and Dr. in the class of the 1st prize. From the 2d group we selected the following varieties, as being first-rate in size, form, and colour:—Anna Alexieff, Marie Baumann, La France, Princess Mary of Cambridge, Miss Ingram, Victor Verdier, Charles Lefebvre, John Hopper, and Dr. in the class of the 1st prize. 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Naturally in the treatment of a subject so wide and so varied, the author is not exactly fallacious throughout. In general terms, the practical portions of this book are admirable; no better guide could be placed in the hands of the young forester. The more strictly scientific portions—those relating to vegetable physiology and botany, to the diseases of trees, and the effects of insects and parasitic Fungi—are inferior in value to the other portions of the work, and contrast unfavourably with much of the forest literature of Germany; and herein lies the reproach to the country, to which we are indebted. It is no subject for blame that the author of a book like this should fall in certain particulars to which he has necessarily devoted less personal attention than to others. The subject is so extensive that no one could hope to be equally efficient in all departments. This inevitable deficiency is provided for in France and Germany in the forest schools of those countries, where forestry is made the subject of special education and special training in a manner quite unlike anything in vogue in this country. What would Dr. Brown say on this point? "Foresters [of Britain] are not possessed of sufficient education to give them capacity for carrying out improvements in arboriculture, and until we have a better educated class of men reared to the profession, a large portion of our woods must remain a comparatively unprofitable part of the resources of landed property. * * * Were proprietors to look to their own interest they would upon no account employ men to take charge of their woods who would do less and know less than such men invariably want ability and skill to manage profitably. * * * Were this attended to on the part of proprietors themselves, we should soon have a right class of men, and a class who would be able to advance the art of arboriculture to the standing its importance demands in the welfare of the country."

Sooner or later we must have a proper school of arboriculture in this country. It is absurd to send our youths to France and Germany to learn what could be better taught at home. The French and German writers to the instruction given here. In Edinburgh, Glasgow, Dublin, or London, specially in the former towns, ample means are at hand for securing a good education to foresters, and particularly to surveyors and men intended for the higher posts. The qualifications necessary for a forester, according to Dr. Brown, whose opinion on the matter is deserving the highest consideration, are a good knowledge of arithmetic and the ordinary branches of an English education, a knowledge of surveying, an acquaintance with the French and German languages, with botany, vegetable physiology, geology, entomology, and chemistry. That such a programme is extensive we admit, but it is not too extensive, and we are glad to find Dr. Brown confirming our own experience that such knowledge pays. Highly educated men of this description get almost invariably incomes proportionate to their ability; and this is no more than fitting, considering the great economy and ultimate profit accruing from a plantation judiciously managed, and the loss and waste that ensue from the reckless, happy-go-lucky system followed by incapable labourers calling themselves foresters. The present edition more than sustains the reputation of its predecessors, and the chapters on the management of hedges and of plantations of various kinds in different situations, and under diverse circumstances, the estimate given for ascertaining the present value of a plantation, and such like practical subjects, are admirable in their bearing upon the business of the forest. In any future edition a chapter might usefully be added on forest law and customs, which latter are varied in different parts of the kingdom.

—Amongst NEW PUBLICATIONS, to some of which we may refer at greater length on another occasion, we may mention the reprint, in pamphlet form, of some lectures on the *Curiosités de l'Alimentation*, by Dr. J. Léon Soubeiran, which appeared in November and December (1870) issues of the "Bulletin de la Société d'Acclimatation" of Paris.—*Example of Labourers' Cottages*, with plans for improving the dwellings of the poor in large towns, by John Birch (T. Pettitt & Co.).—*Vines and Ground Vineries; and Portable Plant Protectors, and How to use them*; by W. Edgcombe Rendle.—Two reprint pamphlets from the Transactions of the Scottish Arboricultural Society, by Robert Hutchison of Carlisle: (1) *On the Comparative Rise and Fall of Value in Scotch Timber*, and (2) *The different varieties of Forest Timber usually grown in Scotland*; and (3) *Premium Report on the Effects upon Trees and Shrubs in different Situations, &c., of the Drought of 1868.—Classical and Pre-historic Influences upon British History*: our Philanthropy from of Old, our ever-struggling Past, and our Future; by Saxe Bannister, M.A.—*Street's Indian and Colonial Mercantile Directory*, 1871.

Florists' Flowers.

THAT during 1870 the Floral Committee should have given Mr. C. Perry four, and his scarcely less successful and equally worthy competitor, Mr. W. Eckford, three, First-class Certificates for VERBENAS, is a pretty good proof of the excellence of the new

flowers of the year. Of Mr. Perry's flowers, Mr. Turner will shortly distribute a batch of 13 varieties; and of Mr. Eckford's, Mr. Keynes will send out a batch of nine varieties. Mr. Perry's certificated flowers are as follows:—John Laing, rosy-crimson, with a centre of a deeper hue, large bold pip and truss; a fine and striking variety. Mrs. George Prince, pale pink, with a bold and well-defined crimson centre, distinct, extra fine, and very free of bloom. Perfection, shades of orange-pink, remarkable for the perfect form and stoutness of the pip: a fine exhibition variety; and the Rev. C. Peach, a novel and fine flower, of a peculiar pale purple hue, large bold pip, and splendid truss. Mrs. Boulton, creamy-white, with a striking cherry-crimson centre, good shaped pip, and large truss; received a Second-class Certificate. The following varieties complete the batch:—Bizarre, a fine and bright looking striped variety, having a white ground, with stripes and spots of scarlet; one of several promising striped varieties raised by Mr. Perry, and the improvement of which type of flower he has lately been turning his attention with considerable success. Black Diamond, rich deep black-purple, fine rounded pip, and bold truss; distinct and good. Clara Perry, creamy-white ground, with a large splash of deep violet as a centre; a somewhat distinct and pretty flower. Constellation, pale lavender, with a centre of purple, fine bold pip and truss. Diana, white, with a bold violet centre, pip finely formed, truss large. E. W. Barlow, a peculiar shade of deep silken crimson, with a large and well rounded white eye, pip and truss large and fine. Mauve King, clear pale mauve, with a small lemon eye, good circular pip, and very pleasing; and Singularity, another good striped variety, having white stripes on a purple ground, distinct and good.

The three flowers for which Mr. Eckford received First-class Certificates are the following: George Peabody, bright reddish plum colour, with large firmness of eye, fine bold and showy flower (perhaps the finest *Verbena* of the year); Mrs. Dodds, pale pink, with rosy-violet centre, pip and truss alike fine; and Peter Williams, a rich bright hue of crimson-scarlet, large pale eye, fine bold pip and truss, and very striking. Miss Charlotte Midmay, a large pale flesh-coloured flower, with a bold rosy-crimson eye, received a Second-class Certificate. The following complete the batch:—Grand Monarque, truss and pip fine, with a centre of fine pip and truss; King-craft, purple, with a large white eye; Lavender Queen, pale lavender, pip and truss both fine, a very promising bedding variety; Mrs. Knight, light rose, with a pale ring round a yellow eye, large pip and bold truss; and Rose Imperial, a fine dark rose-coloured flower, of great substance, and very fine form.

It is well known that Mr. Perry cultivates his Verbenas in pots under glass, growing them in two low span-roofed houses, admirably adapted for the purpose. He is not, nor does he pretend to, test the habits of his new varieties with a view to their adaptability for bedding purposes. Mr. Turner beds out the sets at Slough, and so their fitness for outdoor cultivation is ascertained from a season's growth. In the case of Mr. Eckford's flowers, glass is repudiated; the seedlings are all planted in the open ground, and there they take their chance. In walking round the kitchen garden at Colehill, one stumble upon a bed of seedling *Verbenas*, here and there, fully exposed to all the vicissitudes of weather, just as if they were plantations of Strawberries. A good habit is a *sine quâ non* with Mr. Eckford, and he has every opportunity of studying the habits of growth, as well as the floral qualities, of his new flowers. It was curious to notice how in different parts of the grounds, kitchen and flower garden alike, seedling *Verbenas*—self-sown—would thrust themselves up in various places, in some instances on spots where they might least be looked for, not excepting gravel paths.

As a matter of course, any flower that shows signs of a fine development is protected and shaded, in case it might be requisite to send it to the Floral Committee, but that is all. About all the plants nearly there appears to be a general robustness of habit, which, perhaps, not to be wondered at, seeing that a strong habit is of this rare importance in Mr. Eckford's estimation. It was a rare thing to see a plant with a healthy, near-naked stem. The seed is sown in March, in pans or boxes, and covered with soil from one half to three quarters of an inch in depth. These are placed in a vinery, the seed soon germinates, and when the plants can be handled, they are pricked off into 24-sized pots, about 50 plants in a pot, and as soon as they begin to draw roots, the pots are placed in a cold frame. The next stage is to dib them out in beds prepared for their reception, advantage being taken of a shower, immediately after which planting is done. It is no exaggeration to say they grow like weeds, and after any one has seen how well the plants succeed at Colehill treated in this way, a kind of uncomfortable feeling springs up, that as a general rule the *Verbena* gets far too much "coddling."

The difficulty which besets many plant growers, that of keeping *Verbenas* through the winter, does not appear to trouble Mr. Eckford. He asserts that as a general rule *Verbenas* are kept free from dry during the winter, and that is the cause of many of them dying. He gives water sufficiently to keep the plants growing, but avoids a luxurious growth, and they do well. Any

named sort he is anxious to preserve he propagates by taking cuttings at the beginning of September, which are placed in stone pots. About the middle of April cuttings can be taken from these in plenty, in five days they root in heat, and are gradually hardened off in the vinery.

In front of one of the vineries there was a bed of named *Verbenas*, growing in a hot, dry, shelterless spot, fitted to test their endurance to the last degree. Among these were a few capital bedders, such as Eclipse, brilliant reddish-crimson, with a dark centre, a remarkably fine bedder, with a good trailing habit, free blooming, and does not burn. Sensation, bright carmine-rose, with large white eye, very fine truss, and excellent bedder, keeps its colour well. James Birbeck, shaded pink, capital constitution, and a splendid bedder. Countess of Radnor, pale ruby, excellent habit; very free, gets a little pale in the hottest weather, but comes very fine towards the end of the season; and Pearl, pure white, very fine pip and truss, excellent habit; a great improvement on the white bedders now in cultivation. The foregoing, with the exception of James Birbeck, were sent out by Mr. Eckford, and they go to substantiate what I have before advanced, that the bedding qualities of the *Verbena* are of considerable importance in the estimation of that well-known and successful raiser. R. D.

Garden Memoranda.

THE NEW VINERIES AT GUNNERSBUCK.—A range of four new vineries has just been erected at Gunnersbury Park, Acton, the Middlesex seat of Baron L. de Rothschild, M.P., by Mr. James Gray, of Chelsea; and it is probably one of the finest in the kingdom. It occupies a site on which formerly stood a very old and decayed small house, and has an aspect about due south-west. The huge branching Cedars of Lebanon within the pleasure-grounds close by form an effectual screen on the east; while on the west the gardener's residence and the large span-roofed Black Hamburgh house at the back of it afford shelter from the west winds on that side. Outside, one is struck with the size and loftiness of the range, but these characteristics appear more apparent in the inside, where the visitor realises the great quality of the interior, the elegance of construction, the airiness, and abundance of light secured. In point of elevation it is a lean-to range, with a steep half-span at the back to give the requisite height. The length of the four houses is 160 feet, each being 40 feet in length by 30 feet in width, which is inclusive of a broad paved way 6 feet in width, running the length of the houses, and along which the Baron can drive in his pony chair at pleasure. The sloping roof of glass gives a measurement of 26 feet in width from the front to the summit of the span, the depth of the half span at the back is 10 feet. Of this 26 feet of sloping roof, the upper 8 feet is formed of sashes of that depth, and these can be lowered for top ventilation when requisite, by means of cog-wheels and a chain worked from the inside, the ventilation of each house being complete in itself. Ventilation at the bottom is obtained by means of a line of sashes, in front of the house, opening outwards, and worked by the great cog-wheel apparatus, which lowers and raises the top sashes in both simple and effectual, and worked with ease.

The borders are inside, and have been formed mainly of a fine rich yellow loam obtained from Epsom. The front wall, which is about 3 feet above the surface, rests on a foundation turned on arches, and outside these there is a narrow brick chamber, running the length of the house, and also filled with soil.

The heating power appears to be well adapted to the size and requirements of the houses. Two thousand feet of piping are distributed about them, in level bands of six each, side by side, running lengthwise, at the front and back of the border, and at about a foot above the surface of it. There is such a power, and at the same time such a command of heat, that the whole of the houses, or any one or two of them, can be heated as desired. There are two boilers, but it is regarded as certain that one will do the work thoroughly, and heat the large span-roofed Black Hamburgh house at the back of Mr. Richards's dwelling.

The house at the western extremity of the range has been planted half with White Muscats and half with Madresfield Court Black Grapes; the next house wholly with Black Hamburghs; the third with Royal Ascol, Muscadine, Foster's Seedling, Frankenthal, and Black Hamburgh; and the last wholly with White Muscats. Strong canes of all these were used in a short time since, and the growth has been very successful in every satisfactory manner. Between each Vine there is one in a pot, from which a small supply of Grapes will be obtained this year; these two are every way satisfactory. At the back of the houses there is a narrow border against the wall, and here Mr. Richards also planted Vines, from which he hopes to get Grapes till the interior of the roof of this grand range gets thoroughly covered with fruit-bearing wood. He estimates that these four houses will produce considerably about a ton of Grapes when in full bearing condition.

The dimensions of this range of houses seem to suggest the possibility that they may be after all too large to be under perfect control, though, perhaps, the fact that small vineries are in such request, induces one

to doubt the fitness of large houses. With houses under perfect command, and apparently excellently fitted to serve the ends for which they were constructed, there is ample reason to believe, from past experience, that Mr. Richards will attain to gratifying results. The cost of the erection is estimated at £1600. R. D.

THE WEATHER.

STATE OF THE WEATHER AT BLACKHEATH, LONDON,
FOR THE WEEK ENDING WEDNESDAY, APRIL 12, 1871.

1871. MONTH AND DAY.	AT 9 A.M.									
	Reading of				Hygrometrical Deduction from Glaisher's Table, 5th edition.			Weight of Vapour in a Cubic Foot of Air.		
	Barometer reduced to 32° Fahr.	Therm. in Shade.	Therm. at 5 a.m.	Therm. at 8 a.m.	Dew-Point.	Degrees of Humidity.	Direction of Wind.	Force of Wind.	State of Sky.	Grains of Vapour in a Cubic Foot of Air.
April.										
6. Thurs.	30.00	41.3	41.3	39.6	37.4	87	S.E.	2.6		2.6
7. Friday	29.99	41.3	41.3	39.6	37.4	87	S.E.	2.6		2.6
8. Satur.	29.93	41.3	41.3	39.6	37.4	87	S.E.	2.6		2.6
9. Sunday	29.93	41.3	41.3	39.6	37.4	87	S.E.	2.6		2.6
10. Monday	29.83	44.0	44.0	41.3	39.6	87	S.E.	2.6		2.6
11. Tues.	29.61	44.0	44.0	41.3	39.6	87	S.E.	2.6		2.6
12. Wednes.	29.51	44.0	44.0	41.3	39.6	87	S.E.	2.6		2.6

1871. MONTH AND DAY.	TEMPERATURE OF THE AIR.									
	Highest.	Lowest.	Range in Day.	Mean.	Direction of Wind.	Force of Wind.	Horizontal Rainfall.	Inches.	Direction of Wind.	Force of Wind.
April.										
6. Thurs.	40.8	32.0	8.8	39.2	S.E.	2.6	248	0.00		
7. Friday	39.9	30.1	9.8	35.0	S.E.	2.6	248	0.00		
8. Satur.	39.9	30.1	9.8	35.0	S.E.	2.6	248	0.00		
9. Sunday	39.9	30.1	9.8	35.0	S.E.	2.6	248	0.00		
10. Monday	41.3	32.0	9.3	36.6	S.E.	2.6	248	0.00		
11. Tues.	44.0	39.0	5.0	41.5	S.E.	2.6	248	0.00		
12. Wednes.	44.0	39.0	5.0	41.5	S.E.	2.6	248	0.00		

- April 6.—Overcast in the morning. Generally cloudless after noon. A very fine day.
- 7.—Clouds throughout. Very fine.
- 8.—Generally cloudless. A little light cloud in the afternoon.
- 9.—Cloudy till night, then variable. A little thin rain fell about 3 p.m. A fine aurora borealis at night.
- 10.—Variable till night, then cloudless. Very fine.
- 11.—Generally overcast. Rain commenced falling about 3 p.m. and continued onwards.
- 12.—Variable till night, then generally cloudless. Rain fell during the early morning.

TEMPERATURE OF THE AIR AND FALL OF RAIN AT DIFFERENT STATIONS.

DURING THE WEEK ENDING SATURDAY, APRIL 8, 1871.

NAMES OF STATIONS.	TEMPERATURE OF THE AIR.									
	Highest.	Lowest.	Range of Wind.	Mean of all Heights.	Mean of all Heights.	Mean of all Heights.	Mean of all Heights.	Mean of all Heights.	Mean of all Heights.	FALL OF RAIN.
Portsmouth	46.0	32.0	14.0	39.0	39.0	39.0	39.0	39.0	39.0	0.0
Blackheath	46.0	32.0	14.0	39.0	39.0	39.0	39.0	39.0	39.0	0.0
Birmingham	46.0	32.0	14.0	39.0	39.0	39.0	39.0	39.0	39.0	0.0
Wolverhampton	46.0	32.0	14.0	39.0	39.0	39.0	39.0	39.0	39.0	0.0
Leicester	46.0	32.0	14.0	39.0	39.0	39.0	39.0	39.0	39.0	0.0
Nottingham	46.0	32.0	14.0	39.0	39.0	39.0	39.0	39.0	39.0	0.0
Sheffield	46.0	32.0	14.0	39.0	39.0	39.0	39.0	39.0	39.0	0.0
Liverpool	46.0	32.0	14.0	39.0	39.0	39.0	39.0	39.0	39.0	0.0
Manchester	46.0	32.0	14.0	39.0	39.0	39.0	39.0	39.0	39.0	0.0
Salisbury	46.0	32.0	14.0	39.0	39.0	39.0	39.0	39.0	39.0	0.0
Bradford	46.0	32.0	14.0	39.0	39.0	39.0	39.0	39.0	39.0	0.0
Leeds	46.0	32.0	14.0	39.0	39.0	39.0	39.0	39.0	39.0	0.0
Hull	46.0	32.0	14.0	39.0	39.0	39.0	39.0	39.0	39.0	0.0
Newcastle	46.0	32.0	14.0	39.0	39.0	39.0	39.0	39.0	39.0	0.0
Edinburgh	46.0	32.0	14.0	39.0	39.0	39.0	39.0	39.0	39.0	0.0
Glasgow	46.0	32.0	14.0	39.0	39.0	39.0	39.0	39.0	39.0	0.0
Dundee	46.0	32.0	14.0	39.0	39.0	39.0	39.0	39.0	39.0	0.0
Aberdeen	46.0	32.0	14.0	39.0	39.0	39.0	39.0	39.0	39.0	0.0
Paisley	46.0	32.0	14.0	39.0	39.0	39.0	39.0	39.0	39.0	0.0
Greenock	46.0	32.0	14.0	39.0	39.0	39.0	39.0	39.0	39.0	0.0
Leith	46.0	32.0	14.0	39.0	39.0	39.0	39.0	39.0	39.0	0.0
Perth	46.0	32.0	14.0	39.0	39.0	39.0	39.0	39.0	39.0	0.0
Dublin	46.0	32.0	14.0	39.0	39.0	39.0	39.0	39.0	39.0	0.0

JAMES GLAISHER.

Miscellaneous.

APRIL.

- APRIL is a glorious time,
When the woods are ringing
With the rapturous melodies
Of the wild bird's singing;
April is a lovely time,
When the flowers are budding,
And Violet and Primrose
All the lawn are studing.
April is a happy time,
When the Winter's sorrow
Melts like troubled dream of night
Into glad to-morrow;
April is a hopeful time,
With its fields reviving,
And the forces of the year
On and upwards striving.
April is a peaceful time,
With its evening shadows
Dropt like soothing kisses down
On the sleeping meadows;
April is a solemn time,
With its Sabbath mornings
Tinged with cloud and sunshine soft,
Full of low sweet warnings.

April! Thou wilt come and go.
O that thou mayest find me
With God's spring upon my heart,
Sin's cold frost behind me!

M. M. M., in "Aunt Judy's Magazine."

Garden Operations.

(FOR THE ENSUING WEEK.)

PLANT HOUSES.

EARLY batches of *Cape Pelargoniums* will now commence blooming, and should, therefore, receive a little assistance by being occasionally watered with clear liquid manure. Those that are intended to flower later on the cultivator should be kept back a few weeks ago, will have already formed young shoots, and may now require a shift into pots a size larger. Particularly attend to the wants of all in the matter of watering, and especially to those in which the pots are more or less filled with roots. These will often want looking to twice a-day during fine drying weather. Many of the more delicate kinds of Ferns, such as *Adiantum farleyense*, and the species of *Chelidonium*, *Tofieldia*, *Glechoma*, &c., which the cultivator does not feel disposed to pot again, may now, if the plants are fairly receive a moderately liberal shift into open, fibrous, peaty soil. Pot them moderately firm; so that any excess of moisture may not be able to lodge for any length of time within the ball. In regard to atmospheric influences, reliance should be had more upon the maintenance of a nice salubrious atmosphere, by keeping the paths, &c., well damped, than by constantly sprinkling them overhead, a practice which is not at all in accordance with the requirements of some of the species. *Climbing Plants* will now require very frequent attention, especially such as are planted out, and which grow quickly. *Tacsonia Van Volxemi*, one of the showiest amongst cool stove or greenhouse climbing plants, should be so trained as to allow the young shoots formed at the axils of the leaves an opportunity to hang down neatly, so as to gain from their great beauty as they are capable of producing. *Loasas* required to flower in June, having made nearly the whole of their growth, should be allowed a good supply of sunlight, and receive rather less root moisture than heretofore to aid them in setting their bloom buds. Pot-off *Achimenes* into a light compost consisting of equal parts of peat and leaf mould, with a little sand; as soon as they have made a moderate growth in the nursery, afford them a high temperature, with shade, and an abundance of humidity.

FORCING HOUSES.

Attend to the bottom-heat in which *Pines* are now growing, as frequently at this time unexpected fluctuations may be anticipated, owing to the fact that the surroundings afford an additional inducement to these masses of tan or leaves to ferment anew. I have always warned the uninitiated against too violent a bottom-heat, and have suggested 90° as an extreme limit, and 95° as being a maximum to go beyond which would be absolutely dangerous. There are some growers, and successful ones too—who seldom exceed in practice 85° in the matter of bottom-heat. We should, however, certainly take into consideration the excessive fluctuations which *Pines* endure in the hard baked ground of the tropics; though I still maintain that a bottom-heat of 90° may not be any too much, especially when the thickness of the pots is taken into account, and the maximum heat often attained when the house is shut up of an afternoon full of hot sunshine. *Campanula* and *Campanula* syringing not to moisten the flowers of such as are now setting. Give to the roots of *Quercus* at this stage a free supply of water. Give it them copiously at each application, and apply manure-water with a little forethought, based upon a knowledge of the richness or the poverty of the soil, and the size of the pots in which they are growing. Do not water *Black Jamaica* nearly so freely this early. The mean heat to be maintained now may average 63° by night, and 68° by day, and 70° by day, and 8° more by sun-heat alone. This brings the thermometer higher than the most favourable conditions up to 80°, or nearly so. Proceed with the necessary work in *Vinerie*, according to their stage of growth, and keep up a good maximum temperature in all houses containing the earliest Muscats, the berries on which are in a forward state. Thin out successional crops at the earliest possible moment, and pinch back subterminal shoots as they form, at the same time encouraging one or two wandering shoots in each Vine to grow down the back wall, or in any other wise where it can increase the leaf surface without intervening between the light and the older leaves already occupying their proper space. Tie down the young shoots carefully upon those Vines coming on in succession, pinching them back as soon as it is seen what bunches are to be chosen for the crop. Late ones now break out and be kept cool, if it is necessary to keep them back for the later supply of Grapes. In all houses, save such as are actually in bloom, keep up an incessant supply of nice warm moisture or humidity. Give air in good time in the morning, before the thermometer is allowed to run up hastily to an excessive mean, and shut up again quickly at the advent of heavy clouds, storms, &c., with their attendant draughts, searching gusts of wind.

HARDY FRUIT GARDEN.

Peach and *Nectarine* trees have in many instances become so forward in the matter of growth as to suggest the desirability of commencing to disbud; and as this process is best done piecemeal, many will doubtless do so. My removal into Essex affords me reason to believe that mildew is more virulent in some parts than in others, for already some of the young shoots upon these here are coated over with the whitened murrain, necessitating its removal. I shall follow this up with a good dry sulphuring over of every part. These same trees I am informed were last season so smitten with the malady that the fruit were all blighted over with it in too readily discernible patches. If dry weather continue it will be necessary to root-water all newly-planted trees, whether properly mulched previously or not. Plant out early forced *Strawberry* plants as soon as they can be dispensed with, on to those borders which were previously prepared for them.

HARDY FLOWER GARDEN.

Attention must now be given to hardening-off all kinds of bedding plants intended for early planting out,—this not only in the matter of placing individual kinds in open plots, frames, &c., but also in places where protection can be afforded by night, but also in connection with such as have been recently potted, or for various reasons are still maintained within green-houses, &c. These may be also somewhat hardened off in a preliminary stage, to say the least, by giving a little air on safe nights, and when no frost is to be anticipated. Plant out *Gladioli* where they are intended to bloom. Proceed with the necessary rolling, edging, and mowing of all lawns, and the grass will make material progress in the matter of growth, and the sooner these things are done the better.

KITCHEN GARDEN.

I have to thank your correspondent "K. K." for the information which he gives on the hardness of *Asparagus*. It was many months ago when I adduced the fact that this vegetable was beyond injury from the effects of frost, and asked for information on the subject, but I could scarcely advise in this place that old rules and conventionalities should be laid aside, and that I was prepared to accept of the fact that during our recent severe weather in the early autumn became a positive injury if a wet winter ensued. Especially am I inclined to think that this is the case with beds placed on ill-drained subsoils, or where an excess of gross manure is used, and which when partly decayed naturally absorbs and holds an excess of water,—that in fact positive injury to the roots may be anticipated through excessive moisture causing them to rot away, whilst the mild withstand the utmost frost with perfect immunity from injury. Pot-off *Cucumbers*, transplant *Lettuces*, remove the frame from the earliest *Carrots*; sow *Rhubarb* seed, if this method, of increasing the stock is followed, also Turnip *Radishes*, and a succession of *Broccoli*, *Borecole*, *Cauliflower*, and all things likely to be most in demand. W. E.

Notices to Correspondents.

APPLE: *Carlisle*. We do not know the Apple sent. It appears to be a tolerably good keeper, although its season is now past, so that we are unable to judge thoroughly of its merits.

ARTEA: *Subscriber*. Possibly some of the pollen may suit be good, but it off from the anthers, and place it in a little paper case in a dry place till wanted for use.

We fear, however, the greater part will be spoiled.

CONVALLARIA BIFLORA: B. S. An error clearly.

FORCING LILY OF THE VALLEY: *Grange*. Certainly, you should treat them up in November, and crown annually. Foreign prepared tufts at 6s. per dozen are the best, and next to these in quality are such as have been planted, three or four plants together, in rows, into rich deep soil on an open sunny border. Always, if possible, get them up in November. In forcing them, do so very gradually, and keep them in a darkened position until both leaves and flowers push prominently together; then gradually inure them to the sun, and afford them plenty of tepid water. Putting up ill-prepared, and hence inferior, flowerless specimens, just before commencing to force, and forcing to excess at first, are things to be strictly guarded against. W. E.

FUNGUS: A C. T. Polyporus common, Fr.: by no means a common species is occurring in Aberdeenshire last September. M. J. B.

GRASS IN A PAVED YARD: A *Subscriber*. Give the whole of the yard one or two good dressings of coarse agricultural salt; or, if you want it done quickly, dissolve the salt in boiling water and apply it while it is hot.

LAWN SAND: G. W. Your nurseryman will procure it for you.

LOUDON'S ARBORETUM: D. P. M. Originally published by Messrs. Longmans. Your bookseller would procure it for you.—MILLEPOT: W. G. N. week.

NAMES OF PLANTS: 1. *Mercurialis perennis*; 2. *Adoxa moschatellina*; 3. *Chrysosplenium oppositifolium*.—W. T. C. 2. *Campylopus angustifolium*.

SPOT IN PELARGONIUM LEAVES: C. W. Next week.

ST. ANTONIA: L. ANTONIA: 7. S. H. *Comelia Hilli*, *Staphylea*, not finding this plant mentioned in the catalogues, wishes to know where he can procure it. We doubt its hardiness, except under very special circumstances.

CATALOGUES RECEIVED.—James Brooke & Co., Catalogue of Select Orchids, Palms, Ferns, Nepenthes, &c.—J. Linden (Brussels), Catalogue of Tropical Orchids.

them. It is still to the prize system as applied to farmers that we refer ; but, having now for man

years given premiums for what may be called the means of good farming, the Society is at length offering a prize for results. The best farm of its annual district is to be thus decorated and distinguished, for the instruction of all.

Apart altogether from the award itself in such a competition, there is the benefit of discussion and criticism, which is certain to be realised. The award may be right or wrong, and the grounds of it insufficient or mistaken; but the rivalry which in the first instance it excites, and the controversy which it ultimately raises, are most important educational influences, of which the results are certain to be good. We are glad, therefore, that the Society is to maintain the annual prize which was instituted by Mr. MASON.

If, however, there is one class more than another that has to thank the Agricultural Society for its educational influence, it is the landowners of this country. Certainly they know generally more of what we may call their profession, and take generally much more interest in it, than they did 30 years ago. Most landowners now are more or less agriculturists, which is much more than could then be said. And it is very much owing to the influence of the leading landed proprietors of the country, as members and leaders of the Royal Agricultural Society of England, that this change is due.

Why should not the same addition in their case also, as in that of the tenants of their estates, be made to the prize lists of the Society?—This is a question which has occurred to Mr. BAILEY DENTON, and might well occur to any one interested in land agency. Landowners compete with tenants for the prizes of the show-yard, and often win them. The latter have now prizes offered for good farming; but good farming is influenced by, and indeed we might say depends on, good estate management. Why should not competition in the management of estates be promoted by the grant of valuable prizes to landowners and land agents, in the shape of cups that should vie with those of Ascot and Doncaster?

It is the influence of the landowner that governs the ability of the occupier to secure the utmost profit consistent with good agriculture. What is wanted is a comparison of the acts of the owner, committed and omitted, which conduce to agricultural results. Let us know what is the practical effect of liberality on the part of the owner in effecting permanent improvements, such as drainage, good roads, and well-designed farm buildings; in granting liberal covenants to capable tenants; in discouraging the maintenance of excessive game; in providing proper accommodation for the farm labourer; in helping tenantry in the development of improved breeds, and the introduction of steam in cultivation; and in the education of the labouring class.

What a grand thing would be a sweepstakes among the landowners of a district possessing estates above 5000 acres, each putting down £100—with sufficient competitors to raise £1000 a year, as a prize fund to be awarded by the Royal Agricultural Society of England.—The cup, as an heirloom, would be more valued in a generation or two than twenty Emperor's Cups won on the turf.

A CONSIDERABLE extent of railway travel throughout the southern and midland counties during the last few weeks has given us the impression that the Wheat plant is, for the most part, satisfactory and promising, that Beans and Peas are well planted, and that Barley has been got in well. There are, however, many farms on which, not only this year, but always at this season, some of the work of March and April comes under the general term of "MENDING-UP." Patches have failed, or an acre here and there is weak. A thin plant causes anxiety, and the question how to remedy baldness in the Wheat field leads to mending it with spring Wheat, Oats, or Barley; while not unfrequently the answer is—"Plough up your Wheat, and sow some other crop." It may therefore not be out of place to give here the results of our own experience in this important matter.

We believe that when land is in fair condition, if one-half of the Wheat that is usually sown is ploughed out after it has come up, it would be better for the crop; and so much is true, by reason of the additional strength acquired by the thinner plant, that whenever we have sown fresh seed over a thin Wheat plant the first crop at last took the lead, and the new seed had no chance at all.

Thus in a thin piece of Essex White Wheat of 1869, a year in which insects greatly injured the young plant, we tried to "mend-up" by sowing April Wheat in the spring; and though we never got back the seed we had sown, yet the crop was quite an average one, by reason of the extraordinary tillering of the thin plant. Last year we had a thin Wheat plant at spring time, but the yield, now just threshed, proves to be beyond an average. We have experimented in hoeing out every other row in a crop drilled at 7 inches apart, and found that here the crop was equal to the rest of the field. We have drilled half a field to inches apart, using 5 pecks instead of 8, as employed in the rest of the field, and the result was decidedly in favour of the thinner plant. Our Wheat this year is not so thick as it has been, but, guided by the experience of the past, we have no fears upon the matter. It has been rolled, and already looks improved; if it had not improved, we might apply soot or nitrate of soda to stimulate the plants into more vigorous growth.

Let us suppose that in the ordinary growth of an *event* in the vernacular of the west of England, *suin* (*i. e.*, regular)—plant we have 100 ears of Wheat to a square foot, and that these grow from 25 plants, *i. e.*, an average of four ears to each root. On the other hand, we have had not one-fifth of the roots supposed on a square foot, but it has made little difference when these stood out to from 15 to 25 ears to a root. The difference indeed, if any, was in favour of the fewer plants. The ears from these were fully one-third longer than those from the thicker plant, and each *locusta* had from four to five berries, instead of the two to three which usually mark a thickly sown crop.

The truth is, that as regards Wheat we do not duly estimate the influence of its tillering. If, however, we watch the progress of a Wheat plant, we shall find that whenever a bud is pushed upwards from the young plant, proportionate roots shoot out from its base; and a mass of leaf and root acting in concert will make stronger stems and ears than the same number of each growing singly. The poorest Wheat we ever saw was grown by a friend who sowed a sack of poor Nursery grain to an acre. In this case, as is usual, the grain from the thick-sown plant was smaller than that from a thinner one, and had more bran in proportion to its flour.

With regard to Wheat, then, while there are few patches, however thin, in which it is advisable to sacrifice the crop, it is with us a growing conviction that mending-up with fresh corn is generally inoperative. If the new plants do grow it will be at the expense of the tillering of the old ones, and once this has started, the newer plants have but little chance. Our plan, then, is by rolling, top-dressing, harrowing, and the like, to encourage the growth of a thin plant, as being more likely to produce a good crop than any kind of mending-up whatever.

WHEAT, of which the top price is now quoted at 64s. per quarter, rose from 4s. to 2s. per qr. more money on Monday last than in the previous week in Mark Lane.—In the Metropolitan Cattle Market, on Monday, supplies were short and trade brisk, with an advance of price. Monday's quotations were, however, hardly realised on Thursday.

—At a recent meeting of the Society of Arts, the subject of MEAT PRESERVATION being under discussion, Sir ANTONIO BRADY, the chairman, said the loss of weight in cooking meat depended very much on the food of the animals from which the meat was obtained. From his official position in connection with the Navy, he might say that it was well known that the loss of weight was greater than on any other meat; and they did not dare to buy salt pork in the United States, because, by reason of the mode of feeding the hogs in that country, the loss in the cooking was nearly 50 per cent.; whereas the salt pork prepared in Denmark, Holstein, and particularly in Ireland, where the feeding was the best, lost on an average only from 25 to 30 per cent. With regard to beef, it was exactly the reverse, the very finest coming from the United States. He had had the pig and the lambing of the Food Committee two joints killed and cured at Deptford, and meat imported from the United States; and although the meat was unfortunately not cooked so well as it might have been, being done at an hotel, where they were not accustomed to cook salt meat of that description, it was yet most excellent; and some which he had had cooked for his own table was equal to anything he had ever tasted. It could be imported at a very considerable reduction in price, and the large supplies were now being received from the United States.

—As we go to press the Spring Cattle Show of the Royal Dublin Society is being held in the Agricultural Hall and adjacent premises, Eldon Street. It surpasses any previous exhibition in number, and its general quality is also superior. The Society is untiring in its exertions to make its shows each year more attractive and popular, arranging them for different seasons to secure the best representation of each department of agricultural enterprise, and offering liberal inducements to competitors. The entries this year number altogether 233 specimens, and, including the fat stock, there are altogether over 350 animals on view. There are no fewer than 135 Shorthorn yearling bulls, a limited show of Herefords, also a few specimens of polled Angus and Devons of excellent quality; an interesting group of Kerrys, and a few Alderneys. The Townley challenge cup of the Society is won by Mr. CHALLONER of Moynalty, county Meath, whose now famous bull ROYAL SOVEREIGN has established his supremacy by winning the cup three years in succession, and so securing its possession for his owner. The 1st prize in the yearling class is awarded to Mr. LOFTUS BLAND, Q.C., for his FLAG OF THE REALM. The collection of swine is tolerably large, the entries numbering 72, and the quality is very good.

OUR LIVE STOCK.

CATTLE.

MR. M. TRACEY, we understand, made a journey in the latter part of 1870 with Mr. Thornton into the north of England, and looked over the Shorthorn stock in the neighbourhood of Darlington. From these herds he selected a considerable number of good animals, with which material he proposes to establish a new herd. From Col. Craddock he purchased four breeding heifers, not too high in condition, and of exceedingly good character. From a neighbour of Col. Craddock's he bought *Enfielda*, a magnificent cow, well fleshed and covered with a thick but beautifully mellow skin. This cow has not been regarded as a certain breeder, but we think she has quite lately been mated with Mr. Tracey's new purchase, CHERRY PRINCE 4TH, a remarkably promising bull. During the same pleasant ramble Mr. Tracey secured a 2-year-old bull bred at Aylesby, and subsequently sold at a high price to Mr. Harris, of Heme Hill. He is named CHERRY PRINCE OF FORT, is a son of Mr. TOTT'S BRESTLE and Cherry Duchess 3d, and is of deep red colour.

—For a draft sale, Mr. Cheney's of last Wednesday week was one of the most remarkable ever made. The passion for Shorthorns runs high—too high, it is to be feared, for the ultimate good of breeders or the public, or the breed itself. A Duchess calf, properly bred on both sides, represents, if the numbers of pounds be taken into the account, the least, ugly, and of a quality guaranteeing his throat being cut. Be this as it may, it is our opinion that even Duchesses require "weeding," and we leave it to others to say what should become of the weeds. Weeded they must be, however, if they have to maintain a position superior to that of other ordinary cattle. We return from this digression to notice that Mr. Cheney's sale was a great success. 56 animals realised an average of £91 13s.; 48 cows made £96 10s. 8d., and 8 bulls £57 7s. 6d., while the total amount amounted to £5,322 8s. At the lunch Lord Dunmore presided, and in his speech he gave some account of the fate of DUKE OF TREGUNTER, the bull which he had a few days previously purchased (although hopelessly useless) at Mr. Roberts' sale. This animal, it will be remembered, was bought for 165 guineas. The principal object Lord Dunmore had in purchasing him was to see the last of him, for reasons well enough understood by all whom it may concern. Accordingly the bull was slaughtered at 11 o'clock the day previously to the Gadesby sale. When this was made known a subscription was immediately set on foot by the noblemen and gentlemen present, and the sum of 165 guineas was speedily collected and presented to his lordship. The company around the ring numbered something under 1000 people, and included breeders from several counties, and many noblemen. Previous to the sale Mr. Cheney's Duchesses were shown, after which proceedings commenced, and continued rather tardily. The accompanying tabular view contains a complete list of prices and purchasers, but we must make a passing observation or two upon the principal events of this remarkable sale. The first "long" figure was given by Lord Dunmore for lot 8, *Bright Eyes* 2d by ROYAL BUTTERFLY 3d (18,754), and of the "Wild Eyes" tribe. She is a 5-year-old red cow, a little thin on the back, and inclined to be leggy with the *Bentley* by LORD RED KNEE (22,205) became Mr. Ratcliffe's through Mr. Thornton's bidding, and here again we have a well bred animal, a Foggathorpe on the mother's side, but not perfect in hair, colour, or neck. *Fancy* 2d by ROWFANT 1ST (22,767), and far gone in calf to 9TH GRAND DUKE, a pretty, rather small, 4-year-old cow, became Mr. J. Lynn's at 300 gs. *Eclaira* 8th by 10TH GRAND DUKE, and, like many others, in calf to 9TH GRAND DUKE, was sold to Mr. de Saville at 100 gs. and *Bouquet* 2d and 4th were both secured by Mr. Thornton for Mr. Ratcliffe, of Edenbridge, at high

figures. *Lady Waterloo* 16lb by VISCOUNT WATERLOO 3D (25,387) was quickly run up to 200 gs, when she became Lord Skelders' property. She is a red 3-year-old, with a pretty head, good ribs, straight good loins and deep quarters. Next followed two Wild Ewes heifers—*Bright Eys* 5th and *Lady Bright Eys*; the first very stylish, with nice head, albeit light-fleshed; the second nice, but perhaps plain in colour. These both became the property of the Duke of Devonshire—the first at 170 and the second at 100 gs. The sensation prices were yet to come. Not much can be said as to the personal charms of *Cherry Countess*, but what are personal charms when weighed against pedigree? *Cherry Countess* is in calf to 9TH GRAND DUKE, and her calf may be worth hundreds, therefore Mr. H. J. Sheldon will, it is to be hoped, be well repaid for his investment of 410 gs. in this aristocrat. We pass on to the event of the day, namely the sale of *Cherry Princess* by GENERAL NAPIER, a very good, stylish, square yearling. Lord Dunmore boldly bid 300 gs, and was answered by a bid of 380. His lordship bid 400, and 450 and 600 quickly followed, when a bold offer of 500 gs. made her Lord Dunmore's property.

Name of Animal.	When Calved.	Price.	Purchaser.
<i>Cows and Heifers.</i>		Gs.	
<i>Penelope</i>	1858	35	Mr. Burt.
<i>Agnes Beaumont</i> ..	1858	35	Mr. Salt.
<i>Brilliant</i>	1861	60	Mr. A. Garfit.
<i>Johnanna Southcott</i> ..	1862	70	Mr. Oliver.
<i>May Lass</i>	1863	37	Mr. Salt.
<i>Autumn Rose</i>	1864	30	Mr. Sharp.
<i>Anemone</i>	1864	40	Lord Skeldersdale.
<i>Bright Eys</i> 5th	1865	185	Lord Dunmore.
<i>Bouquet</i> 4th	1865	125	Mr. Thornton (Ratcliffe).
<i>Blanche Kate</i>	1867	56	Mr. Salt.
<i>Blanche Rose</i>	1867	300	Mr. Lynn.
<i>Prosperitie</i>	1867	34	Mr. Sturgeon.
<i>Elvira 7th</i>	1867	100	Mr. G. Saville.
<i>Elvira Pageant</i>	1867	40	Mr. H. B. Barclay.
<i>Amelia</i>	1867	40	Mr. Salt.
<i>Belle of Oxford</i>	1867	1	Mr. Marquis of Exeter.
<i>Bouquet</i> 4th	1867	305	Mr. Thornton (Ratcliffe).
<i>Brampton Rose</i>	1867	80	Ms. Mackinder.
<i>Elizabeth</i>	1868	40	Mr. Dunn.
<i>Lady Waterloo</i> 16th ..	1868	200	Lord Skeldersdale.
<i>Bright Eys</i> 5th	1868	170	Duke of Devonshire.
<i>Lady Bright Eys</i>	1868	100	Duke of Devonshire.
<i>Yearling</i>	1868	100	Lord Fitzhardinge.
<i>Cherry Countess</i>	1869	410	Mr. H. J. Sheldon.
<i>Lady Blanche</i> 2d	1869	65	Mr. C. M. Hamer.
<i>Blanche Rose</i>	1869	85	Mr. G. G. G.
<i>Cambridge Princess</i> ..	1869	70	Mr. J. White (Australia).
<i>Princess Clophra</i>	1869	85	Lord Dunmore.
<i>Prosperitie</i>	1869	32	Mr. Bailey.
<i>Agnes Beaumont</i>	1869	33	Mr. Elwes.
<i>Elvira 8th</i>	1869	73	Marquis of Exeter.
<i>Bouquet</i> 4th	Jan., 1870	105	Mr. Thornton (Ratcliffe).
<i>Water Lass</i> 2d	Feb., 1870	105	Lord Fitzhardinge.
<i>Blanche 3d</i>	Feb., 1870	105	Duke of Devonshire.
<i>Blanche Rose</i> 3d	Mar., 1870	45	Mr. Crowden.
<i>Cherry Princess</i>	April, 1870	500	Lord Dunmore.
<i>Belle of Oxford</i> 2d	April, 1870	66	Marquis of Exeter.
<i>Oxford Pageant</i> 2d	April, 1870	62	Mr. H. D. Barclay.
<i>Lady Bright Eys</i> 2d	May, 1870	100	Lord Dunmore.
<i>Elizabeth</i> 2d	May, 1870	35	Mr. Elwes.
<i>Brilliant</i>	May, 1870	40	Mr. A. Garfit.
<i>Anemone</i> 2d	Sept., 1870	47	Mr. Ashburner.
<i>Princess Amelia</i>	Oct., 1870	60	Lord Dunmore.
<i>Princess Amelia</i>	Oct., 1870	60	Lord Dunmore.
<i>May Lass</i> 5th	Jan., 1871	24	Mr. Salt.
<i>Blanche Rose</i> 4th	Jan., 1871	35	Lord Fitzhardinge.
<i>Princess Clophra</i>	Jan., 1871	35	Mr. Patterson.
<i>Princess Joan</i>	Jan., 1871	16	Mr. Sharp.

<i>Bulls.</i>			
<i>WATERLOO PRINCE</i> ..	Jan., 1870	150	Mr. G. Eland.
<i>DUKE OF ATHENS</i> ..	April, 1870	30	Mr. Tiller.
<i>PRINCE OF ASTORIA</i> ..	June, 1871	100	Duke of Buccleuch.
<i>DUKE OF ARTERAY</i> ..	Oct., 1870	120	Marquis of Exeter.
<i>DUKE OF ELV</i>	Jan., 1871	—	Not sold.
<i>DUCLAIR</i>	Dec., 1870	—	Mr. Sharp.
<i>MARQUIS OF YORK</i> ..	Jan., 1871	—	Mr. Salt.
<i>BARON YORK</i>	Feb., 1871	52	Mr. Casswell.

MR. ALLEN RANSOME,

ON A LETTER OF MR. W. SMITH, AT P. 391.

Ipwich, April 5, 1871.

TO THE EDITOR OF THE AGRICULTURAL GAZETTE.

DEAR SIR,—My attention has been called to an article in your paper of March 25, on the "History of Steam Cultivation," by Mr. Smith, of Woolston, in which he has thought fit to attribute to my late friend, John Fowler, and to myself, that we abused his hospitality by acting as spies on his proceedings, in order surreptitiously to become possessed of his ideas to be used to his disadvantage.

To those to whom either of us may have been personally known such a statement carries on the face of it sufficient refutation, especially as Mr. Smith expressly states the circumstances under which he gave to Messrs. Fowler and to my firm the order to construct for his use the motive power and other mechanical arrangements required for the traction of his own implements, which he had found required more power than could be easily applied by horses. Mr. Smith might also have stated that he gave no original instructions or even suggestions as to the mode by which the object he desired to attain was to be carried out, nor that from the time of giving the order until the machinery was "delivered fit to go to work the fol-

lowing day," he did not see either the drawings or the apparatus; whilst as regards Mr. Fowler's patent of Jan. 16, 1856, which appears to have been the subject of his jealousy, Mr. Smith must be aware that it did not relate to any matter connected in the most remote degree with any of his inventions. Surely with these facts within Mr. Smith's knowledge, nothing but a distorted imagination could pretend to perceive that because the designer and manufacturer accepted his invitation with the natural desire to witness in operation the successful accomplishment of their object, their presence was unfriendly, and subjected them to the miserable imputation of abusing his hospitality.

Whenever the full history of steam cultivation shall be written by a competent pen, Mr. Smith will be entitled to credit for the sagacity which induced him to obtain the assistance of others in his desire to realise the advantages of steam traction, to subdue his stubborn clays; but most assuredly to John Fowler will be due the highest praise amongst the many ingenious inventors who had previously laboured in the same field, but who, from some cause or other, had failed individually to secure perfect success. To John Fowler's generous appreciation of the labour of others, and to the liberality with which he was willing to secure for them a full share of the advantage to be derived by a judicious combination of their own inventions with those which were essentially his, may be attributed a large measure of the success which has attended his work. It is the advantage derived from the inventions and experience of his predecessors, or contemporaries, no man was ever more ready at all times, and whether in public or in private, to acknowledge the value than was the late John Fowler.—*J. Allen Ransome.*

WOOLSTON DOINGS.

A HISTORY OF STEAM CULTIVATION.

AT p. 429 "W. B." says:—"Although self praise is no recommendation, Mr. Smith has a well-merited right to plead the exception." This implies that I praise myself, or, at all events, I make up my mind to do so. I am not taken up with the point, for all I do is to tell as plainly as I can what I do and how I do it; and if I see anything written that I do not agree with, I bring the best evidence I can to bear upon it; hence the evidence brought against "W. B." at p. 355, who sings my praises thus: "From the clearness with which he brings out his facts to speak for themselves, facts which prove that every farmer farming 160 acres ought to have steam tackle." I thank "W. B." and I commend his talk to the farmers of England.

"W. B." then questions Woolston doings thus:—"But when the ploughing, harrowing, and drilling are done by horses, is he justified in holding up Woolston as an example of a steam-cultivated farm?"

The doings at Woolston are all recorded from my start sixteen years ago. I began with a smasher and a ridger and subsoiler, and down to 1862 I did all my heavy work with them. In that year I brought out a combined cultivator and drill with a harrow to bear upon my land for some operations (the implement was arranged so that it could be cultivating only, or drilling only, or the two with the harrow might be worked together), and the machine worked well upon all points, and for some years I continued to work it, and I liked it; but in 1867 I found that if I continued to work it I should not keep my land clean, and from then till now I have used nothing but my smasher and ridger and subsoiler—the two implements with which I started. The costs and results for the sixteen years are as follows:—

Heavy Land.—Field No. 1: 8 acres. The total cost of the 16 seed-beds has been £6 12s. 10d., or an average of 8s. 4d. an acre a year. The crops have been—Wheat, 5; Oats, 1; Clover, 2; Turnips, 1; Barley, 2; Beans, 4; and it is now in Beans for the 16th crop.

Field No. 2: 8 acres. The cost for 16 years has been £5 15s. 6d., or an average of 7s. 3d. an acre a year. The crops have been—Wheat, 6; Turnips, 1; Barley, 2; Clover, 1; Beans, 5; and it is now in Beans for the 16th crop.

Field No. 3: 12 acres. The cost for 16 years has been £7 8s., or an average of 8s. 11d. an acre a year. The crops have been—Peas, 1; Barley, 2; Wheat, 6; Turnips, 3; Beans, 5; and it is now in Beans for the 16th crop.

Field No. 4: 10 acres. The cost for 16 years has been £7 6s. 4d., or an average of 9s. 2d. an acre a year. The crops have been—Wheat, 6; Barley, 2; Swedes, 1; Beans, 6; and it is now in Beans for the 16th crop.

The preceding relates to my old heavy land, and since I bought my new heavy land hedges have been stubbed up, and thus an acre has been added to the four fields of heavy land. Now I may like to go the new heavy land.

Field called No. 3 contains 29 acres. In 1871 it was in Beans, and now it is in for Wheat 169 bush. The cost of the seed-beds for the two crops has been 10s. 7½d., or an average of 5s. 3½d. an acre a year.

Field called No. 4 contains 24 acres. In 1870 it was in Beans, and now it is in for Wheat, for the second crop under steam culture. The cost of seed-beds for the two crops has been 13s. 0½d., or an average of 6s. 6½d. an acre a year.

Now let us go to the light land.

Light Land.—Field No. 1: 12 acres. The cost for 16 years has been £7 3s. 4d., or an average of 8s. 11d. an acre a year. The crops have been—Beans, 3; Wheat, 5; Oats, 3; Clover, 1; Peas, 1; Barley, 2; and it is now in Barley for the 16th crop.

Field No. 2: 13 acres. The cost for the 16 years has been £6 3s. 2d., or an average of 7s. 9d. an acre a year. The crops have been—Wheat, 3; Wheat, 5; Clover, 3; Beans, 2; Barley, 2; and it is now in for Wheat for the 16th crop.

Field No. 3: 11 acres. The cost for the 16 years has been £6 1s. 8d., or an average of 7s. 8d. an acre a year. The crops have been—Wheat, 5; roots, 3; Barley, 3; Beans, 3; Clover, 1; and it is now in for Clover for the 16th crop.

Field No. 4: 12 acres. The cost for the 16 years has been £6 4s., or an average of 7s. 10d. an acre a year. The crops have been—Wheat, 6; Beans, 3; roots, 2; Barley, 2; Clover, 2; and it is now in for roots for the 16th crop. *i.e.*, the land is ready for planting.

Field No. 5: 12 acres. The cost for the 16 years has been £5 6s. 3d., or an average of 6s. 8d. an acre a year. The crops have been—Clover, 3; Wheat, 5; Beans, 3; roots, 2; Barley, 2; and it is now in for Wheat for the 16th crop.

Field No. 6: 14 acres. The cost for the 16 years has been £5 8s. 7d., or an average of 6s. 9d. an acre a year. The crops have been—Wheat, 5; Clover, 3; Oats, 2; roots, 1; Peas, 3; Barley, 4; and it is now in for Barley for the 16th crop. In 1868, 1869, and 1870 this field was in Barley, and the average produce for the three years was 57½ bush. per acre. In 1847 it was in Wheat, and the produce was 43 bush. per acre. It is now in for its fifth white-strawed crop in succession. In 1869 and 1870 it had 6 cwt. of superphosphate per acre each year, and it has got 6 cwt. per acre for this year's crop. No common cart dung has been used for the five crops.

During the whole of the 16 years the whole of the heavy operations have been done by steam-power. The number of horses used during that period have been just enough, aided by my nag, to cart my corn at harvest, and my opinion at starting was that I should not be about to do more than cart my corn. I shall always be obliged to keep some to do job-work as well as harvest carting; therefore, the horses that I keep to do my harvest work, do my ploughing, harrowing, drilling, and all the job work on my farm. In this way they get about 118 days' employment in a year. I read that Lord Dunmore is getting up a company in Scotland, £50,000 strong, to do the harvest carting and harrowing, &c., and thus do without horses altogether, and let hury on, and I am glad to hear of it. I have said that Mr. Byrdell was going to do all that fifteen years back. I did not believe that he ever would do it; he did not do it, neither do I believe that Lord Dunmore or any other man will show us how to farm successfully without some horses. We do not do all our travelling by steam. For instance, if I go to London, I drive to Bletchley station—my nag does that—then the steam-engine takes me to London; then a nag takes me to some place; then another nag and cab bring me back to Euston Station; then the steamer brings me to Bletchley, and then my nag brings me home. You see nags are needed in travelling; and, besides all that, I generally get a lot of walking in London. Let Lord Dunmore, "W. B.," and others, reflect a bit over this before they make sure of doing harvest-carting, &c., by steam-power. Then, surely, I am fully justified in "holding up Woolston as an example of a steam cultivated farm." I do not, where is there a farm that has done amongst the contracting men: Mr. Isaac Robinson tells us that he is obliged to hunt his district through to get employment for a set of tackle; and even advertising is resorted to. Then who are the farmers who have sold off all their horses and get their work done by contract, harvest-carting included? We know that private workers do not do this; it is only such inexperienced men as "W. B." and Lord Dunmore who expect to do it. I have said that by steam-power the harvest-carting and job-work included.

"W. B." goes on thus: "On thousands of farms cultivated by the four and five course shift half the area of the former and two-fifths of the latter are in clover-land and land after roots; so that were such ploughed by horses, there would only be half the area remaining to be cultivated by steam, thus leaving a balance in favour of horses." Here is "W. B." sticking to the old frosty "red tape"—everything must be done as it has been done, the old system of cropping, &c., must remain. Where should I have been had I have stuck to "red tape"? The three crops and dead fallow must have remained, for that was the order of the day till I applied steam-power here. Now on my heavy land you see almost a continuous corn-cropping system carried out without any fallow, and that will be quite the order of the day hereafter. On No. 6, light land, there is now planted the fifth white-strawed crop in succession. "Red tape" would not allow such practice, yet for I have not had on my farm 28 acres cropped with Barley; therefore, there will be 104 acres of white-strawed crop this year out of my 166 acres; 39 acres are in Beans, and a first-rate plant, too, so that roots and Clover represent only 23 acres. "W. B." must see that I had the will to cut out a road suitable to my own case, leaving "red tape" to take care of itself; and so his "thousands of farms cultivated upon the four and five course shift

systems," must bend to the power. It is of no use for "W. B." to try to bend steam-power to systems. My father taught me the four-course shift; but then I have learned a little myself, and "W. B." must look ahead instead of looking back after his father's doings.

"W. B." asks this question—"Is horse-culture steam-culture?" An answer has been supplied to me, and it is this: when horses have been worked hard at ploughing or cultivating, they may frequently be seen steaming a bit, especially so in the frequently foggy month of November. Does "W. B." know of any other way by which horse-power can in any way be shown to represent steam-power? *William Smith, Woolston, Ely Station, Bucks, April 3.*

(To be concluded next week.)

GRINDING MILLS.

GRINDING MILLS in the cookery of food for cattle have become as much a practical question of necessity as grinding mills for the food of man. Whether examined from a scientific or practical point of view, few subjects have given rise to a greater amount of controversy amongst millers than the millstone—its quality, form, and dress; and now that farmers have become millers, the same questions will have to be determined by them, and no doubt experience will lead them ultimately to similar conclusions.

The annexed illustration (fig. 98) shows the improved single grinding mill of Messrs. Clayton & Shuttleworth, Lincoln and London, which is equally adapted for grinding fine flour for the baker, confectioner, and cook, as rough meal for the cow-bend and shepherd, and any number of such mills, up to the energy of the motive power to drive, may be placed in the continuous line of, and be driven by, the "lay-shaft," thereby dispensing with the ordinary overhead motion pulleys with their respective driving bands. In any combination of mills, one or more, as circumstances require, may be uncoupled from the lay-shaft, and thus remain stationary while the others are working, and this can be done without stopping the process of grinding.

The frame of each mill consists either of a single casting or of a series of castings fixed together. As a permanent fixture for home use the former is preferable, but for exportation it is advantageous to have the top and bottom separate castings from the upright or shaft portion of the frame. The top stone is the runner, and revolves on the upright spindle, on the lower end of which is a large driven bevil wheel, the driving bevil wheel being on the lay-shaft. Either the one or the other of the two bevil wheels is geared with wood to economise wear and prevent noise. Motion is given to the lay-shaft by one or two pulleys on the right hand outside. When two are used, one is fast on the lay-shaft, for giving motion to the runner, and the other loose, as in the engraving, to allow the belt to run while the stones remain at rest. When required to be worked direct from a portable or fixed engine, the loose pulley is not required.

The small hand-wheel seen on the centre "bridge" that supports the upright spindle is for adjusting the fineness of grinding—the degree, as already stated, being from the finest flour required for family use to the coarsest meal cooked for pigs, dogs, and poultry. Or the stones may be dressed and set so as to dearticulate Wheat for fermenting, Barley for pearl and pot barley, and Oats for "groats" to make gruels. This may be done to any degree of fineness, the "dust" or refuse being used in the cattle cookery; or the stones may be adjusted to bruise or kibble Oats, Peas, Beans, and Indian Corn. The quantity of work done will of

course depend upon the state of the grain and the degree of fineness to which it is ground—the speed running from 4 bush. of Wheat for fine flour to 2 or 3 qr. of Oats or Barley for cattle food.

The mill is furnished with French burr stones, such being indispensable for grinding Wheat into fine flour; and although Derbyshire grey stones cost some £10 to less money, the diameter being 3 feet, and may be used for agricultural purposes, the former (the French burrs) are the cheapest in the long run, being more effective, more durable, and requiring less expense in dressing. A French bedstone and grey runner, or *vice versa*, cost £5 less money, but they are not equal to two burrs, as the greater efficiency, durability, and reduction of expense for dressing soon recoup the extra £5. The same line of argument applies to steel grist and kibbling mills, which cost little money in the outset, but are soon worn out, whilst they are expensive to keep in proper working order, and decrease in efficacy as the runner shortens on the grinding surface, and is screwed up to the bed-plate. Steel mills are also more heating than French burrs, and so are Derbyshire grey stones, and cool grinding is worth far more

a mill fixed to a beam in the wall. Both are power-mills, but hand-mills on either plan may be made. The mill is giving satisfaction to those who have tried it, and the novelty consists of the runner, a Derbyshire Peak stone working in a steel bed-plate case, or the case may be stone and the runner steel. The mills exhibited at the meeting of the Royal Agricultural Society of England at Oxford, and more recently at the Smithfield Club Show in the Agricultural Hall, London, and at local shows, were of the former kind, the runner being stone and the bed steel. In an experiment made expressly for the *Agricultural Gazette*, the power of grinding was rapid, but the meal was fine, though too hot, the runner being set rather close to the bed, and driven at a great velocity. When the distance between the grinding surfaces was increased the power of grinding was also increased, and the rougher meal came from the mill less heated under ordinary driving.

There is nothing peculiar about the mechanism of this new mill that deserves special description, beyond the bed and runner being of different materials, the one Derbyshire Peak stone, and the other steel. The grain is put into the hopper, from the bottom of which it is

conveyed to the eye of the mill by means of a "mill shoe" on the old plan. The runner is of a pear-shaped form, so that, popularly speaking, it is a "conoid."

More correctly it may be termed a "conoid," which is generated by the revolution of a curve about its axis. We refer to this because the Etruscans, who in Pliny's time were said by him to be in advance of all other nations in the art of grinding flour, laid down the rule that the grinding surface should be an "hyperbolic conoid," which may be either flat or otherwise, according to what part of the cone the curve is taken. They also used the hyperbolic curve dress. We had not the curiosity to take Pinfold's runner out of the case to examine what the curvature is, but if an hyperbolic conoid, the obliquity with the axis is considerable. If the Etruscans were right in their theory, and no doubt their theory according to Pliny was based upon experiment; and if Pinfold's grinding surface is also the result of experiment, there is some probability that it may be an approximation.

"Practice with Science" has become not only the motto of the Royal Agricultural Society but of the age, the curvature of the grinding surfaces of grist mills and also of all grinding mills is, we believe, of more importance than is perhaps generally credited, whether the rotating surface is convex, as in Pinfold's case, or concave, as in the Etruscan; or whether the axis be horizontal, as in Pinfold's mill, or vertical, as in the Etruscan mills (one of which was recently dug from the ruins of Pompeii), and in Clayton & Shuttleworth's mill, fig. 98. In Pinfold's mills the distance between the grinding surfaces is easily adjusted by a hand-screw, seen on the left hand of both illustrations.

The merits of Derbyshire Peak stone for grinding are well known, and the probability is that, opposed to a steel bed, it will grind cooler than when both are of steel. But it must be borne in mind that the common rules of heating surfaces do not apply, there being an intervening body between them, *viz.*, the corn being ground. *W. B.*

WEEDS IN DRAINS.

PLANTS seem sagacious, for they never enter drains that are alternately wet and dry.—I mean into those pipes that have only to carry away the surface water. But the case becomes altered where a continuous supply of spring water, rising from below to the

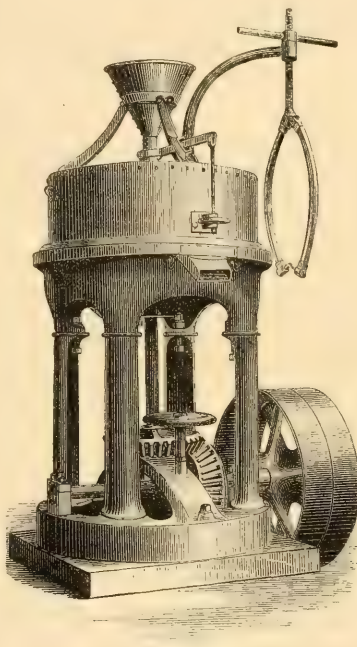


FIG. 98.—CLAYTON, SHUTTLEWORTH & CO.'S GRINDING MILL.

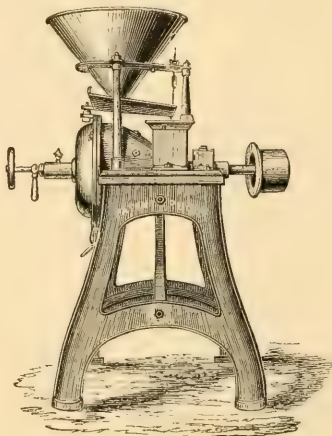


FIG. 99.—PINFOLD'S GRIST MILL, IN FRAME.

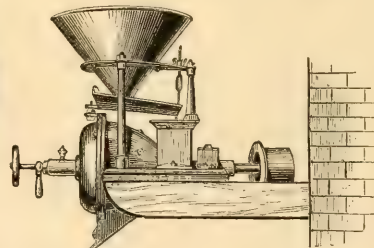


FIG. 100.—PINFOLD'S GRIST MILL, FIXED TO BEAM IN WALL.

than is generally put upon it. Heat accumulates fast in steel and grey stone, but slowly or scarcely at all in French burrs, when grinding coarse meal for agricultural purposes, owing to the porous texture of the stone. Of course corn cannot be ground or even bruised without heat, and the finer it is ground the more latent heat is set free, and blunt grey stones that clog in the grinding and that require to be driven at a greater velocity to produce equally fine grinding and quantity of work are more heating than French burrs, which maintain their dress longer, and so on. The difference in this respect is very much in favour of French burrs.

The stones are neatly and closely cased in, so that little or no waste takes place from the escape of "stive." The corn is put into the hopper above, from which it is regularly fed into the eye of the millstones, on the most improved plan of "cup-feed," and a sack attached to the spout at the side receives the meal as it is ground. The mill is provided with a simple crane of an improved construction to lift the running stone for dressing. The dress is straight, but may be curved if preferred. The form of the grinding surfaces is that usually preferred by millers for grinding fine flour, but any form may be given which special work requires.

Pinfold's Grist Mill.—Mr. J. D. Pinfold, of Rugby, has brought out a new grist mill, of which we give two illustrations, fig. 99 being a mill in a frame, and fig. 100

drain, flows along it in a continual current. If there is a tree or a fence within any reasonable distance, it will send forth a root towards the drain, will insinuate itself through the most minute joints of the pipes, and, there luxuriating in the flowing and aerated water, increase in bulk until, the size of a fox's tail or a small birch-broom, it will so nearly choke the drain that water can only pass through the wig of roots; therefore, if you desire to avoid a heading back of water, and the injury or ruin of many acres of your crops, look sharply after your spring drains. This remark holds good equally as regards plantations of trees or farm crops.

In my shrubbery an insignificant dribbling stream of spring water, which arose in the sand and gravel, and which was 20 years ago, carried through a clay, by a line of small drain-pipes, permeated gradually by the fibres of roots from some trees entering and filling the drain-pipes. In consequence, there was a gradual rising of stagnated water towards the surface. The Rhododendrons and other shrubs sickened, and gradually, in the course of years, died. I wish to warn my brother agriculturists against the insidious action of these gradually rising waters: years before they are seen on the surface they are chilling and killing the roots of the young plants and crops, which look and feel sickly, but cannot in words enlighten you as to the cause of their sufferings.

The rising water expels the air, and, as roots of plants require a change and circulation of air in the soil, for want of this they sicken, and at last die. These unexpected causes of injury and loss are most dangerous and extensive, and sometimes affect immense areas; the stoppage of a single drain may affect a hundred or more acres, for, as is well known, a pressure on one portion of water becomes instantly a pressure on the whole—witness hydraulic machines. I have heard two millers say that, although a mile distant on the stream from each other, the letting away, or shutting off the water from one mill was instantaneously felt, and known at the other. I will give a recent instance on my farm of the result from the partial obstruction of a spring drain.

It will be well to remember that clay kept constantly wet will hold water like a basin, therefore, as on my farm, if there is an immense bed of subterranean sand filled with water, surrounded or opposed by a clay basin or wall, of unknown depth and thickness, the water in the sand basin is retained, and, when full, runs or oozes over the clay. In the meantime this filled basin heads back water over an immense area. In fact, springs are formed by the rain-water, which, sinking its way through porous strata, filters in gravitation through the subterranean sand, chalk, or loose gravel strata, and thus crop out at intervals wherever the porous stratum finds an outlet on the surface. Thus, water falling on high hills or mountains may follow the porous channels, and pass over or crop out on the sides of other mountains of inferior altitude.

On my farm we have cold white sands full of water, abutting against a wall of plastic clay of more than 150 feet deep. Twenty-eight years ago I cut a drain through the clay, in fact tapped the wall that headed back the water, and thus lowered the water in the great sand bed to the depth of many feet, and prevented its rising to the surface and injuring vegetation. Swamps and bog thus became dry land, through which the rains now descend and fertilise.

How far this sand bed extends I am unable to say, but the area of supply must be extensive, for one drain has run twenty-eight years, and has just two or three other drains about half the quantity. There has been a continual supply or deposit of very fine white sand at the outlet of the drains, which has to be removed from time to time. The water is brilliant, and of the finest quality, and generally at a temperature of 46° both winter and summer, feeling icy cold in July and resisting frost in winter. The drains were 12 feet deep at the deepest part. These drains, after a storm, emptied in twenty minutes, and the water lay 14 feet deep in water during winter. For many years not a drop of water has since been found in them; a pump some 600 yards from the drain lost its water, and would have to be sunk many feet to the level of my drain. On another portion of the farm, a 6-foot drain lowered all the water of the surrounding district to its own level. These drains act abundantly summer and winter, but more copiously in winter than in summer.

The main object of this paper is to communicate an interesting fact, as a warning to others to prevent loss. My two great spring drains have continued their usual discharge, but with somewhat less velocity, so that there was no indication of anything being wrong. Two or three years ago a part of a cottage garden, 500 yards from the drain, became wet and puzzled us, seeing that for 24 years it had been dry. Last year it was drained. Recently the ground in the neighbourhood of our great spring drains showed unmistakable heath. Although there were no trees or fences near, and although the drains discharged abundantly, we suspected that something was wrong in the drains. On opening them at a depth of seven feet from the surface, we found them (although six inches in diameter) partially filled with what we call cat's-tails, occupying the pipes for a distance of 25 yards. As soon as these were removed, the outflow was increased immensely in rapidity, and all the land became quickly dry and

firm. We can now understand why the garden, although so distant, became gradually wet and unproductive. These cat's-tails had no connection with the surface soil. I have found Thistles many yards long in spring drains, and a slight development of leaf or head within the drain.

In the summer a row of Laurels planted on the side of an apparently dry ditch that would always look miserable and yellow and slow in growth, while their neighbours were of a dark green and vigorous growth. Suspecting something wrong, after a few years a deep drain was dug, tapped the subterranean water, and the Laurels became pictures of health. Unseen water, making itself only felt near the surface, is a most insidious enemy to plants. If an accurate account could be taken of the annual loss occasioned to the British agriculturist and British people by the want of drainage, local and arterial, it would form an astounding and alarming total. If I am right in my estimate, much more than £100,000,000 sterling are required for draining, and it would pay somebody 10 to 15 p. cent. annually.

This amount of money is a mere trifle, for the money article of the *Times* recently congratulated us on having lost only £50,000,000 to foreigners last year. I never let me hear again of want of money for agricultural improvement. Only give the security on the land, and £300,000,000 sterling, or very much more, could be readily obtained. I speak practically, and not as an enthusiast.

But the pride of owning or farming a large area of poor or half farmed land is a national misfortune, and must ultimately give way to more business-like and common-sense considerations. This nation overflows with capital and population; they both need employment, and then we shall be safe and happy, pecuniarily and politically.

To compel them both to emigrate, instead of producing us food at home, is a sort of national insanity and suicide. My experience of more than a quarter of a century has taught me that there is no investment more safe, and few more profitable, than the improvement of land by drainage, deep cultivation, and plenty of manure. If we had been told 40 years ago that in order to save time and facilitate intercourse we should raise and expend six hundred millions sterling in railways, such a proposition would have been looked upon as insane and impossible. But the thing has been done, and who can precisely estimate the many advantages that have accrued to this kingdom by the expenditure of such vast sums in mental and physical labour. To it must be attributed mainly our great increase in population as well as in wealth, dignity, and security. The same means would produce similar results in agriculture by producing more abundantly, cheapening our home-grown food, and increasing the consumption of it by the employment of more labour and capital. At present the meanness of our agricultural produce is a disgrace to so wealthy and populous a nation. Its agricultural population scarcely knows the taste of beef and mutton.

The miserable annual acreable produce of £3 15s. per acre indicates a lamentable condition of poverty, want of enterprise, and an attachment to antiquarianism altogether inconsistent with our intelligent and steam-animating manufactures and commerce.

Let our great landowners and legislators ponder on this, and lend their powerful aid in the much needed freedom, improvement, and progress of British agriculture. The Board of Trade returns show an area of crop of 1,466,177,370, worth, according to my estimate, £4,466,000, or £454,434, 2s. Besides this there are some millions of acres still to reclaim and cultivate. *J. F. Mechi, Tiptree, April, 1871.*

GROWERS OF CABBAGES.

[The following is the postponed portion of Mr. Cadle's paper on Cabbage cultivation, read before the Farmers' Club last week.]

THE following information has been given by gentlemen who have been growers of Cabbages:—

1. Mr. Hartland, of Biddlestone, Ross, tells me he has grown them for 12 or 14 years, and does not know now what he should do without them. He plants the seed in last week of July or first in August, and plants them out in October, getting the land into a fine tilth, made firm by rolling. He then marks it out with a Turnip seed-drill as he would drill Turnips, and then crosses these drills, so that there is the mark for each plant, being planted: this enables him to horse-draw each way. He has two men who will dig each of their 5000 year day; and he told me he had heard of a man at Evesham who would engage to plant 1000 an hour. He does not keep them to sprout for a second crop, but begins in June to cart them to the sheep on the Clover, finishing them off by hurling the sheep on them at night, and letting them go on the Clover by day, and after the crop is cleared takes Rape or Turnips. The best crop he has grown of any sort of Cabbage has been by trenching the land out 3 feet deep, and filling in the bottom of these trenches with farmyard manure; but this was only in a garden, and would be impracticable in the field, but the crop obtained by this method was immense.

2. Mr. Stratton, of Chilcombe, Hants, writes: "I sow Cabbage seed early in August, some of the small

early and some of the large late kind. I plant out some of the small sort in the autumn for feed in July, and in the spring plant out all the plants. I have the small sort 2 feet square, and the large 3 ditto. They will keep good till January, and do sheep better and grow more feed than any other vegetable. The plants of the small sort crop the top, and are a large, one-third less. They can be cheaply kept clean by horse-hoeing two ways. I sold 1000 lambs (born the end of February and beginning of March) October 22, at 60s. each, and Cabbage was their chief diet."

3. Mr. R. H. Masfen, Pendeford, Wolverhampton: "I grow a few acres, my first being the garden kind, and I follow up with the larger and later sort. The early kind I plant in rows between the furrows, and 16 by 14 between the plants; they, therefore, average nearly 54 Cabbages per square yard, and grow nearly or quite as large a weight as the larger kinds. We begin to cut in June, and arrange to have them for the remainder of the year, and some of the later planted we generally reserve for the winter, during the months of May and June, so that it is difficult to see them come from frost, and if they are planted too soon they are of little advantage for spring food. I have a good portion of my plants from Scotland, and although I have frequently grown seed from the best of the kind, they are not so good in their proof as the plants I get from there direct—a thing I am often surprised at."

4. Mr. Samuel Robinson, Melbourne, near Derby: "It is now about thirty years since I began to cultivate Ox-Cabbage upon an extensive scale as an article of food for sheep and cattle. At that time it was not nearly in so general use as at present. My method of using it for cattle was to put it through the chopping machine with a little water, and to mix it with a portion of food both wholesome and at the same time more economical than any I knew, and of which they ate freely. After several years' experience of its value for autumn and early winter food, I directed my attention to the improvement of the stock then in cultivation, and by seeding the large hearted stems in close proximity with the leafy and more robust constituted ones, I think I have succeeded in producing a stock which will stand a much greater amount of severe winter weather, and also double the weight of vegetable substance. I have on several occasions calculated on different plots of land after the rate of 50 to 60 tons per acre, with individual bulbs from 70 lb. to 84 lb. each, and by reference to my catalogue you may judge of my success in different competitions and exhibitions. I have found that ammonia liquor from gasworks, soot, lime, and salt, combined with stable manure, are a good dressing for the growth of the Cabbage class, and of the great advantages of Cabbage for cattle and sheep food in autumn is, that they have less acid in them, and do not produce that scouring effect as Mangels and Turnips at that season of the year."

5. Mr. T. H. Saunders, Watercombe Farm, Dorchester, says: "I am not a large grower, but I generally grow a few acres of the large late kind, and Robinson's Drumhead; it is a large sort of Cabbage, which comes in for feeding at the latter end of September, and lasts until after the heavy frost comes in. I generally cut and cart away the best, and after fold with sheep—the smallest with sheep. I give my catted ones to my store pigs and working oxen; and when my fattening beasts first come to house, I begin by giving them Cabbage as long as they will clean it, and then I give them a little more, and they get ripe and hard. They don't all get ripe together, therefore I cut a road through the piece wide enough for a cart to pass, and begin to cut the ripest first, as they begin to crack open, and carry them to the road, where the cart takes them away; so I still go over them and cut those which are ripe, as I find all stock prefer the hard white part. I do this because the first which get ripe spoil before the later ones are fit. If land is put in good order, and well manured with yard dung, in our chalky arable land they weigh from 8 lb. to 16 lb. each, and some of the best up to 20 lb. and 25 lb. each, in a good season. I don't grow any early sorts, as I don't want them at that time of the year. I generally grow them on land coming in course for Wheat, where the other part of the field is sown to Rape or early Turnips, as Rape comes with me better than Cabbages planted out early in the autumn, as the winter and game destroy them if planted out in the autumn. I am just going to plant out mine now in the open field. I have about 130,000 which I transplanted about 4 inches apart last September, in a sheltered situation, and put hurdles round to protect them; they are now good sized plants. I put them at 2 feet apart each way, so that I have 64 to the rod. I am particular about having them put in exactly on the square, as I can horse-hoe them each way to keep them clean and a little expense when I see any weeds begin to appear. Cabbages must not be sown before the first week in August, or many of them will run to seed. I generally leave an end of a headland in my Turnip field to sow about 3 lb. or 4 lb. very thickly, until they are large enough to transplant out. By this system I find it is most convenient, as well as cheapest. If you buy your plants, you often do not get the sort you want, and cannot get them when most wanted. I find it is best to put the seed to go to the sort of seed is to pull up three or four of the sort of

Cabbages in September which you think is the best, trim off the leaves instead of cutting the Cabbage in the usual way, then transplant them where they can stand for seed. If not planted early the winter mostly kills them. Then sow this bit of seed early in June, to go for seed, as I have before described. By this means you can improve your sort. The way I adopt in planting is easy and simple. When the land is worked fine I roll it with a light roller; then I put two tines reversed to the bar of a horse-hoe, with a pony in; it makes two marks across the field; then I put in a third time; let the third time be steered back in the mark made in the first going across, while the horse-hoe is being rolled to a feet apart. When you have the land marked out one way, then begin to cross the other in the same manner, so that you can see where to put the plant at every crossing. Some boy or girl takes the plants in baskets, and drops one on every crossing. It costs about 2s. per acre planting. I sometimes sell some to people who come with carts to carry to market. I never sell them under 3d. each; it would pay well if you could get plenty of customers for all."

6. Mr. T. Chapman Saunders, of Watercombe, son of the last-named gentleman, read a paper to the Winfrith Farmers' Club, on the 6th of last month, on the preparation required and the best time for planting the usual farm crops on different soils, part of which is pertinent to our subject this evening. In the course of his remarks he said:—"The greater the variety and assortment of green crops for stock, to be used at different stages throughout the season, the better. Experience too has truly proved, especially in the counties of Sweden and Turnip, that the land became "sick" by the same crop being too frequently sown, hence farmers should give attention to any new plant that was calculated to supply such a deficiency. Cabbage has been thought by some to be an exhausting crop, but after 10 years' experience he had arrived at quite a different conclusion. He had invariably found the land to grow Wheat better after Cabbage, part carried off and part fed on it, than after Turnips. He would remark from the experience of rearing plants, including transplanting, hoeing, &c., was precisely the same for a bad crop as a good one, hence (the cost per acre being the same) the better the land was, or artificially made so, so much the better paying the yield would be. He thought also some misapprehension existed as to the cost and method of growing Cabbage in the field. As much had been said and written on the subject of late, perhaps it would be well to state something of the system he had adopted. At first place, he reared his own plants, which every one who intended growing a few acres of Cabbage annually should do, as by that means the expense was much less than by purchasing them, to say nothing of the advantage of transplanting immediately from the bed. Besides, they could choose the weather most suitable for the purpose, which, if stormy, was so much the better. The seed should be sown about the first week in August. If sown in July, the plants too frequently "can be used." He went on to describe the method of rearing the plants their going to seed and being regarded as a bad sort, to the fact of their being sown too early. About the beginning of October these plants would be fit to transplant into a plot of well-prepared land, allowing each plant about 4 inches square of space each way. One horse and plough was needed to turn over a small furrow, which was best raked down to make a plain surface for the reception of the small plants, which should be set in the ground by the use of a stick. A first forcing of staff of labourers and a suitable time should be selected for such work, so as to get it completed in a limited period, thus the small plants should remain till the following April or beginning of May, when they could be removed and planted out finally at proper distances, say 2 feet each way, which should be done in this manner: Having prepared the land (which is generally taken after a root crop, fed off late, after Barley sowing has ended), the horse-hoe would be rolled over the land, first in one direction, then fixing three lines (on the reverse way, remember), on the bar of the horse-hoe, at a distance of 2 feet apart, proceed to mark lines across the field one way, then drawing the implement across the field at right angles the other way the plants must be set at the points where the lines cross each other, thus easily indicated; and from the fact of the plants being in perfectly direct lines several ways, the horse-hoe would be rolled over the land in the same way, one way, and then across in the other direction a few days later, as might appear desirable. Thus the cost of hand-hoeing was reduced to a minimum. About 11,000 plants per acre would be required to place them at what he found a fair distance, viz., 2 feet apart each way. Method was essential in the distribution and economy of labour in planting Cabbages, not less than in many other branches of farming pursuits. He found the best plan the best plan was to first, form a small party of three men, each taking a separate line across the field; one boy or woman had work enough, and not too much to drop the plants, one at each mark indicated. If another company could be formed similar in number so much the better, but it must act independently. A lad not quite equal to planting might be usefully employed in placing baskets filled with plants at easy distances from those who dropped them, and also in removing

empties. He preferred placing plants in baskets drawn from the beds, as they suffered little damage in being taken from the beds, and they might if thrown into a cart. It was also easier to carry them into the middle of a field, walking on the land already planted, so as not to disturb the crossing marks. The cost of carting the plants, say one-eighth of a mile, and planting on this system, would not exceed 5s. per acre altogether. It was better to plant out finally in spring rather than in autumn, as the risk of damage by game, rabbits, wood pigeons, and severe winter was lessened. A deviation from the four-course rotation was necessary, as Cabbages well in this respect, and were so many others; that system would be more and more condemned as time passed and circumstances altered. Other systems providing that not more than one-half the land be sown to corn in any one year might be advantageously introduced into future agreements between landlord and tenant.

7. Mr. John Cadé, Ballingham, "Cabbage: its cultivation, &c." The following is the plan usually adopted in July 20, 1869, by me on land previously prepared for that purpose, and which has been rendered of a very fine tilth. I generally leave a portion of the ground that has been prepared for Turnips for this purpose. Some plant the seed after early Potatoes, and it is a very good plan, as the object is to get the land as clean as possible, and not manure too highly; if manured, the plants grow so quick, and the stems are very liable to get broken in planting, and are also very apt to become long in the stems. 1 lb. of seed is sufficient to plant half an acre of ground, and 1 lb. of seed will grow enough plants to transplant 1 acre. It is a great mistake to sow the seed too thickly; the plants do not make such vigorous growth from a thick seed-bed as a thin one. I have tried drilling the seed on the ridge, and then drawing the surplus plants out in the autumn or spring, leaving the remainder to their proper width. If drilled in summer, the ground is occupied too long, and if drilled in autumn, the plants do not grow so well as to stand the winter, and are not deep enough in the ground to prevent the winds in March blowing them away. Immediately after harvest, I use Bentall's scraper on my Wheat stubbles: after Clover, well harrow the stubble, &c., and thoroughly clean it. I then let it remain till about the middle of October, then haul about 15 tons of good farmyard manure; plough it in about 7 inches deep. The plough is followed by a subsoil plough, breaking up the bottom of furrows another 4 or 5 inches. Then, about the last week in October, I sow on about 4 to 5 cwt. of bone superphosphate of lime: harrow the ground down and mark out the rows. This I accomplish by taking the levers out of corn-drill, and only leave two or three in according to width required, then run the drill over the ground: one horse will do this. I then transplant the Cabbage plants in the drill marks. I like them best 27 inches apart from row to row, and about 15 to 18 inches in the row. By putting them 27 inches apart, I am enabled to get a cart between the rows, during summer, to haul off those that become matured first without injury to the others. I like planting on the flat much better than on the ridge, as I used formerly to do, the ground lies so much cooler during summer. Care must be taken to steer the drill straight. I give 1d. per hundred (120) to pull and plant. Women can get about 2s. per day, provided they have not far to carry them. I seldom find them in the adjoining field, they get better rooted to stand the winter when pulled and planted the same day. I should not advise any one to plant too early, as they are very apt to go to seed in the spring; if planted about the end of October they will be plenty early enough, as the object in growing Cabbage is to provide food for the stock when all other keep is short, which is about June, July, August. Mangel Wurzel are generally all gone by this time, and then in September, and during autumn, winter, and spring, get plenty of them in the adjoining field, they get better rooted to stand the winter when pulled and planted the same day. I should not advise any one to plant too early, as they are very apt to go to seed in the spring; if planted about the end of October they will be plenty early enough, as the object in growing Cabbage is to provide food for the stock when all other keep is short, which is about June, July, August. Mangel Wurzel are generally all gone by this time, and then in September, and during autumn, winter, and spring, get plenty of them in the adjoining field, they get better rooted to stand the winter when pulled and planted the same day. I find those who planted increase their acreage every year. During May and the early part of June we also have generally a sufficient quantity of grass and Clover. I find that during the three months before named, we are shorter of keep than at any time of the year. I find them especially useful to haul out on Clover, &c., to wean lambs on or to give to milk cows in July, when the grass is shorter, and before the autumn months are over. I think the Enfield Market the best sort to plant; it grows large and yet comes in early, too much desirable objects. I use the horse-hoe very freely during the summer months. I have often been surprised at the great quantity of keep one acre will produce.

DEVONSHIRE BUTTER.

THE day has long gone by when any agricultural process could be stereotyped over in imagination. New circumstances arise, and new wants pave the way for new appliances. In the cheese manufacture what changes have occurred within a few years in this country and in America: instead of the tenant of every little holding making a host of small cheeses from dribbles of milk, the cheese manufactory has sprung up, and the milk is carried to that centre from a radius of several miles, and then to the farmer is merely a

matter of cartage, the distance being of no great moment to him; yet if we take the trouble to reckon the weight of the milk of a dairy of 100 cows, it will be a large item, even at the very moderate figure of only 4 gall. a day for each cow. This, at 10 lb. to the gallon, will give nearly 2 tons of liquid to be carted daily, and it will frequently be over 3 tons with cows newly calved, and no stint of grass. But it is the weight of milk, as regards the making of butter, to which attention has now to be directed; for it will be seen that where it is the custom to churn all the milk to make butter, the churning of 2 or 3 tons of milk takes the weight of the small matter, and we find the farmer employed to do the churning of the large farms. Where the farmer professes to make cheese only, the whey is boiled and skimmed, and the "beetings" churned to get the fat out of the milk that can be got; and this whey butter, when first made, is very good, but it does not keep sweet for any length of time.

The wise man said truly that the churning of milk brought forth butter, but in Cheshire, at least, this is equally true of whey. The churning process has in all ages been a heavy item, and has been performed in so many ways that the last century has seen no less than the art of churning. The Eastern churn which we read of was worthy of the time and of the people, and consisted of two leathern bottles (skins), filled half full of milk, and placed on the back of a camel, one on each side, and as the camel lifted his right fore leg and his right hind leg at the same time he would raise the right bottle of milk, and when he moved the left fore and hind legs, he would raise the left bottle, and produce that rocking motion from side to side, which was the secret of the churning process. However painful it might be to the rider, the driving of the camel round and round churned the butter. The manufacture of churns has lately assumed large dimensions, as any visitors at the gatherings of the Royal Agricultural Society may see. Who is there in a small farmer's house—husband and wife, son and daughter—who has not suffered the torture of being obliged to churn cold cream in cold weather, till the temper of the whole household as well as their own was worn away by the process? The same misemancipation from the slavery of churning, for we have trustworthy information now before us to show that excellent butter can be extracted from milk without the aid of any churn now in use, from the jolting of the camel to the latest patent timed to churn new milk in 10 minutes.

One of our correspondents has transplanted the Devonshire process of making butter from scalded cream into farms scattered over the country, and has made good Devonshire cream in Scotland, in Lancashire, and in Ireland, although it has always been said that the process was peculiar, and could only be done in part of Devon and in part of one of the adjoining counties. Clotted cream is merely rubbed for a few minutes in a smooth wooden tub by the hand, when the butter is ready for washing; and the amount of buttermilk is so small, that to every pound of butter there would not be more than half a pint of buttermilk. It will thus be seen that the great weight of this department will be removed from the farmer's shoulders, for if it takes 2 gallons of milk cream to yield 1 lb. of butter, the weight of the milk will be 20 lb., whereas 14 lb. of clotted cream will yield the same weight (1 lb.) of butter. Where all the milk is made to pass through the churn, there will always be an ocean of butter-milk to be disposed of. This is by no means a desirable article to have on hand; but by the system of making butter from clotted cream there is no butter-milk, but in its place plenty of sweet skim-milk, available for feeding calves or for the making of cheese, as well as for domestic purposes, purposes which butter-milk could not serve.

The scalding process is a very simple one. The milk is kept in a tub, and subjected to a heat a little under the boiling point, and this after it has stood from the previous day, so that all the milk of yesterday would be scalded this morning, and be set again in the cool till to-morrow morning, when it would be skimmed and the cream made into butter. The heat must be raised slowly, and no smoke must be in the apartment where the scalding is done. It has, moreover, to be kept still, not agitated, or shaken in order to get the cream to rise to the top, as it has only the slight difference of its specific gravity to enable it to rise at all. If allowed to rise to the boiling point by neglect the object is defeated. There are several points of detail besides what are here stated, but these will give our readers some idea of the principles of the system; the thing is no novelty, and it is in full work in the locality stated. The most convenient shape and size of the tins are as follows:—Diameter of bottom, 10 inches; diameter at brim, 14 inches; depth, 7 inches; made of strong tin plate, with a wire handle on each side.

The vast amount of capital embarked in live stock on the farm makes every little item connected with their management of importance; every leakage is a loss, however small the cranny may be by which it is let out; and, on the other hand, every item of profit, however small, secured from materials running to waste, adds up in the balance-sheet to the credit side. The scalding process is a cleanly one, it is therefore a change for the better, and deserves a fair trial, if for no other reason than to get rid of the slavery of the churn. A. F.

Home Correspondence.

Experiments with Potash on Potatoes.—Few things speak more for the value of potash to the agriculturist than its now regular appearance among the other manures in the week's prices of our agricultural papers, and in the advertisements and circulars of manure dealers. But though abundance of experiments upon phosphatic and nitrogenous manures are extant in our agricultural books, those upon potash are few, and not readily found. Having tried it very thoroughly upon Potatoes, I send you some particulars and results, which, I believe, prove useful to some of your readers who are about to plant their Potato crop:—

Manures.	Weight per acre of Produce.	Extra cost of Potash Manure over the other.	Value of increase from Potash Manure.	Profit over Cost of Potash Manure.
Tns. cwt. lb.	lb. s. d.	lb. s. d.	lb. s. d.	lb. s. d.
4. Superphosphate, 4 cwt.; muriate of potash, 4 cwt.	7 6 89	1 18 0	6 1 1	3 3 1
8. Superphosphate, 4 cwt.; salt, 4 cwt.	5 11 64			
9. Same as above in another field, and the following year, 1869	6 15 90	1 18 0	4 3 8	2 10 0
11. Farnyard manure, 15 tons	4 7 41			
12. Same with lime, 15 tons	7 7 101			
13. Superphosphate, 4 cwt.; salt, 4 cwt.	8 3 11	1 12 0	2 12 2	1 0 2
14. Farnyard manure, 10 tons; and lime, muriate of potash, and salt	7 15 15	0 13 4	2 14 4	2 1 0
15. Same as above, but without the potash	6 12 71			
19. Lime, 3½ cwt.; salt, 2½ cwt.	4 17 63			
20. Lime, 2½ cwt.; muriate of potash, 1½ cwt.	5 11 90	1 0 0	1 16 8	0 16 8
21. Lime, 1½ cwt.; salt, 1½ cwt.	4 11 93	1 3 0	2 11 7	1 8 7
26. Superphosphate, 4 cwt.; muriate of potash, 12 cwt.; Peruvian guano, 2½ cwt.	6 1 7	Less cost.		
27. Bone dust, 5½ cwt.; Peruvian guano, 2½ cwt.	5 5 109	0 12 3	1 12 8	2 4 11
28. Dissolved bones, 5½ cwt.; Peruvian guano, 2½ cwt.	5 5 109	0 4 6	1 12 8	1 17 2

The first two experiments are the results for one year only, all the rest are the average of three years. The source of potash employed was muriate of potash of 80 to 83 per cent. strength, and is charged at 10s. 6d. per cwt. for the soil of plots 11 and 12 was a somewhat heavy loam; of 19 to 25, a light gravelly loam, and the rest a medium gravelly loam. As the practical result of very numerous experiments, I can recommend for Potatoes, per acre, superphosphate of lime, 4½ cwt., muriate of potash, 3 cwt., and sulphate of ammonia, 2½ cwt. This will be found for Potatoes much better and safer as regards disease than farnyard manure; and if the latter be valued at 5s. per ton laid down in the field, the above mixture will be found also cheaper, even taking into consideration the after effects of the farnyard manure. These experiments were tried upon the Blennerhasset farm, owned and farmed by William Lawson, Esq., and where, in 1868 and 1869, 40 and 70 acres of Potatoes have been grown entirely with these chemical manures; though 14 and even 18 cwt. per acre have been applied, the Potatoes are to-day (March 25) coming out of the plants nearly as sound as when they were in. I have tried the effect of potash manures upon grains and grasses, and cannot advise their application to the grains as a profitable investment. Upon a grass crop rich in Clover the effects of potash are very marked, and when applied in moderate quantity—say, under 20s. cost per acre—will generally prove profitable if quality is wanted; but where a great weight per acre of Rye-grass is wanted, the addition of potash to the manures suited for that purpose has not proved profitable upon our soils, though the quality of the produce was certainly improved. It has also shown profitable results when applied to Turnips, and probably all root-crops will pay for the use of potash along with the ordinary manuring. *Charles D. Hunter, Blennerhasset, Cumberland, March, 1871.*

Analyses of Superphosphate.—Having been for some time past struck with the contradictory analytical result given by chemists, and seeing the vast importance of the matter, both to manufacturers and consumers, I determined to make the following experiment. A sample of ordinary superphosphate of lime was taken and reduced to a fine state of division, and to ensure greater uniformity was passed several times through a fine sieve. Seven tins were then filled from the sifted sample, and sealed up in the presence of a disinterested witness. The tins were forwarded to

seven different chemists, and in due course the following results were obtained:—

Amount of Soluble Phosphate of Lime contained in a Sample of Superphosphate of Lime received from —

No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.	No. 7.
25.46	19.48	24.43	20.33	22.74	19.81	24.59

From the above you will see there is a difference of nearly 6 per cent. in the amount of soluble phosphate in the seven different analyses, representing a money value of at least 18s. per ton. The chemists were all well-known men,—three of them respectively chemists to the Agricultural Societies of England, Scotland, and Ireland; three of the others men whose analysis is always taken in commercial transactions. In the face of this, how is it possible for a manufacturer to guarantee the quality of his goods. In the above cases there must have been either gross carelessness (which I am unwilling to believe), or the several methods employed by chemists to determine soluble phosphate do not give the same result, and are therefore not equally correct. The sample was so carefully prepared, that I have no difference in stating there ought not to be more than a difference of more than 1 per cent. between any of the analyses. I enclose my card as a guarantee for the correctness of my statements, but for obvious reasons do not wish my name published. *F. C. S.*

Societies.

ROYAL AGRICULTURAL OF ENGLAND.

MONTHLY COUNCIL: Wednesday, April 5.—Present: Mr. Vernon, President, in the chair; Viscount Bridport, Lord Licham, Lord Tredegar, Sir A. C. Macdonald, Bart.; Mr. Barnett, Mr. Booth, Mr. Cantrell, Colonel Challoner, Mr. Davies, Mr. Druce, Mr. Edmonds, Mr. Brandreth Gibbs, Mr. Hornsby, Mr. Hoskyns, M.P.; Mr. Masfen, Mr. Milward, Mr. Pain, Mr. Randall, Mr. Ransome, Mr. Ridley, M.P.; Mr. Stone, Mr. Torr, Mr. Turner, Mr. Wells, M.P.; Mr. W. Whitehead, Colonel Wilson, Mr. Jacob Wilson, Professor Simonds, and Professor Voelcker.

The following new members were elected:—Averill, Charles, Jun., Prehill Stone, Staffordshire. Awoock, Henry, Oxen Heath, Tunbridge. Beck, Francis Henry, Albrighton, Shifnal. Becroft, Charles, Lowtham Lodge Farm, Nottingham. Beeton, William, Kidderminster. Boulton, John, Bowling Green Farm, Shifnal. Bowman, John B., Sandcroft Farm, Hawarden, Chester. Byrd, David, Milford, Stafford. Cassen, Joseph, Burghy Sands, Carlisle. Clark, Charles Frederick, Perton Grove, Wolverhampton. Clay, John, Kinsull, Oswestry. Clever, Robert Thomas, The Woodlands, Weston, Shifnal.

Crane, Joseph Calcott, Shrewsbury. Critchley, Walter, Salwick Hall, Preston. Crowdy, George Frederick, Faringdon, Berks. Dabell, Anthony, Staunham Hall, Wokingham. Davies, Lewis Thomas, Llyncyn, Llanpumpant, Carmarthen. Davis, Peter, Rickmarsh Hall, Leicester. Dean James, Breton, Rugely, Stafford. Deild, Henry, The Hall, Rotherfield, Tunbridge Wells. Dowdell, Benjamin, Croft, Easton, Fairfield. Edwards, Edwin, Brockton Grange, Shifnal. Forsthy, James, Wolverhampton. Gelsorpe, Thomas, Morton Manor, Newark. Gutteridge, Charles, Assendon, Henley-on-Thames. Hare, Theodore Julius, Crooke Hall, Cheshire. Hextley, Thomas, The Meadleys, Pittingham, Wolverhampton. Hensman, H. D., Duston Lodge, Northampton. Hibbit, A. W. W., Penkridge, Stafford. Hildyard, Thomas R., Horsey, Eastgate, Durham. Hulme, Thomas, Dunwood Lodge, Emdon, Stoke-on-Trent.

King, William, Denham, Uxbridge. Lea, John, Mackley Farm, Sudbury, Derby. Litter, John, Stogmore, Ludlow, Cheshire. Lloyd, Joseph, St. Asaph, Flint. Love, Robert H., 15, Clarendon Street, Nottingham. Lythall, Frederick, Spittal Farm, Banbury. Mather, M. Edward, Gifford, Holywell. Matthews, James, Salopon Works, Cleveland Road, Wolverhampton. Moffat, James, Kirklington Park, Carlisle. Moxon, Thomas D., Easenhall, Rugby. Nail, Joseph, Hovingham, Nottingham. Norman, William, Hall Bank, Asparia. Ogilvie, James, D. D., Melbourn, Derbyshire. Paget, Richard, Cranmore Hall, Shepton Mallet. Paulson, Fredk. Wm., Broomhill Grange, Ollerston. Picken, William, Hilton, Newport, Salop. Pursell, Robert Rushton, Oxley, Wolverhampton. Robson, Samuel, Jun., Melbourn, Derbyshire. Sandkey, Elizabeth, Bratton Farm, Wellington, Salop. Smith, Thomas C., Adamston, Rugely. Southwell, Charles F., Albion Ironworks, Rugely. Spence, Charles, Little Holt Farm, Bridgnorth. Spencer, John, 62, King William Street, London, E.C. Thompson, John, King's Newton, Derby. Van Allen, J. J., Long's Hotel, Bond Street. Walsingham, Lord, Merton Hall, Theford. Wight, C., Boycot, Rudge Hall, Wolverhampton. Wyley, W. John, Adamston, Wellington.

FINANCES.—Major-General Lord Bridport (chairman) presented the report, from which it appeared that the secretary's receipts during the past month had been

duly examined by the committee, and by Messrs. Quilter, Ball & Co., the Society's accountants, and found correct. The balance in the hands of the bankers on March 31, was £1892 12s. 8d., and £2000 remain on deposit. The quarterly statement of subscriptions and arrears to March 31, and the quarterly cash account, were laid on the table: the amount of arrears being £833.

The committee recommended that the name of Viscount Bridport, as a trustee, be substituted for that of Mr. Bramston, in whose name, in conjunction with the Earl of Powis and Lord Portman, the reserve fund had been now invested.—This report was adopted.

JOURNAL.—Mr. Milward reported that 23 arable farms and four dairy farms have been entered to compete for the prizes offered for the best managed farms in the two counties of Shropshire and Staffordshire; and he stated the recommendation of the committee in reference to judges and a reporter. It was also recommended that the first inspection should be made as soon, and the second as late, as may be found practicable; that the instructions to the judges be the same as last year, with an addition directing their special attention to the management and cleanliness of the dairy on those farms entered to compete for the dairy prizes; and that the judges be informed that a sum of £500 has been placed at their disposal by local subscribers, to be awarded in any special manner that they may deem desirable.—This report was adopted.

In reply to a question by Mr. Cantrell, the Secretary stated that the names of the judges and of the competitors would be published as soon as the former had officially signified their willingness to act.

GENERAL, WOLVERHAMPTON.—Mr. Milward reported the recommendation of the committee that the catalogues of the forthcoming exhibition should be sold by commission; that the first edition of the awards be printed with numbers only, and a full report published as early as possible; and that the secretary with Mr. Bantock be instructed to inquire what arrangements as to railway and admission tickets can be made with the railway companies, so as to report to the Council in May. It was also reported that the arrangements made by the secretary with regard to the supply of refreshment in the Wolverhampton showyard were considered very satisfactory.—This report was adopted.

EDUCATION.—Mr. Wells, M.P., reported that nine gentlemen had entered their names as candidates for the Society's prizes and certificates, five of whom are eligible for the Society's prizes, not having completed their 21st year.—This report was adopted, and the list of examiners nominated by the committee was also approved.

IMPLEMENT.—Mr. Jacob Wilson presented the report, which announced that a report had been received from Mr. Easton, explaining the system which he proposes to adopt in carrying out the trials of implements at Wolverhampton. In order to render these trials as efficient as possible, the committee recommended the purchase of a new dynamometer equal to 100-horse power for the breaking, and a pair of indicators for measuring tank, measuring oil-cans, and weighing-machine up to 28 lb., at a total cost of £234. They also recommended that the present dynamometer be thoroughly repaired, and that Mr. Easton be instructed to arrange a meeting with Messrs. Bramwell and Cowper, with a view of receiving any suggestions and opinions from them which may have been gathered from the previous trials of steam-cultivating implements at Leicestershire and elsewhere, and to report on the question the next report to be adopted. Mr. Randall again raised the question whether the original appointment to the office of consulting engineer to the Society had been of Mr. James Easton, or Mr. C. E. Amos (as it stands in the Society's Journal), or of Messrs. Easton & Amos (as it appears in the minute-book of the Council), and he moved the following resolution as an amendment to the report of the Implement Committee:—"That the consulting engineer to the Society be the firm of 'Easton & Amos,' it is not expedient to release that firm from the responsibility of performing the duties appertaining thereto, until they think proper to resign the appointment, or until the Council shall think fit to make another." This amendment was seconded by Mr. Booth, and opposed by Mr. Jacob Wilson and Mr. Ransome. A discussion then ensued in reference to the following questions: whether the firm had originally been appointed consulting engineers to the Society; whether there had been any reappointment after Mr. James Easton, Sen., and Mr. C. E. Amos retired from the firm; and, if not, under what circumstances Mr. Amos had continued to act as consulting engineer after such retirement, if not on the understanding that it was the individual partners who had been originally appointed. Ultimately Mr. Randall's amendment was carried by 12 votes against 10. The following resolution was then moved by Col. Wilson, seconded by Mr. Pain, and carried unanimously, after some further discussion, in the course of which Mr. Randall stated that his resolution did not in any way upset the one which had been arrived at by the Council last month, in which it was stated that there was no vacancy in the office of consulting engineer:—"That the Council resolve, Messrs. Easton & Amos as their consulting engineers,

the Secretary be instructed to write to Mr. Easton, requesting him to sign the report in the name of the firm, or, if not still in the firm, to obtain the signature of the firm." It was then resolved that upon this signature being obtained the report in question should be printed, and a copy sent to every member of the Implement Committee.—The report of the Implement Committee as amended was then adopted.

JUDGES' SELECTION.—Mr. Milward presented the report of this committee, nominating judges of live stock, which was unanimously adopted, subject to an amendment appointing three judges of Leicester sheep instead of two.

SELECTION.—Major-General Viscount Bridport (having presented the report of this committee) moved, and Mr. Turner seconded, the election of Sir W. W. Wynn, Bart., as a Vice-President, in the room of Viscount Bridport, elected a trustee.—This resolution having been carried unanimously, it was moved by Mr. Torr, seconded by Lord Tredreagh, and carried unanimously, that Mr. J. Wells, of Booth Ferry, be elected a member of Council, in the room of Lord Vernon, elected a Vice-President.

SHOWYARD CONTRACTS.—Mr. Randall (chairman) presented the following report:—(1). The surveyor reports that the contractor has commenced the show yard works at Wolverhampton, that the drainage has been completed by Mr. Webb according to the plan produced to the Council at the last meeting; and that the necessary works for the supply of water to the showyard have been fully explained to the local committee. (2). The committee recommend that the contract with Mr. Penny, for the future erection of showyard works, be made absolute for five years, reserving to the Council the power of terminating such contract at any time in case of non-fulfilment of the conditions thereof. (3). That the filling and levelling at the entrances inside the showyard be done at the expense of the Society. (4). That the usual temporary fence inside the showyard be dispensed with. (5). That permanent wooden floors be made for the entrances. This report was adopted, subject to an amendment,—“that paragraph 4 be omitted from the report, and that the fence be constructed as usual,” which was moved by Mr. Davies, seconded by Mr. Jacob Wilson, and carried by 11 votes against 5.

Memorials having been received from the towns of Newport and Cardiff, and from the manor of Cheltenham, inviting the Society to hold their country meeting for 1872 in those localities, an inspection committee was appointed, consisting of the President, the senior stewards of stock and implements (Mr. Jacob Wilson and Lieut.-Col. Maitland Wilson), Mr. Brandreth Gibbs, and Mr. Milward; and it was arranged that Mr. Milward should act for the President, and Mr. Torr for Lieut.-Col. Wilson, in the event of their being unable to attend.

The secretary was authorised to affix the common seal of the Society to the diploma of M. Jublin Dannfelt, a recently elected honorary member. A communication from the Wolverhampton local committee was referred to the general Wolverhampton committee.

Memorials from the breeders of Shropshire sheep in reference to the selection of judges were referred to the Judges' Selection Committee.

Memorials were read from Mr. Bailey Denton on the subject of storage of water, and from Mr. Cobbett on a variety of Maize.

The usual leave of absence having been given, on the motion of Major-General Viscount Bridport, to the secretary and clerks, the Council adjourned over the Easter recess.

Notices of Books.

Concerning the Employment of Children, Young Persons, and Women in Agriculture (1867). *Fourth Report of the Commissioners with Appendix.* Presented to both Houses of Parliament. Her Majesty's Stationary Office, 1870.

The fourth report of this Commission relates to the circumstances of Scotland as to the condition of its agricultural labourers in such particulars as education, lodging and cottage accommodation, modes of hiring, amount of wages, diet, and morality. The appendix contains a great mass of evidence collected by the Assistant Commissioners and contributed by both employer and labourer, also by many clergymen and philanthropic men. The whole is a complete picture of the social condition of a most important class of the community, which includes within its single scope the whole scale of merit and of comfort from its heights to its depths. There is poverty and there is vice, there is also decent respectability and unselfish excellence—and every step on the ladder between the lowest and the highest is occupied by agricultural labourers not only in England but in Scotland.

It is not easy within the narrow limits of a newspaper column to analyse the labours of the Commissioners so as to present in miniature the pictures which they draw. We shall, however, make frequent extracts from these pages, so that our readers may gather bit by bit some of their conclusions. The whole is a treasury

of information, and those who are interested in the condition of the labourer in country parts should procure these Blue Books for frequent reference.

Farm Memoranda.

CHIRNSIDE, BERWICKSHIRE.—Mr. John Wilson, of Edington Mains, in this parish, says:—

Children are seldom employed under 12 years of age except in bird tending. At about 12 years old they work in summer only and go to school in winter.

Women are employed in the proportion of 14 to 100 acres of arable land on farms suited for turnip culture in such work as Twitch gathering, filling and spreading manure, singling and hoeing root crops, trimming and slicing Turnips for sheep, barn work, &c. The ordinary hours of work are nine hours for all. In harvest 10 hours while cutting corn, and as long as light will allow when carrying.

Any interference with the labour of women or children would be peculiarly mischievous and injurious to all concerned.

We have a parish school and female industrial school. The labouring class keep their children at school till they have at least mastered the three "R's."

The cottages in general are good, and sufficient for the supply of labour. They are always situated on the farms. The greater number of cottages in Berwickshire have been rebuilt or much improved within the last 30 years, and have now generally sufficient accommodation.

The bothy system does not exist.

Loans under the Inclosure Commissioners for cottage building have been very little taken advantage of. Their regulations regarding the size and arrangement of the cottages are not adapted to this district.

After having answered the circular questions, Mr. Wilson continues:—

20. There is nothing unfavourable to health or morals in farm work as conducted in this county. As a rule our farm labourers and their families are well fed, well clothed, and well lodged. It is rare to find any of them, either men or women, who cannot read and write. Nearly all of them as they come to manhood or womanhood become members of one or other of the Presbyterian churches, and are regular in their attendance on public worship on the Lord's day. During the past 50 years I cannot remember above two or three cases of a farm servant in this county being tried for a serious crime. Intemperance is exceedingly rare amongst them. Indeed the only blot on the character of the class is that 10 per cent. of the births in Berwickshire is illegitimate. (The farm population are not, however, responsible for the whole of this, as the return for the population of the towns and villages.) A good deal has sometimes been made of this fact in disparagement of the character of our community. Certainly, I have no wish to extenuate this offence, which has often caused me much sorrow. But justice demands that certain facts bearing on this question of the morals of our farm people should be known and kept in view by all who would come to a sound conclusion regarding it. 1st, there is no prostitution; 2d, conjugal unfaithfulness is nearly unknown; 3d, as such farm people are a fixed number of families, it is to overtake its labour, for which it has a corresponding number of cottages, and as there are no manufactories or mines to absorb the increase of the population, it follows that the young people must either defer marrying until an opening occurs from time to time been made to account for such an amount of illegitimacy in a community so intelligent, so orderly, and in all other respects so well conducted; and various suggestions have been made for its remedy. In my humble opinion the true cause of it is the impediment to early marriage, to which I have now referred.

21. The following are the number of years' service of the whole staff of 21 adult male labourers employed by Mr. Wilson.—One man has served 38 years; five men have served from 20 to 25 years; five men have served from nine to 16 years; nine men, varying in age from 18 to 45 years, have been brought up on the farm, and have never been in any other service; one man has served two years.

22. *Note.*—I visited six cottages in a line at Edington Mains, the first (the steward's cottage) has two rooms on the ground floor, the rest only one, which is divided by box beds to form two apartments. The rooms are lofty, but the space above the boarding is open to the slates. The best feature about these cottages, which are decidedly not good, is a little dairy in a lean-to at the back. Notwithstanding the little accommodation in these cottages, the people seem content with them; two of the women said, "We're comfortable off in they hooses," and the others expressed themselves to the same effect. In conversation about the state of the cottages, Mr. Wilson pointed out, in these words, one impediment in the way of cottage improvement:—"I'm adding of first putting the cottages right, and then instead of the rent asked, say 5 or 6 per cent. on the outlay, landlords are apt to ask the rent of the farm is so much, and an additional rent of 5 or 6 per cent. will be charged on whatever outlay you ask for on account of cottages." The option is thus left to the tenant who proposes to

take the farm, and where there is such a competition for farms, a tenant who will not be satisfied without good cottages for his labourers is pretty sure to be out-bidden by a man who will make the old ones serve his purpose.

Families are engaged for a year from Whit Sunday to Whit Sunday, the hiring taking place in March.

An ordinary ploughman's gains are as follows:—In money £5.5s. (a) Oats, 54 bush; (b) Barley, 21 bush; (c) Peas or Beans, 9 bush; (d) Potatoes, 1800 lined yards (equal to one-third of an imperial acre); (e) cow's keep or £6 or £7 in lieu thereof. Coals carried from the pit or nearest railway station. Food in harvest whilst it lasts, worth 1s. a day. Money allowance of 6d. or 9d. a day when delivering grain, &c. Cottage and garden rent free. (A) A hind is entitled to the best corn a farmer has after he has selected his seed; (b) a cow's keep consists of grass in summer and straw and Turnips (3 tons) in winter; (c) the farmer finds manure and horse-labour, the servant seed and hand-labour.

Foremen or stewards, as they are called here, have from £10 to £15 more than ordinary ploughmen.

Shepherds have the same grain, &c., as ploughmen, but instead of the £5 money they have the keep of eight ewes and four hoggets, along with their master's flock.

Each married servant who keeps one or more grown daughters on a stout lad, receives £2 10s. a year for so doing, in addition to the 1s. a day paid to each worker.

Men who stack corn, feed threshing-machines, &c., get 3 or 4 bush. of Wheat in addition to the wage above stated.

One ploughman also at each of the homesteads gets an additional pound for keeping the time of yoking, setting out the stiches (ridges), &c.

Several young men are paid wholly in money, and receive from 13s. to 15s. a week, according to ability.

Women are paid 1s. a day throughout the year for every day actually at work, except in harvest, when they get 2s. 10d. to 3s. a week. *Appendix. Part II., to Fourth Report of Commission on the Employment of Children, Young Persons, and Women in Agriculture.*

Miscellaneous.

THE ROAD STEAMER FOR STEAM CULTIVATION.—An inventor has two classes of difficulties to contend with. From the moment he has conceived the idea to which he is to give form and life he is engaged in a fierce struggle with brute matter, which he must bend to his will, while, at the same time, he himself must yield at every turn to some immutable physical law. To do this he must effect new combinations, climb rugged and steep paths, and grope his way through the unknown. While the contest lasts, he is a prey to alternate fears and hopes; he must give up his days and his nights to the one thought; he must put aside every other interest, abandon every other pursuit, sacrifice all to it, even his strength and health. One would think that a man striving thus over a creation the object of which is the general good would receive the warmest sympathy and encouragement from his fellows, that they would regard him with awe and veneration, and provide hundreds and thousands with fresh spheres of work as a greater benefactor than the philanthropist who can only give them alms. But so far is this from being the case that the inventor's second class of difficulties is almost harder to overcome than the first. He has to deal with incredulity, doubt, and conservatism, and where his invention interferes with old interests nothing is spared to crush it. In proportion to its rarity, then, should we esteem such public spirit as Lord Dunmore's, who did not fear to proclaim his faith in, and to identify himself with, a yet untried invention, and who has devoted to it, unflinchingly, his experience as an eminent farmer, his energy, and time. Now that his exertions are crowned with complete success, and that agriculture has acquired in the road steamer a new servant, ready to perform every kind of farm work, we must not forget that if Mr. Thomson gave us this servant, it is Lord Dunmore who has trained it for us. *Times.*

The Week's Work.

APRIL 15.—Seed Threshing and Dressing commences at the close of the harvest, and continues to the end of seed-time. When properly harvested, seed corn and also grass seeds kept, best in the straw, and farmers who grow their own seed generally thresh as they require—newly threshed being preferable to old threshed. During the latter half of March, and beginning of the current month, grass seeds are threshed-out for sowing in early districts, and towards its close in late ones. Grass seed of every kind requires to be carefully sifted, in order to remove the seeds of weeds, spores of Fungus, and seed-germs of parasitic plants, otherwise more weeds than grass may be raised. Dressing-machines for the different kinds of seeds are in common use, but they should not be wholly trusted. Rotary wire screens are to be preferred to the hand sieve for corn, as they not only remove the small seeds, but clean and equalise the

sample. Eye-grass, and most of the natural grasses can be screened and cleaned by machinery, and what cannot thus be dressed should be done by hand. The importance of thoroughly dressing and cleaning every kind of seed cannot be over-estimated.

Change of Seed is of more value than is generally estimated, there being but few farmers that can keep the different kinds of seed most improved standard. To sow an inferior sample when better can be had at a few shillings more money is a penny wise and pound foolish economy. Intelligent farmers look about them in time, railway conveyance being now favourable for delivery at the time of sowing. Many never grow their own grass, Clover, and root seeds, and however fine the appearance, the vitality of bought seeds should be carefully tested in a flower-pot. All home-grown samples should also be tested for close of harvest, and early in the spring, to see whether they will vegetate healthily or no, and, were this done, a much greater change of seed would take place. To grumble at much "dead seed" and sickly braird is to be wise behind-hand.

Paring and Burning has lost much of its popularity since the introduction of recent improvements. Lady-day entries give rise to the breaking up of large breadths of inferior meadow and pasture for capable husbandry under steam culture and with artificial manure; and where paring and burning is preferred the work should now be done as early as possible, the weather being unusually favourable in the south. The paring of level land comparatively free from stones is best done by the horse paring-plough, but land full of large stones, unlevel, or covered with ant-hills, may have to be pared with the breast-plough or breast-spike. The depth to be pared depends upon the thickness of effete vegetable matter composing the sod, and the quantity of ashes required. From 1 1/2 inch to 2 inches is a common depth, but in some peaty soils a shallow furrow-slice, from 3 to 6 inches in depth, is turned up with a common plough, furnished with a broadshare and suitable mouldboard. The latter practice is, more correctly speaking, "stiffie burning." In drying weather like the present the sods are soon ready for burning, but in wet weather, or with a moist atmosphere and little sunshine, they require to be set up to prevent growing. Some whose growth begins or drying weather sets in, turn up the sods with a heavy harrow. When sufficiently dry the sods are collected and burned in small heaps with a smouldering charring fire, so as to produce black ashes. When the work is done by contract, with the horse paring-plough, it costs about 15s. per acre, including the spreading of the ashes, and when done by the breast-plough it twice the money. So much straw is generally allowed for kindling the fires. When the land requires draining, the heaps of ashes should be laid out so that the drains can be cut up between the rows before the ashes are spread. Some drain before paring, but with Lady-day entries this is seldom advisable, as the sward is difficult to pare across the drains, but when the drainage can be done during winter it may be otherwise.

Breaking-up Grass Land by Trenching.—This is done either by close-trenching or bastard-trenching. When close-trenched with the plough, one plough follows the other, the bottom sod being thus turned over on the top of the surface sod. In bastard-trenching a subsoil-plough follows a common one, loosening the bottom, but leaving it below the surface furrow slice. When the subsoil is sound the former is preferable, but with wet ground, as is generally the case, the latter. Both plans are equally good, the latter is of common sale, if the land will stand it with a good dose of lime or artificial manure well harrowed in, will promote the rotting of the sods in dry seasons. A good dressing of sewage manure is better, and when town or farm sewage cannot be had, the land should be well soaked with pond or river water if practicable. The sods, whether below or on the surface, should not be disturbed until thoroughly rotted. Sufficient mould can be raised by the harrow and clod-crushers, or covering artificial manure and whatever seed is sown. The work is best done before winter, as the frost pulverises the surface, thus covering the sods with sufficient sap to rot them. But we have trenching in April and grown heavy crops of Swedes and Turnips on both heavy and light land. Trenching two spits deep with the spade costs from £4 to £6 per acre, according to the nature of the land, the workmen making 2s. 6d. per day.

Sewage Grass and Water Meadows are this year of inestimable value, and late as vegetation is, the scythe should begin as soon as the grass in either case will stand up to it, and the sewage and water let on to force forward a second and heavier cutting for May. By mixing the grass with a small proportion of hay, chaff, and bean-meal in troughs, sheep will do better when thus folded on some dry land than on the meadow; and guano or grass manure washed into the meadow will compensate for the droppings of live stock, so as to force forward a hay crop; and, should the season so require, a second cutting from the meadow may be taken for soling, followed by a second dose of guano for a hay crop. The frequent cuttings of heavy crops of sewage grass now grown, points to something more being obtained from water meadows than hitherto, and the requirements of a dry season encourage progress.

Sugar-Beet sown as soon in April as the weather will

permit. The cultivation of the land more resembles that for Carrots than Mangel, as the root should be grown below ground to obtain the highest percentage of sugar. Horse-hoeing is essential to success, and therefore the crop should be grown in rows sufficiently far apart to permit of horse-hoeing in the rows. The young plants should be thinned out as close as 4 lb. roots can grow, consequently not less than 4 lb. of seed will be required per acre, taking care to thin out the young plants in time should all the seed braird. The question whether growing on stretches or on the flat is preferable is not yet settled; but as the roots must be grown below ground, the testimony of experience is in favour of the latter.

Grazing Stock will this year be early turned out to the pastures, if the weather will at all permit, and no attention will be required to preserve health. Housing at night, and in bad weather during day, may be necessary, and when kept indoors for a whole day it is often no easy matter to get some animals to eat dry food one day, and only grass the next. The better plan is a regular allowance of dry food daily for a short time. *W. B.*

Markets.

HOPS.

BOROUGH MARKET, April 13.

Messrs. Pattenden & Smith report that the demand for all descriptions is of a very retail nature; quotations, however, are well supported where sales are effected. The stock of really good Hops is exceedingly limited.

HAY.—Per Load of 36 Trusses.

SMITHFIELD, Thursday, April 11.	
Prime Meadow Hay, 130s. 103s.	Clover, old .. 135s. 125s.
Interior do. .. 102 110	Interior do. .. 110 120
New Hay	Prime ad cut do. .. 130 135
Interior do. .. 36 45	Interior do. .. 110 120

CUMBERLAND MARKET, Thursday, April 12.	
Sup. Meadow Hay 132s. 107s.	Interior Clover .. 120s. 103s.
Interior do. .. 110 132	Prime ad cut do. ..
New do. ..	New do. ..
Interior do. ..	Straw .. 43 48
Superior Clover .. 118 147	JOSHUA BAKER.

COALS.—April 12.

Hastings HARTLEY, 14s. 9d.; Holywell Main, 15s. 3d.; West Hartley, 14s. 9d.; Eden Main, 15s. 4d.; Walls End Braddly's Hetton, 16s. 6d.; Walls End Haswell, 16s. 6d.; Walls End Hetton, 15s. 4d.; Walls End Tunstall, 15s. 6d.; Walls End South Kelso, 16s. 6d.; Walls End Tees, 17s. 3d.—Ships at Harlow, 18s. sold, 18s. at sea, 5s.

METROPOLITAN CATTLE MARKET.

MONDAY, April 10.

We have again a small supply of Beasts and a good demand, consequently prices have advanced, and a fair clearance is effected. The number of Sheep is also smaller, and readily disposed of at higher rates. Lambs are more plentiful; trade is slow for them, and it is difficult to dispose of all at our reduced quotations. Choice calves are scarce and dear. Our foreign supply consists of 700 Beasts, 360 Sheep, 60 Calves, and 10 Pigs; from Scotland there are 185 Beasts; from Norfolk and Suffolk, 1300; and 205 from the Midland and Home Counties.

s. d. s. d.		s. d. s. d.	
Best Scots, Here- fords, &c. ..	5 8 0 6	Best Long-wools ..	5 10 0
Best Short-horns ..	5 6 5 8	Do. Shags ..	5 6 5 8
2d quality Beasts ..	4 0 5 0	Ewes & ad quality ..	4 0 5 0
Best Downs and Half-breds ..	5 8 0 6	Do. Shorn ..	4 8 5 2
Do. Shorn ..	5 8 0 6	Lambs ..	6 8 5 8
Beasts, 2390; Sheep and Lambs, 14,300; Calves, 65; Pigs, 90.		Calves ..	6 8 5 8

THURSDAY, April 13.

The number of Beasts is smaller than on Monday last; it is, however, quite equal to the demand, and Monday's quotations cannot be realised. The supply of Sheep, although not large, exceeds the demand, and there is a consequent reduction in price. Trade is very much worse for Lambs; only some of the choicest are in demand, and these are sold at lower rates. Choice Calves are still scarce and dear. Our foreign supply consists of 140 Beasts, 100 Sheep, and 18 Calves.

s. d. s. d.		s. d. s. d.	
Best Scots, Here- fords, &c. ..	5 6 0 8	Best Long-wools ..	5 10 0
Best Short-horns ..	5 4 5 6	Do. Shags ..	5 4 5 6
2d quality Beasts ..	3 8 4 8	Ewes & ad quality ..	4 0 5 0
Best Downs and Half-breds ..	5 8 0 6	Do. Shorn ..	4 8 5 2
Do. Shorn ..	5 8 0 6	Lambs ..	6 8 5 8
Beasts, 815; Sheep and Lambs, 6470; Calves, 50; Pigs, 15.		Calves ..	6 8 5 8

METROPOLITAN MEAT MARKET, April 12.

Best Fresh Butcher ..	18s. per dozen lb.
Second do. ..	15s. "
Small Pork, 4s. 4d. to 5s. 4d.; Large Pork, 3s. 4d. to 4s. 4d. per 8 lb.	

MARK LANE.

MONDAY, April 10.

There was a short supply of English Wheat to this morning's market, which was generally held for an improvement of 2s. per qr. with which millers were unwilling to comply, and the sales made were 1s. per qr. above the prices of this day's night. The business done in foreign Wheat was not extensive, and the extreme rates of last week could not be exceeded. Barley, Beans, and Peas were fully as dear. Oats commanded rather more money.

The Flour trade was steady, at an advance of 1s. per sack and 6d. per barrel.

PRICE PER IMPERIAL QUARTER.		s. s.	s. s.
WHEAT, Essex, Kent, Suffolk, &c. ..	White 47s 55s Red ..	53-56	48-57
— fine selected runs ..	do. 57-61	58-61	53-56
— Talavera ..	do. 58-61	53-56	48-57
— Norfolk ..	do. ..	Red ..	..
— Foreign ..	45-46	..	..
BARLEY, grist, &c. ..	Chert. 47s 55s Malt ..	35-41	35-41
— Foreign ..	grinding and distilling 47s 55s	35-41	35-41
OATS, Essex and Suffolk ..	..	35-41	35-41
— Scotch ..	..	35-41	35-41
— Irish ..	..	35-41	35-41
— Foreign ..	..	35-41	35-41
RYE, &c. ..	..	35-41	35-41
RYE-MEAL, Foreign ..	..	35-41	35-41
BEANS, Mazagan, &c. ..	43s. to 47s. Ticks ..	40-50	40-50
— Figeon ..	51s. to 59s. Wink ..	40-50	40-50
— Foreign ..	..	40-50	40-50
PEAS, White, Essex, and Kent ..	Boilers 36s 40s Suffolk ..	40-42	40-42
MAIZE, Maple, 40s. to 44s. ..	Grey 36s 40s Foreign ..	40-42	40-42
FLOUR, best marks, delivered ..	per sack 42s 50	..	..
— 2d ditto ..	ditto 36s 42	Country 35-43	35-43
— Foreign ..	per barrel 28s 30s Per sack ..	35-43	35-43

WEDNESDAY, April 12.

Although business at Mark Lane to-day has not been extensive, the tone throughout has been good, and values have been maintained. There has been only a moderate supply of English Wheat on the stands, but a fair supply has come to hand from abroad. The trade has been steady, and prices have ruled firm. With Barley the market has been moderately supplied; the importation has been to a fair extent, at late currencies. Malt has been quiet on former terms. For Oats there has been a fair demand, at full quotations. Beans have been disposed of, at previous quotations. Peas have realised late currencies. Flour has sold more freely; American barrels have improved fully 6d.

ARRIVALS OF GRAIN, &c., INTO LONDON BY WATER CARRIAGE.

	Wheat.	Barley.	Oats.	Flour.
English & Scotch ..	Qrs. 310	Qrs. 310	Qrs. 310	Sacks. 2150
Irish ..	—	—	—	16700
Foreign ..	16,340	—	6150	16700
	16,800	310	6350	—

LIVERPOOL, April 11.—There has been a good attendance at to-day's market, and a much stronger feeling. In Wheat a large business has been done, at an advance of 1d. to 3d. per cental on the week. Flour has also been firm, and 6d. to 1s. per cwt. Indian Corn weaker, at a reduction of 3d. per qr.

AVERAGES.

	Wheat.	Barley.	Oats.
March 4 ..	53s 2d	35s 5d	24s 10d
— 11 ..	53 8	36 0	24 10
— 18 ..	54 7	36 1	25 7
— 25 ..	55 7	36 3	25 7
April 1 ..	55 9	36 9	25 7
— 8 ..	56 7	36 8	26 10
Average ..	54 10	36 2	25 8

SEED MARKET.

The want of rain gave during last week a slight check to the home demand for seed; the trade for French grass, however, continued without abatement. No fresh arrivals of American red Clover are now coming to hand, so that we have to draw our supplies from the small stocks now remaining. English parcels come forward less freely. Alsike and White Clover are dull. For Trefail seed the demand is quiet, at reduced rates. Spring Tares, being in abundant supply, are again cheaper. French Italian is scarce. Mustard and Rape seed are the turn dealer. For Sainfoin seed the trade has fallen off. Bird seeds move off in retail, at last Monday's prices. A few genial showers would give increased animation to our markets.

JOHN SHAW & SONS, Seed Merchants,
16, Water Lane, London, E.C.

Notices to Correspondents.

GRASS: *B. O.* We recommend you to apply rotten bone-dust about 100 lbs. per acre (if in an earthen compost so much the better), and thereafter to carry Turnips or other feed for sheep on the land and fold sheep. If the Rib-grass is excessive, you can hoe it up. The bone-dust and the folding will encourage the finer grasses and Clovers.

MOWING MACHINES: *Barlow, Scaggs, Kettering.* We can hardly undertake the guidance of our correspondents in such matters. They must study the reports of the judges of the Royal Agricultural Society. Burgess & Key send out a strong and most efficient mower, so does Mr. Wood, so do others. Perhaps some of our correspondents will be good enough to give their opinions.

THE COMFREY PLANT: *A Constant Subscriber in Scotland* says: "I have lately heard that the common Comfrey plant is very good as food for cattle, pigs, and sheep, and that they all like it; it grows in the spring, and it can be successfully grown as a regular crop it would be invaluable in this country, where the grass is always very late." [The Comfrey is easily propagated by dividing the roots. Will any one relate his experience in its cultivation?]

GREEN'S PATENT SILENS MESSORS,

OR

NOISELESS LAWN MOWING, ROLLING, AND COLLECTING MACHINES, FOR 1871.

THOMAS GREEN AND SON, in introducing their PATENT LAWN MOWERS to the Public for the present season, take the opportunity of acknowledging the unprecedented patronage that has been accorded to them in former years, and can assure their future Patrons that nothing will be wanting on their part to maintain the CONFIDENCE so long given to them.

Every Lawn Mower that is sent out by them is warranted to give entire satisfaction, otherwise it can be returned at once, free of cost to the purchaser. Our Machines have been submitted to numerous practical tests in Public Competition, and have in all cases carried off every Prize that has been given.

The following are their advantages over all others :—

- 1st. Simplicity of Construction, every part being free of access and easily managed.
- 2d. They are worked with far greater ease than any other Lawn Mower.
- 3d. They are the least liable to get out of order.
- 4th. They make little or no noise in working, as is the case with Cog-wheel Machines.
- 5th. They perform their work in a neat and smooth manner, and leave no notches or scores.

PATRONIZED BY

HER MOST GRACIOUS MAJESTY
THE QUEEN,
ON 45 DIFFERENT OCCASIONS ;
H.R.H. THE PRINCE OF WALES ;
THE KING OF THE BELGIANS ;



THE EMPEROR OF THE FRENCH ;
THE EMPEROR OF RUSSIA ;
AND MOST OF THE
NOBILITY, CLERGY, AND GENTRY
OF THE UNITED KINGDOM.

PRIZE MEDALS AWARDED TO GREEN'S PATENT NOISELESS LAWN MOWERS.

International Exhibition, London, 1862.

International Exhibition, Dublin, 1863.

Agricultural and Horticultural Society, Brussels, 1862.

Agricultural and Horticultural Society, Brussels, 1863.

Agricultural and Horticultural Society, Hamburg, 1863.

Agricultural and Horticultural Society, Liege, 1861.

Agricultural and Horticultural Society, Namur, 1862.

Agricultural and Horticultural Society, Laeken, 1862.

Agricultural and Horticultural Society, Gand, 1862.

Agricultural and Horticultural Society, Linneene, 1862.

Agricultural and Horticultural Society, Linneene, 1863.

The following are a few of the principal places where Green's Patent Lawn Mowers are the only Machines in constant use, and have been for a number of years giving entire satisfaction :—

THE ROYAL GARDENS, WINDSOR.
BUCKINGHAM PALACE GARDENS.
MARLBOROUGH HOUSE GARDENS.
SANDRINGHAM HALL GARDENS.
CHISWICK HOUSE GARDENS.
ROYAL HORTICULTURAL SOCIETY'S GARDENS,
SOUTH KENSINGTON.
ST. JAMES'S PARK.
GREEN PARK.
KENNINGTON AND BATTERSEA PARKS.

ROYAL BOTANICAL GARDENS.
ROYAL HORTICULTURAL GARDENS.
KENSINGTON PALACE GARDENS.
TEMPLE GARDENS.
ZOOLOGICAL GARDENS.
CRYSTAL PALACE GARDENS.
SOUTH KENSINGTON MUSEUM.
BERKELEY SQUARE GARDENS.
RUSSELL SQUARE GARDENS.
GORDON SQUARE GARDENS.
PARLIAMENT SQUARE GARDENS.

BRUNSWICK SQUARE GARDENS.
ROYAL HOSPITAL CHURCH.
ROYAL NAVAL SCHOOLS.
HYDE PARK GARDENS.
LIVERPOOL PARK.
BIRKENHEAD PARK.
PRESTON PARK.
SUNDERLAND PARK.
HALIFAX PARK.
BRAINFORD PARK.
LEEDS ROYAL PARK.

NOTICE OF REDUCTION IN PRICES.

With the increased advantages and facilities we possess for the Manufacture of Lawn Mowers, we are enabled to Sell them at a greatly reduced rate on former years, as will be seen from the following Scale of Prices :—

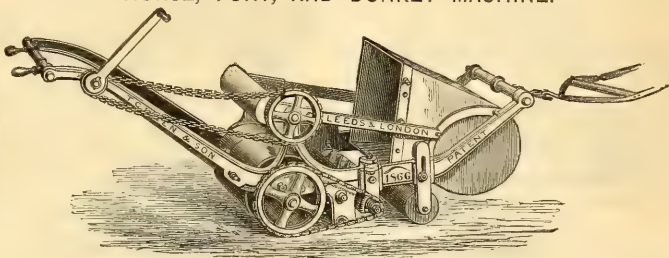
SINGLE-HANDED LAWN MOWER.

To cut 8 inches	..	..	..	..	Price £2	10 0
" 10 "	..	..	..	..	" 3	0 0
" 12 "	..	..	..	..	" 4	0 0
" 14 "	..	..	..	..	" 5	0 0

DOUBLE-HANDED LAWN MOWER.

To cut 16 inches	Price £6	0 0	} This can be worked by one Man on an even lawn. By Man and Boy.
" 18 "	" 7	0 0	
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" 22 "	" 8	0 0	
" 24 "	" 8	10 0	"

HORSE, PONY, AND DONKEY MACHINE.



Prices of Horse, Pony, and Donkey Machines, including Patent Self or Side Delivery Box, Cross Stay complete ; suitable for attaching to ordinary Chaise Traces or Gig Harness.

DONKEY AND PONY MACHINES.

To cut 26 inches	..	..	..	£13	0 0
" 28 "	..	..	..	" 15	0 0
" 30 "	..	..	..	" 17	0 0
Leather Boots for Donkey	..	..	..	" 0	18 0
Ditto for Pony	..	..	..	" 1	2 0

HORSE MACHINES.

To cut 36 inches	..	..	..	£21	0 0
" 36 "	..	..	..	" 24	0 0
" 42 "	..	..	..	" 27	0 0
" 48 "	..	..	..	" 30	0 0
Leather Boots for Horse	..	..	..	" 1	6 0

The 26 and 28 inches can easily be worked by a Donkey, the 30 inches by a Pony, and the larger sizes by a Horse ; and as the Machines make little noise in working, the most spirited animal can be employed without fear of its running away, or in any way damaging the Machine.

SPECIAL NOTICE.

Both the Horse, Pony, Donkey, and Hand Machines possess (over all other makers) the advantage of self-sharpening ; the cutters being steel on each side when they become dull or blunt by running one way round, the cylinder can be reversed again and again, bringing the bottom edge of the cutters against the bottom blade, when the Machine will cut equal to new. Arrangements are made that the cylinder can be reversed by any inexperienced person in two or three minutes.

The Handles of the Machines can be altered to suit the person using them, by either raising or lowering them.

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N.B.—With the large number of all sizes of Machines we have in Stock at our Leeds and London Establishments, we are in a position to execute all Orders on the day they are received. REPAIRS are done with efficiency and despatch both at Leeds and London.

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The only Lawn Mower that Cuts Wet or Long Grass
(as well as dry) without Clogging,

Leaving the Cuttings in small particles, evenly scattered, never looking untidy, serving as a Mulch to Protect the Roots from Heat and Drought, and Fertilising the Sod, which cannot fail to invigorate and beautify the Lawn. Perfectly adapted to SLOPES, UNDULATING LAWNS, RIDGES and VALLEYS; and for the CROQUET GROUND is invaluable.

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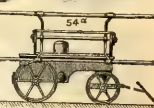
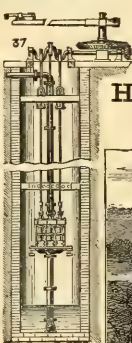
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468 " . . . 1s. 442d. 476 " . . . 1s. 454d.
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490 " . . . 1s. 464d. 498 " . . . 1s. 476d.
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586 " . . . 1s. 560d. 594 " . . . 1s. 572d.
588 " . . . 1s. 562d. 596 " . . . 1s. 574d.
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592 " . . . 1s. 566d. 600 " . . . 1s. 578d.
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596 " . . . 1s. 570d. 604 " . . . 1s. 582d.
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608 " . . . 1s. 582d. 616 " . . . 1s. 594d.
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SHANKS'S NEW PATENT LAWN MOWERS FOR 1871.

UNDER THE PATRONAGE
OF
HER MOST GRACIOUS MAJESTY
THE QUEEN,



AND MOST OF THE
PRINCIPAL NOBILITY
OF
GREAT BRITAIN.

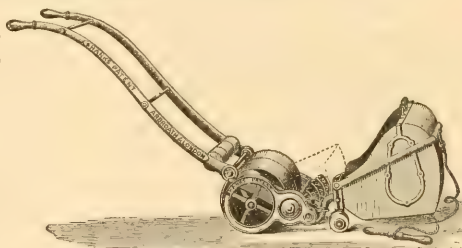
The Improvements introduced into Shanks's Lawn Mowers at different times have resulted in these machines occupying the first place in the market, to which the continued increase in the annual sale bears ample testimony.

THE MACHINE
FOR 1871

IS MADE FROM

NEW PATTERNS,

AND IS SO ARRANGED THAT IT



CAN BE USED

EITHER

WITH or WITHOUT

THE USUAL

FRONT ROLLERS

ALEXANDER SHANKS AND SON, in bringing their PATENT LAWN MOWERS under the notice of the Public for the Season of 1871, desire at once to draw attention to the various points of merit which their Machine possesses over all others. These advantages have only to be known to ensure the success and to establish more firmly than ever the position of Shanks's Machine as unquestionably the cheapest and best Lawn Mower in use.

1. SHANKS'S PATENT LAWN MOWERS have been entirely remodelled for the Season of 1871.

Every conceivable alteration has been made tending to improvement and reducing friction to a minimum. Notwithstanding the great expense which has attended these alterations, A. S. AND SON offer THEIR NEW MACHINE AT LAST SEASON'S PRICES.

2. SHANKS'S PATENT LAWN MOWER is fitted with a double-edged Sole-Plate. This Sole-Plate enables the Cutting parts to last twice as long as those in other Lawn Mowers.

3. SHANKS'S PATENT LAWN MOWER is fitted with a self-sharpening Revolving Cutter.

4. SHANKS'S PATENT LAWN MOWER is fitted with a Wind-Guard, which prevents the Grass escaping the Box when the Machine is in use during the prevalence of wind.

5. SHANKS'S PATENT LAWN MOWER has no obstruction in front of the Cutter, a most important improvement, just introduced.

6. SHANKS'S PATENT LAWN MOWERS are made of the very best material, carefully apportioned, so that no part has more weight than is absolutely necessary, and securing at same time the greatest rigidity as a whole.

7. SHANKS'S PATENT LAWN MOWERS are more easily worked and more durable than any other Lawn Mower, and are not at all liable to get out of order.

8. SHANKS'S PATENT LAWN MOWERS are silent in working.

9. SHANKS'S PATENT LAWN MOWERS perform their work in a manner vastly superior to the Scythe. The Lawn is not "ribbed" when cut, but has a most beautiful appearance, being as smooth as a piece of velvet.

10. SHANKS'S PATENT LAWN MOWER has not only obtained more Prizes and Medals than any other, but the highest Prize that has ever been given for a Lawn Mower at an International Exhibition was awarded to A. S. AND SON, who received a First Prize Silver Medal for their Machine at the Paris Exhibition of 1867. It is significant that no other Exhibitor received a Prize, not even an "Honourable Mention" or a "Bronze Medal."

11. SHANKS'S PATENT LAWN MOWERS are warranted to give ample satisfaction, and, if not approved of, can be at once returned.

12. SHANKS'S PATENT LAWN MOWERS are delivered free at any Railway Station or Shipping Port in Great Britain. Orders are executed on the day they are received, either from the Manufactory, DENS IRON WORKS, ARBROATH, N.B., or from the London Office and Warehouse, at 27, LEADENHALL STREET, E.C.

PRICES:—SHANKS'S NEW PATENT HAND MACHINE.

Easily Worked.				Easily Worked			
8-inch Machine..	..	..	£2 10 0	16-inch Machine..	..	..	£6 10 0
10-inch Machine..	..	..	3 10 0	19-inch Machine..	..	..	7 15 0
12-inch Machine..	..	..	4 10 0	22-inch Machine..	..	..	8 10 0
14-inch Machine..	..	..	5 10 0	24-inch Machine..	..	..	9 0 0

The Hand Machines are all with Silent Movement.

SHANKS'S NEW PATENT PONY and DONKEY MACHINE.

If with Patent Delivering Apparatus.			
25-inch Machine..	..	..	£12 10 0
28-inch Machine..	..	..	14 10 0
30-inch Machine..	..	..	15 15 0

Silent Movement, 12s. 6d. extra.

Boots for Pony, 22s. per set; Ditto for Donkey, 18s. per set.

SHANKS'S NEW PATENT HORSE MACHINE.

If with Patent Delivering Apparatus.			
30-inch Machine..	..	..	£19 0 0
36-inch Machine..	..	..	22 0 0
42-inch Machine..	..	..	26 0 0
48-inch Machine..	..	..	28 0 0

Silent Movement, 20s. extra. Boots for Horse, 26s. per set.

ALEXANDER SHANKS AND SON,
DENS IRON WORKS, ARBROATH; and 27, LEADENHALL STREET, LONDON, E.C.

27, Leadenhall Street is the only place in London where intending purchasers of Lawn Mowers can choose from a Stock of from 150 to 200 Machines.

All sizes kept there, whether for Horse, Pony, or Hand Power.

Editorial Communications should be addressed to "The Editor;" Advertisements and Business Letters to "The Publisher," at the Office, 41, Wellington Street, Covent Garden, London, W.C.
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GARDENERS' CHRONICLE AND AGRICULTURAL GAZETTE.

No. 16.—[1871.]

SATURDAY, APRIL 22.

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Notice.

GARDENERS' CHRONICLE and AGRICULTURAL GAZETTE.
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GRAND MIDSUMMER EXHIBITION, JUNE 7.
second, 14th; third, 20th.

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Geraniums.—W. POTTEN can supply strong plants, as advertised in the *Gardener's Chronicle* of April 11th and 18th. Priced LIST of all the leading varieties, also of BEDDING and RIVER PLANTS, can be had on request for application to W. POTTEN, Seedsmen and Florist, Sissinghurst, Staplehurst, Kent.

Novelties for 1871.—GERANIUM, MRS. J. H. BODDS, the finest pink bedding GERANIUM in cultivation; 24s. per dozen to the Trade. See KEYNES' CATALOGUE.

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IMPORTANT NOTICE.

MORE THAN ONE HUNDRED DUPLEX BOILERS AT WORK.

SELECTED LIST OF LARGEST ESTABLISHMENTS WHERE
**WEEKS'S PATENT
 DUPLEX UPRIGHT TUBULAR BOILER**
 IS NOW IN OPERATION.

TWO BOILERS IN ONE. PERFECT SAFETY INSURED.

CANTERBURY CATHEDRAL,

Length of Piping, nearly 3 miles.

ZOOLOGICAL GARDENS,

Length of Piping, 5,600 feet.

ROYAL BOTANIC GARDENS,

Length of Piping, 3,600 feet.

LORD ASHBURTON,

Length of Piping, 2,500 feet.

VISCOUNT BRIDPORT,

Length of Piping, 3,650 feet.

THE HON. C. L. WOOD,

BISHOP AUCKLAND,

Length of Piping, 1,600 feet.

J. C. P. CUNLIFFE, ESQ.,

HOOLEY,

Length of Piping, 6,500 feet.

W. H. STONE, ESQ., M.P.,

DULWICH,

Length of Piping, 2,500 feet.

THE EXHIBITION, 1871,

Length of Piping, 10,000 feet.

COLUMBIA MARKET,

Length of Piping, 3,000 feet.

His Grace the DUKE of RICHMOND,

Length of Piping, 2,100 feet.

LORD MONSON,

Length of Piping, 1,300 feet.

COL. THE HON. W. H. TIGHE,

Length of Piping, 2,720 feet.

W. LEAF, ESQ.,

STREATHAM,

Length of Piping, 4,410 feet.

W. H. STONE, ESQ., M.P.,

HAVANT,

Length of Piping, 4,900 feet.

POTTO BROWN, ESQ.,

HUNTINGDON,

Length of Piping, 2,100 feet.

MRS. TORR,
Garbrand Hall, Ewell.

STEPHENSON CLARK, ESQ.,
Croydon Lodge, Croydon.

TITUS SALT, ESQ.,
Milner Field, Bingley.

J. FRAZER, ESQ.,
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THOMAS BRASSEY, ESQ.,
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J. MARSHALL BROOKS, ESQ.,
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DANIEL THWAITES, ESQ.,
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C. J. CORBETT, ESQ.,
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ST. CUTHBERT'S CHURCH,
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Chelsea.

HER MAJESTY'S PRISON,
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Newport, Monmouthshire.

FRANCIS PHILLIPS, ESQ.,
Lee Priory, Wingham.

J. TATTERSALL, ESQ.,
Quarry Bank, Blackburn.

MRS. WARRENER,
The Mount, Bishopstoke.

S. MORLEY, ESQ.,
Hall Place, Tonbridge.

W. F. SPLATT, ESQ.,
Flete, Ivybridge.

C. BUTLER, ESQ.,
Warren Wood, Hatfield.

T. MARLING, ESQ.,
Stonehouse, Gloucestershire.

ST. EDMUND'S CHURCH,
Northampton.

HOWLEY TANNERY,
Warrington.

HER MAJESTY'S PRISON,
Chatham.

MESSRS. WOOD AND INGRAM,
Huntingdon.

THEIR ILLUSTRATED BOOK OF DESIGNS (12TH EDITION)

And full particulars of PATENT DUPLEX BOILER forwarded Post Free on application to

J. WEEKS AND CO., HORTICULTURAL BUILDERS and HOT-WATER APPARATUS
 MANUFACTURERS, KING'S ROAD, CHELSEA, LONDON, S.W.

Choice Hardy Scarlet and other Rhododendrons.
JOHN WATERER AND SONS have the pleasure of announcing that their **CATALOGUE** of the above plants, as exhibited at the Royal Botanic Gardens, Regent's Park, is now published, and will be forwarded to applicants. It faithfully describes the colours of the Rhododendrons, and also contains selections of the most approved **CONIFERS**, with heights and prices, as well as the leading **EVERGREENS** and **ROSES**.

The American Nursery, Bagshot, Surrey.

Abies baborensis (numidica).
MESSRS. HOOPER AND CO. have just received a small supply of fresh Seed of this rare and beautiful Conifer. It is found on only two peaks of the Atlas Mountains, at a spot which probably not fifty Europeans have ever visited. It is quite distinct in appearance from *Picea Pissap*, and remarkable for its pyramidal form and general beauty. Packets of 10 seeds, 2s 6d; 25 seeds, 5s. Price to the Trade on application.

HOOPER AND CO., Covent Garden, London, W.C.



New Seeds for 1871.

ARCHD. HENDERSON begs to announce that his descriptive and select **LIST** of **KITCHEN GARDEN, AGRICULTURAL, and FLOWER SEEDS**, also a select **LIST** of **GLADIOLUS** for spring planting, with cultural remarks on all the most important Seeds, Roots, &c., is now ready. These Seeds have been selected from the most celebrated English and Continental Growers.

GRAPE VINES in pots, an unrivalled collection.

Address, Sion Nursery, Thornton Heath, and at the East Surrey Seed Warehouse, North End, Croydon.

E. G. HENDERSON AND SON

offer the following:—

NEW BEDDING VERBENA, BASILISK.

Up to the present period raisers of the Verbena appear to have aimed at novelty in feature, or size of flower, rather than the production of first-class varieties in any given section of colour, or adaptation to the highest purposes of garden decoration. As an exception, **E. G. HENDERSON & SON** now offer a variety, the colour of which embodies the highest features of excellence in the old varieties, with the most desirable improvements in habit and bloom known at the present period, the variety above named being of the scarlet section, and uniting the most brilliant colour of *V. Melindres* with the erect branching habit and profuse bloom of *V. Purple King*. The flower truss is large, well formed, and of great depth; well expanded, of good substance, and opening to the centre. For large beds, secondary groups, belts and ribbon rows, it will be found the most effective kind in its class ever offered, and adapted for the most extensive planting in all favourable aspects of situation, exposure, and soil.

This fine variety is not a casual production from the present race of scarlets, but the genuine offspring from a true cross with the original species, *V. Melindres*.

For six postage stamps a Coloured Plate will be sent, immediately on being received from the Artist.

Orders received to be executed early in May.

3s. 6d. each; 6 plants, 15s.; 12 plants, 21s.

THALICTRUM ADIANTOIDES.

Amongst the very numerous species of perennial herbaceous plants presenting a wonderful diversity of feature to the varied aspects of a flower garden, as well as in their suitable adaptation in the decoration of classic designs and art-structures, there is perhaps not a single species which rivals the present plant for its beautiful symmetry in leaf structure throughout the summer months. It is a very elegant hardy perennial, rising with a slender, yet firm erect stem, from 12 to 18 inches in height, and in mature growth nearly equal in diameter, of a neat branching habit. From the terminal and lateral growth, the graceful triply-winged leaves diverge to an almost horizontal outline, each multifold leaf being formed of numerous short evenly expanded wedge-shaped leaflets, attached by exceedingly fine thread-like pedicels or foot-stalks, which, as they spread their tiny surfaces to the sun, may not inaptly be compared to a group of fairy-like summer leaf screens. Though perfectly hardy, standing any degree of cold, thriving in all ordinary garden soils, requiring no artificial support, and adapted to the most limited and select flower-beds, in delicacy of structure it rivals the finest species of exotic *Adiantums* or Maiden Hair Fern, by the exquisite beauty of its leaf fronds; and by its remarkable adaptation for enduring a warm room, and exposure to the open air in a cut state, it is unequalled by any other plant, even by the best known Ferns, for a back shield or framework to the most select drawing-room, hand, or dress bouquet; for these designs it retains its freshness and verdure beyond any other known species.

5s. each; 6 plants for 21s.

For descriptions of the **BEDDING FANSY** of the season,

QUEEN OF SCOTS,

and the two **WHITE BEDDING AGERATUMS,**

WHITE TOM THUMB and **WHITE IMPERIAL DWARF,**

see *Gardeners' Chronicle*, April 1, for the first, and April 15 for the two last.

THE WELLINGTON NURSERY,
ST. JOHN'S WOOD, LONDON, N.W.

PRIMULA VERTICILLATA var. SIMENSIS.
New Abyssinian Primrose.



JAMES VEITCH & SONS

HAVE MUCH PLEASURE IN OFFERING

FOR SALE, FOR THE FIRST TIME, THIS VERY PRETTY NOVELTY,

Which, exhibited under the name of *Primula Boveana*, was so much admired at the Royal Horticultural Society's Exhibitions both last year and during the present season, and also at the Royal Botanic. The following description by **Dr. MASTERS** is taken from the *Gardeners' Chronicle* of April 30, 1870, page 597:—

"A handsome Primrose, some 18 inches in height, with tufted root leaves, each leaf about 8 to 10 inches in length, oblong lanceolate, feather veined and covered with white mealy powder, especially on the lower surface. From the centre of the tuft of leaves rises a scape bearing two or three tiers or whorls of flowers one above the other, each of these whorls consisting of a dozen or more flowers, the stalks of which measure 2 inches in length. We may say that there can hardly be two opinions as to the merits of the plant exhibited by **Messrs. VEITCH**, which has the meanness of an *Auricula*, the stature and habit of *P. imperialis*, while each individual flower has the form and something of the colour of the common Primrose, though deeper in tint and not quite so large. The Abyssinian Primrose is thus a very welcome addition to our garden flora."

The plant is a hardy greenhouse perennial, and as strong specimens produce from 10 to 12 spikes of bloom at a time, the flowers being sweet-scented, it is doubly valuable both as a plant for decoration or for cutting from.

Price 5s. each, or 55s. per dozen.

SPECIAL PRICES TO THE TRADE ON APPLICATION.

ROYAL EXOTIC NURSERY, KING'S ROAD, CHELSEA, LONDON, S.W.

Novelties for 1871.
DAHLIAS.—KEYNES' first-class varieties, consisting of 12 Show Flowers and 6 Fancy Flowers, wonderful improvements. The sets, complete, to the Trade, for 2s. See KEYNES' CATALOGUE.

DAHLIA, MARC HONNESS OF BATH (Woolwich).
 J. KEYNES has just introduced a beautiful flower. White-tipped purple. First-class Certificate. Price 10s. 6d. each.
 Castle Street Nursery, Salisbury.

New and Unadulterated Seeds.
BUTLER, MCCULLOCH AND CO.'S
SPRING CATALOGUE is now ready. In addition to the General Lists of Vegetable and Flower Seeds, it contains Select Descriptive Lists of all the new, rare, and choice Vegetable and Flower Seeds of the present season. Sent free post paid on application.

27, South Row, Covent Garden Market, London, W.C.
 Established upwards of a Century.

Russell's Pyramid Primula.
GEORGE CLARKE has this season secured a quantity of this very fine strain, in excellent condition, which he recommends, feeling assured that no other possesses such a robust character, with really splendid flowers. Mixed, Red and White, 2s. 6d. per pk. Instructions for raising and growing sent if required.
 Nurseries: Streatham Place, Brixton Hill, London, S.W.; and Nottingham, Kent, S.E.

NEW BEDDING CALCEOLARIA.
PRINCESS LOUISE.—It is of dwarf bushy habit, growing from 6 to 8 inches high. The flower stems are short but stout, and carry the trusses of bloom well above the foliage; trusses large and very compact; the blooms, which are larger than those of any other yellow bedding Calceolaria, being closely set together. Colour, pure sulphur-yellow, very effective.

PETER LAWSON AND SON are now booking orders for Plants to be delivered in May, price 12s. per dozen, or 60s. per 100, with the usual discount to the Trade. Price per 1000 upon application. Copies of Testimonials received by the Raisers, Mr. McMillan, Erskine Gardens, may be had on application—Edinburgh and London.

TROPEOLUM, MINNIE WARKEN.—A beautiful variegated plant of the highest excellence for the decoration of the flower garden. The leaves are green, blotched and broadly edged with pale cream. Habit dwarf and compact. Trusses of the highest merit, by receiving their first-class certificates in the past season. To be sent out in May next at 10s. 6d. each, or five plants for 45s. Orders booked and executed in strict rotation. A Coloured Plate may be had on receipt of 1s. in postage stamps.
JOHN CATTELL, Nurseriesman, Westerham, Kent.

New Bedding Tropæolums.
THOMAS THORNTON, Heatherside Nurseries, Bagshot, Surrey, has the pleasure to offer the following new and distinct forms of **BEDDING TROPÆOLUMS**, all of which can be highly recommended for bedding purposes.

LUSTROUS.—Bright crimson flowers, thrown up well above the dark foliage; a very compact habit, and a free and continuous bloomer.

COMPACT CRIMSON MAID.—Rich, scarlet-scarlet flowers, very bright, and of unusually large size; compact habit, and free, and always in flower.

YELLOW DWARF.—A dense and continuous bloomer, something like *complanatum* in form, improved in character, but deeper in colour, and having a more open-spreading habit.

ETNA.—A very fine variety, which produces extremely showy vivid crimson flowers, and is also a free and continuous bloomer.

VERBENA.—Bearing a profusion of rich bright orange-crimson flowers, that are thrown up well above the dark foliage of the plants.

Plants, 3s. 6d. each, or the set of five, 15s.
 A very liberal allowance to the Trade, especially for quantities.
 For further description of these, see *Gardeners' Chronicle* for October 15, 1870, and "Gardeners Year Book for 1871."

NEW PLANTS FOR 1871.

BENJAMIN S. WILLIAMS

Begs to announce that on the 1st of May he will offer to the Public
 THE UNDERMENTIONED SPLENDID NOVELTIES.

Adiantum Capillus-Veneris crispulum (Moore).

This is a fine robust form of the species; the fronds are upwards of a foot long, very broad, with large crisp bright green pinnae. It forms a very ornamental plant, and is amongst the most distinct and beautiful of its class; succeeding early in the cool fernery.

Price 21s. each.

Fuchsia Empress of Germany.

Habit of plant compact, branching, and very free flowering; tube and sepals bright waxy-carmine; the latter well reflexed; corolla very double, being made up of broad even petals, which are pure white.

Price 7s. 6d. each.

Fuchsia Harry Williams.

A thoroughly distinct variety; it is a compact growing plant, and a profuse bloomer; tube and sepals deep rich waxy-scarlet, the latter well reflexed; corolla very double, formed of even and regular petals, which are intense violet, tinged towards the base with carmine.

Price 21s. 6d. each.

Fuchsia Princess Louise.

An elegant dwarf compact variety; tube and sepals large and well reflexed, rich waxy-carmine; corolla large, single, and pure white, formed of broad even petals of good substance.

Price 7s. 6d. each.

Ixora Prince of Orange.

A very beautiful and valuable addition to this genus. It is of free compact habit, the trusses are large and dense; flowers rich orange red, tinged with violet towards the centre. This variety is distinct in colour from any of the other kinds, and will become a superb plant for home decoration or public exhibition.

Price 31s. 6d. each.

Ixora Williamsii.

This is a superb free-growing plant, and an abundant bloomer, producing immense trusses of large fine flowers, which in colour are of a distinct and pleasing reddish-salmon. The profusion of bloom, added to its distinctness of colour, will cause this plant to take first rank amongst the many beautiful forms of this ornamental family.

Price 31s. 6d. each.

Pelargonium Princess Beatrice.

This very fine Golden Tricolor Geranium is one of the best among the many new kinds now used for bedding purposes; indeed, as a bedder it equals Mrs. Pollock, and is far more brilliant in its markings. It is a good grower, compact, and free-branched, leaves smooth, centre deep green, with a rich bronze and scarlet zone, and a broad uninterrupted gold margin.

Price 10s. 6d. each.

Pelargonium Lord of Lorne.

A first-class variety, of free yet compact habit, producing large trusses of very double and regular flowers, which stand well above the foliage, and are deep scarlet shaded with crimson. One of the best of the double-flowered kinds.

Price 7s. 6d. each.

Passiflora Inesii.

This superb hybrid Passion-flower is a valuable addition to this exceedingly ornamental genus. The stem is quadrangular, smooth, and narrowly winged. Leaves broadly ovate, about 6 inches long by 4 inches broad; sepals and petals nearly 2 inches long, white, the latter distinctly dotted with red. The corolla is composed of many rows of long thick filaments, white banded with red at the base, and spotted and variegated with violet on the outside. In addition to the pleasing colour of its large flowers, this variety has the merit of blooming freely when only a foot high, and is deliciously fragrant. It succeeds admirably treated as a greenhouse climber.

Price 21s. to 42s. each.

Pteris serrulata corymbifera (Moore).

An extraordinary and very handsome variation of the well-known *P. serrulata*. It grows some 12 inches high, fronds erect, pinnae all much shortened, forming a dense, crisp, bright green corymbiferous head. This variety is not only the farthest removed from the normal type of the species, but is one of the most handsome Ferns in cultivation, and will become invaluable for general decorative purposes, especially for the Wardian case or dinner-table.

Price 42s. each.

Selaginella rubella (Moore).

This is a very beautiful species, entirely distinct from any other previously introduced. It is a close creeping plant, never becoming erect, but densely covering the ground with its branches and bright dark green leaves. It is constantly adapted for Wardian cases, or forming edgings to walks in the Shrub.

Price 10s. 6d. each.

Toxicoploea Thunbergii.

After repeated but unsuccessful attempts to introduce this superb Stone flowering plant to our gardens, I am at last enabled to offer it to public notice, and in doing so I have no hesitation in saying it is one of the choicest of modern introductions. It belongs to the order Apocynaceæ, and to habit and general appearance very much resembles an *Ixora*. The leaves are opposite, elliptic, and dark green; the flowers are tubular, with a spreading five-lobed limb, pure white, deliciously fragrant, and produced both in large terminal corymbs and in smaller ones from the axils of the leaves, thus forming a dense raceme of bloom, frequently upwards of a foot in length. It will undoubtedly become as general a favourite as *Ixora*.

Price 63s. each.

Viola cornuta Enchantress.

The present variety is worthy a place in every garden; it is entirely distinct from any other form, and will become one of the finest plants for spring and summer gardening. It is dense, compact, and free-branched in habit, growing from 4 to 6 inches high, leaves from 2 to 3 inches long by 1½ to 2 inches in diameter, petals broad and of good shape, ground colour mauve, with narrow yellow eye, surrounded with circles of violet, radiating from the centre.

Price 2s. 6d. each, 24s. per dozen, 70s. per 50 plants, 45s. per 100.

VICTORIA and PARADISE NURSERIES, UPPER HOLLOWAY, LONDON, N.

NEW FINEST FLOWERS.

H. CANNELL, F.R.H.S.

RESPECTFULLY offers the following New and beautifully improved varieties of Soft-wooded Plants—**CROWN PRINCE** and **MASTER CHRISTINE** the only two Zonal Geraniums awarded a First-class Certificate by the Floral Committee of the Royal Horticultural Society last year:—

FOUR SPLENDID PICOTEES, raised by the veteran grower Mr. N. Norman—**MASTER NORMAN**, **KING OF PURPLES**, **MAID OF KENT**, and the **MAN OF KENT**. The Set, in pairs, for 35s.; single plants, 20s.

TWO NEW FUCHSIAS—**ALBERT MEMORIAL**, the best double yet sent out; and **ARABELLA IMPROVED**, much the largest light-coloured Fuchsia ever yet seen. 7s. 6d. each.

DAHLIA, GEM of the GROVE.—This received a First-class Certificate from the Floral Committee of the Royal Horticultural Society, and is a fine improvement on that beautifully distinct variety, **Stafford Gem**. 5s. each.

GERANIUM, MASTER CHRISTINE.—Certainly the best pink-coloured bedder ever offered or seen. 10s. each.

DOUBLE GERANIUM, CROWN PRINCE.—5s. each, 3 for 12s. 6d., 6 for 20s.

DOUBLE GERANIUM, KING of the DOUBLES.—2s. 6d. each, 3 for 6s. 6d., 6 for 12s.

The latter being a decided improvement on *Marie Lemoine*, &c.

For other New Choice Plants, and full particulars of the above, see CATALOGUE, sent Free on application.

NEW FLORIST FLOWERS and FLORIST FLOWER SEED MERCHANT, WOOLWICH.

All ready on the 1st of May.

"COMPARISON" "INVITED,"

"THE ROYAL SEEDSMEN"



GENUINE SEEDS.

DESCRIPTIVE LISTS
GRATIS, POST FREE
5 PER CENT DISCOUNT
FOR CASH.

CARRIAGE FREE

237, & 238, High Holborn,
LONDON.

CARTER'S PRIZE MANGEL
AND SWEDE SEEDS,
HARVESTED ON THEIR OWN SEED FARMS,
FROM CHOICE PRIZE STOCKS.

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| YELLOW GLOBE MANGEL | Per lb.—s. d. |
| CARTER'S NEW CHAMPION INTERMEDIATE MANGEL (see Illustration) | 0 7 |
| CARTER'S VARDEN PRIZE YELLOW GLOBE MANGEL | 1 0 |
| Ordinary stocks at reduced rates. | |
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| Ordinary stocks at reduced rates. | |

Much Cheaper by the Bushel or Cwt.

CARTER'S
Champion New Yellow Intermediate Mangel,
superior to all others.



An immense cropper, with fine top, 10d. per lb.
Cheaper per cwt.

CARTER'S GRASS SEEDS

FOR ALL SOILS, CARRIAGE FREE,
As used at Aldershot, Chatham, Woolwich, Hilsen,
Bristol, Netley, &c., &c.

FOR PERMANENT PASTURES.
FOR ORDINARY SOILS, best quality, 27s. to 30s.
per acre; second quality, 20s. to 24s. per acre.
FOR HEAVY SOILS, best quality, 28s. to 31s. 6d.
per acre; second quality, 20s. to 26s. per acre.
Reduced Rates for quantities of more than ten acres.
For full descriptions see CARTER'S ILLUSTRATED FARMER'S
CALENDAR, sent Gratis and Post Free.

JAMES CARTER AND CO.,
237 and 238, HIGH HOLBORN, LONDON, W.C.

Ferry's New Verbenas.
CHARLES T. FERRY has strong plants now ready
of Mr. Ferry's beautiful new VERBENAS, which received so
many First-class Certificates during 1870, and which he can strongly
recommend. The list of 15 varieties, 25s. For description, see
CATALOGUE, now ready.

The Royal Nurseries, SloUGH.

ROBT. T. AITCH, the Nurseries, Exeter.
I respectfully announce that he has now ready for distribution
plants of the above fine WHITE AZALEA, which obtained a Special
Certificate from the Royal Horticultural Society in the spring of 1869,
and was also again greatly admired at their Exhibition held in March
last. Can be confidently recommended as a fine bloomer, surpassing
all other sorts for early forcing. Price 2s. 6d. each. Four for three to
the Trade. Can also offer the Trade several dozen LUCILIA
GRATISSIMA and PINCTANA, at 3s. per dozen.
Exeter, April 19.

CLEMATIS GEM.—A new and beautiful hybrid
raised by G. BAKER & SON, and exhibited at the Horticultural
Society's meeting at St. James's Palace, August 17, 1870, by whom it
was awarded a First-class Certificate. It is a most profuse bloomer,
and continues in bloom until destroyed by frost; colours, rich blue,
like Standishii, size of lanuginosa. Plants will be sent out the second
week in May, 1871, price 6d. each.

G. BAKER AND SON, American Nursery, Bagshot, Surrey.

Verbenas, Verbenas—6s. per 100, 50s. per 1000.
WILLIAM BADMAN offers well-rooted Cuttings of
VERBENAS—Purple, White, Scarlet, Rose, Crimson, &c., at
6s. per 100, 50s. per 1000; in single pots, 2s. 6d. per dozen, 2s. 6d.
per 100, 20s. per 1000.

GERANIUMS.—Vesuvius, Lord Derby, Madame Lemoine, Wilhelm
Fitzler, established plants, in single pots, 2s. 6d. per dozen, 20s.
per 100; Crystal Palace Gem, finest Golden-leaf Geranium, 2s. 6d.
per dozen, 20s. per 100.

HELIOPTROPS.—finest dark varieties, 6s. per 100, from stores.
AGERATUM, Imperial Dwarf, strong, 5s. per 100.
Package included. Terms cash. Post-office Order on Gravesend.
Cemetery Nursery, Gravesend.

RICHARD SMITH'S SEED CATALOGUE
contains a Calendar of Time for Sowing and sowing, and directions,
with Prices, Directions for Cropping well and economically,
Manure, Depth, Distance, Season, Hardiness, Duration, Form,
Height, Colour, Storing, Use, Flavour, and other qualities desired.
The List free by post for one stamp. Seeds direct from the Growers,
the surest way in the market. Richard Smith, Seed Merchant, Worcester.

Botanic Nurseries, Brixleywood, Beds.

NEW PINK, the FLOWER OF EDEN (white forced).
This is one of the greatest novelties of the season, it has
received the highest Certificate of the Royal Horticultural Society of
London, and similar Certificates from most of the leading Horticultural
Societies of England. It is a pure white, free flowering, heavy
bloomer. Size enormous, measuring 6 inches in circumference. Will
flower in May in the open air. Price now ready, 7s. 6d. each, or
5s. for 30.

CENTAUREA CANDIDISSIMA.—The Advertiser
has a fine stock of the above to DISPOSE OF, in suitable
for bedding out, at the following prices—4s. 6d. per dozen, 2s. 6d.
per 100; extra selected, 6s. per dozen, 55s. per 100. Remittances should
be accompanied by the unknown Correspondents.

ROBERT HORSKMAN, Longdown Nursery, Marchwood,
Southampton.

New Cypripedium.



MR. WILLIAM BULL has a large stock of the
lovely CYPRIPEDIUM NIVEUM, imported direct from its
native habitat. This new kind elicited universal admiration when
exhibited at the Royal Horticultural Garden on Wednesday last, and
was awarded a First-class Certificate by acclamation.
Establishment for New and Rare Plants, King's Road, Chelsea,
London, S.W.

The Gardeners' Chronicle

SATURDAY, APRIL 22, 1871.

A FLOOD of information as to the progress
of SILK CULTIVATION has set in upon us all
at once, intelligence from Japan, from Australia,
and from Madras, having come in almost simul-
taneously. For the last two or three years
regular reports on the silk culture of Japan have
been received by Government from Mr. ADAMS,
which have been laid before Parliament, and
have been published among the Parliamentary
papers; and a third report by him, dated
Japan, August 10, 1870, has been presented
to both Houses of Parliament in the present
year, of which a copy has just reached us.
In this a good deal of information will
be found as to the extent of silk cultivation
in Japan, the system of culture, and the
diseases of the worms in that country. What
concerns us most, however, is the fact that, as
might be expected, under the fostering influence
of the large demand for Japanese eggs in Europe,
the culture of the silkworm in Japan is rapidly
extending, and that European machinery for
reeling the silk is about, or at least is proposed,
to be introduced—although it would not appear
to have yet got beyond the stage of being talked
about.

Another introduction, however, which but for
the inherent folly and reckless speed of mankind
would have been thought impossible, has, we are
afraid, been actually made, namely, the Pebrine,
or silk disease, which has so nearly annihilated
the cultivation of silk throughout Europe. When
this calamitous disease gradually spread from
France to Italy, from Italy to the Levant, from
the Levant to India, and from India to China, it
was felt that the discovery of the means of trans-
mitting eggs glued upon cards from Japan—almost
the only unaffected silk producing country—
was to be almost a providential inspiration. It
appeared saved from destruction a trade or

manufacture on which hundreds of thousands
depended for their daily bread. As the cocoons
produced by the Japanese worms were small in
size and inferior in quality, and consequently the
value of their eggs solely consisted in their being
pure and free from infection, it might have been
thought that the Japanese for their own interests
would guard that purity with the most jealous
care; and the situation of their country, pro-
tected by sea from all danger of a natural im-
portation of the infection, would have rendered it
not difficult to do so. But could any one have
thought that they themselves would cut their own
throats, and as if of *malice prepense* actually
import the infection from Europe into their own
country?—and yet, from the following passage in
Mr. ADAMS' report, it would appear that this is
what they have actually done:—

"We found that cards of Italian eggs had been sent
this season to Shunamur, in order that the hatching
and rearing might take place there. The result of this ex-
periment has not, I fear, been at all satisfactory. We were
told that out of over 25,000 which had been hatched
only about 1000 had lived to cocoon. We then the re-
minder had died off two or three days after the com-
pletion of the fourth rest, and that out of the 20,000 remain-
ing the proportion of uji was about 50 per cent. We
saw some of the cocoons, which, though gener-
ally well formed, were very small. The cards produced
of sufficient scientific knowledge to affirm that
these worms which were produced from Italian cards were
affected with pebrine, but the fact of the mortality occur-
ing after the fourth rest tends to raise a suspicion that
much may have been done by the cards. We then the re-
two former towns too early in the season to know the
result there, but at Yashiro it was said to have been un-
satisfactory."

Words are feeble to express the indignation
and disgust with which one reads of such a
suicidal means of attempting to improve the
quality and breed of their silkworms. He that
hopeth all things may goodnaturedly trust that
the infection feared by Mr. ADAMS may not
prove to have been introduced, but, if it
were so, that can in no respect alter the con-
demnation that the introduction of Italian cards
deserves. Although they had tried it, the intro-
ducers could have taken no better means of
effecting the destruction of the Japanese silkworm.
Whatever precautions they may have
taken (and it does not appear that they took
any while the result would seem to signify that
they took none), they had no right to risk the
tremendous consequences hanging upon such a
step on the faith of any private judgment what-
ever. The world will now watch with interest
what is the outcome of these Italian eggs.

Japanese silkworms seem to have a sufficient
share of diseases of their own, without the help
of any foreign varieties. Some of them seem
very similar to those that are well known in
Italy and the South of France, such as dysentery,
&c.; but that which seems to be regarded as
most formidable, and which has occupied most
of Mr. ADAMS' attention, is the ichneumonising
of the silkworm by some minute hymenopterous
insect. This seems to make great havoc, sweep-
ing off from 30 to 50 per cent. of the worms.
Mr. ADAMS has wisely recommended the destruc-
tion of all the ichneumonised worms, by burn-
ing, boiling, or otherwise, so as to prevent the
ichneumons which have done the mischief pass-
ing through the rest of their stages and after-
wards appearing as perfect insects, a recom-
mendation which seems to be necessary in
consequence of the Japanese merely throwing
away the attacked worms, leaving the parasites
to run their course. This is a very proper pre-
caution, although it can hardly be expected to
have much effect, seeing that the parasites in all
probability do not confine their attacks to the
silkworm, but extend them to any larvæ which
they may find roaming about in the wild.

A better precaution, as it seems to us, would
be the protection of the windows of the *mag-
naries* with musquito netting, at the period
when the ichneumons lay their eggs in the larvæ.
The immense mortality thus caused speaks
the volumes as to the carelessness and neglect of the
superintendence of the Japanese—there must be
clouds of ichneumon hovering all round the
worms at the time in question, or it could never
take place.

Mr. ADAMS also speaks of the cultivation of
the Yama Mai, and—a rare *désolément* in a
Parliamentary paper—we have a couple of
coloured plates showing the close resemblance

which the worm bears to the leaves on which it feeds, both in form and colour. He says:—

"It is a curious and most absorbing sight to watch the larva clinging to the branches and leaf-stems, and to observe how completely their colour corresponds with the leaf on which they most delight to feed. Their bodies are of a pure and almost transparent green, with a bright line running down the sides, ending in a brown patch, &c. So much did every colour and streak resemble the plants to which they cling that it was some time before our eyes became sufficiently practised to distinguish them at all without close examination."

We shall be delighted if our amateurs in this country can succeed in making such an interesting sight common, but no great feat it must be of science and no love of self that will do it, for we see that the price quoted by Mr. ADAMS for the cocoons of Yama Mai, in Japan, is four dollars per thousand, equal to about six cocoons for a penny. He mentions that the use to which the silk is put is the manufacture of a stout kind of netting, and that it is also made up with other raw material, such as cotton.

So much for the silk intelligence from Japan. That from Madras and Australia must, we fear, be left over for another time.

CONSIDERABLE apprehension exists with respect to the prevalence of the VINE MILDEW in AUSTRALIA, which we are very happy to modify, as far as the specimens go which have been submitted to us. The following extract from an Australian paper shows somewhat of the state of feeling, but we shall subjoin an extract from a letter lately received, which enters more fully into the matter:—

"No doubt is now said to exist with regard to the character of the vine disease that has appeared in the Upper Murray vineyards. Mr. ADAMS, the Surveyor-General of New South Wales, who is now largely consulted, has communicated his opinion in a letter to the *Albany Banner*. He pronounces it the true Oidium: 'I found not only the same evidences of an attack, probably three weeks old, but also the disease in full activity. It has not yet been ascertained whether the disease will be a permanent one, or whether it will be a passing one. If the latter, I fear that it may still seriously affect the coming crop, and I therefore advise your readers to provide sulphur and bellows.' Twenty pounds of sulphur and one pair of bellows are sufficient provision for 10 acres. The *Albany Banner* writes: 'We look forward, not only with anxiety, but with some apprehension, to the coming vintage, which will commence in less than two months.'

Mr. G. F. WILSON, whose services are so well appreciated at South Kensington, has sent us the following extracts from the letter above mentioned received from Mr. CARSON of Melbourne, the President of the Victoria Horticultural Society:—

"American Blight, against which I use Gishurst Compound, is very bad with us this season. In Sydney they have had upwards of 60 inches of rain for the year. This has had a very bad effect on the Vines, producing a great deal of disease; and as the Grape Vine is now largely grown in Australia, a great deal of discussion has lately taken place as to the cause of the disease. Some would have it is caused by insects, some by frost, and all sorts of causes. The disease has generally got to be called the 'Black spot.' Most of the owners of vineyards would allow it to be called Oidium, for fear of depreciating their property in value. At one of our monthly meetings of the Victoria Horticultural Society, as president I was asked my opinion. I referred them to an account given in 1865 by Mr. M. C. COOKE, Upper Holloway, who gives Mr. GIBBSLEY as authority for the history and description he gives of the Vine disease in the book entitled 'Rust, Mildew, and Smut.' I may say, as far as I have been able to judge, there can be no doubt that the disease we have is the same as that described in Mr. COOKE's book. I may, say some of our own *seniors*, can we prove it is the same? I say no; I have neither the skill nor knowledge, but I shall send samples to those who have, and I think I shall get a reply. I have therefore taken the liberty of sending you a few specimens of blighted Vine twigs and leaves. I am also pleased to find prepared for the foregoing particulars, and to request for their opinion as to whether this is the Vine disease as known to them, or one new and distinct? Enclosed is a portion of the agricultural report in the *Argus*."

On examining the leaves we find little brown dead patches scattered in numbers over them, and penetrating through the whole substance, reminding one of those which so often occur on Peach leaves when exposed to cold and wet. There is not the slightest trace of Fungi upon them, and, above all, there is no resemblance to what takes place from the attacks of the Oidium. The unusually wet weather is perhaps quite sufficient to account for their condition. But the shoots of the Vines are in a far worse state than the leaves. Many are quite killed, and there are curious patches scattered over the new shoots which look like blue bruises, beneath which the tissues are now altogether decayed. The patches at first are orbicular, quite smooth, and shining,

and look like some closely pressed cocoon, but the cuticle soon breaks up, and partial or complete disintegration of the subjacent tissues takes place. We can find no trace of insects, but it might be worth while to examine these spots in the living plant with a good lens, to see if anything in the shape of minute insect life can be detected. Certain it is that there is no Oidium in the case, and it is to be hoped that a more general season may bring with it improved growth, though the condition of the specimens before us is far from encouraging. *M. J. B.*

We are requested to state that the days fixed for the next INTERNATIONAL ROSE SHOW are Thursday and Friday, July 6 and 7. It will probably be regretted by some rosarians who have been regular exhibitors in former years, that other days could not have been selected, but the committee had no alternative but to choose the days now announced, as the Town Hall, in which the show has always been held, is bespoken for all the days which would have been eligible for the show in the week preceding the fixture and in that following it.

The following communication, relating to the PURCHASE of POSTAGE STAMPS, has been received by the Secretary of the Committee of the Postal Reform.

"I am directed by the Postmaster-General to acquaint you, with reference to your letter of the 29th ult., that, after full consideration, he has decided that, in order to diminish as far as possible any inconvenience that may temporarily arise from the restricted use of postage-stamps for the purpose of remitting small sums to continue the present system until June 30 next; but that, as so much evil has resulted from it, no postmaster will be permitted to purchase postage-stamps from the public after that date. *W. Parkhurst.*"

—A new specimen of WELLINGTONIA GIGANTEA, or "big tree," 40 feet 4 inches in diameter, has been discovered lately near Visalia, in Southern California. This, says *Nature*, is thicker by 7 feet than any other that has yet been found. A section made of the "big trees" is now exhibited in Cincinnati, and is 76 feet in circumference and 14 feet high, and, standing on the floor of the hall, it gives one a perfectly clear idea of the enormous size of the tree from which it was taken. The section was cut last year in the Mariposa Grove, about 250 miles southeast of San Francisco, and far up the western slope of the Sierra Nevada Mountains. It was divided and hauled 140 miles to Stockton, on three wagons, by 17 yoke of cattle.

The following schedule of PRIZES for COLLECTIONS of ECONOMIC ENTOMOLOGY, offered by the Royal Horticultural Society, has just been issued:—

1. A prize of £10 for the best collection of British insects, anterior to any published as to Coleoptera, Caba, when (A) the (choice of the plant to be left to the competitor). The insects to be shown as much as possible in their various stages of development—eggs, larva, chrysalis, and perfect insect. In judging, a preference will be given to those collections which most successfully illustrate the life history of the insect, and which exhibit the mischief done, whether shown by specimens, drawings, models, or other means.

Examples of the application of drawings, models, and specimens to this purpose may be seen in the Society's collection at the South Kensington Museum.

2. A second prize of £3 for the second best collection.

3. A prize of £5 for the best miscellaneous collection of any branch of British Economic Entomology, similarly illustrated.

4. A second prize of £2 for the second best collection.

The collections to be sent to JAMES RICHARDS, Esq., Assistant Secretary, Royal Horticultural Society, on or before May 1, 1872, each collection bearing a motto, and a separate sealed envelope, with the motto on the outside, and the name of the competitor inside. The prize to be given to the exhibitor to be taken from any of the collections sent in, whether successful or not, whatever specimens or illustrations they may choose, at a price to be fixed by the judges.

The judges to have power to refrain from awarding the prizes should the collection seem unworthy.

The characteristic PROPERTIES of the АРГОНИА (Gmel.) are not so much to inspire confidence in their edible qualities, but though the milky secretions of some are dangerous poisons, those of others are palatable and inert; in like manner the seeds and fruits of some are exceedingly virulent, while others are not only eatable but are said even to be delicious, such for instance, are the fruits of the Mangaba (*Hancornia speciosa*, Gomez), a small tree, growing in quantities in Brazil. In size and appearance the fruits somewhat resemble a Plum, but are of a yellow colour with red streaks; they are highly prized by the natives, but are not fit to eat until they have become quite ripe, and in this state are sent into the markets at Pernambuco. Cattle are so fond of them that they wait under the trees till the ripe fruits fall.

—We understand that at the State opening of the LONDON INTERNATIONAL EXHIBITION of 1871, on May 1, the chief municipal authority of each city and town of the United Kingdom, the chairmen of Chambers of Commerce, the masters of City companies, the Council of the Society of Arts, the Council of the Royal Horticultural Society, the official staff, reporters

for the exhibition, and members of committees, will be invited to take part in the ceremony, and to inspect the Fine Art and Industrial Galleries, in which the exhibition of Musical Art will take place in the Royal Albert Hall, under the general direction of Sir MICHAEL COSTA, when will be performed a chorale representing Italian music, composed and conducted by Chevalier PINISUTI; a psalm representing French music, composed and conducted by M. GOUNOD; an overture representing German music, composed by Dr. F. HILLER; a cantata representing British music, composed and conducted by Mr. ARTHUR SULLIVAN; and a "God save the Queen" by the chorus and audience.

The taste which has of late years been increasing for Lighter, or might even say white—Woods for bedroom furniture has to a large extent done away with the old system of painting and graining. Silver Fir and Spruce are now largely in demand for bedroom suites, and nothing can be more cleanly in appearance and pleasing to the eye than these simply polished unpainted woods. A similar good taste is also shown in the seats and other woodwork of modern churches, for where Oak is too expensive common Pine and Birch, simply varnished, is now largely used.

The bold dark lines produced by the annual rings of the latter render it specially adapted for church work, and large quantities of the wood are now used in this country. It is supposed to be the produce of *Pinus australis*, and comes from the Southern States of North America. It is not a little remarkable that, even in Brazil, a country abounding in hard wooded timber trees, the Pitch Pine is largely used; indeed, it is preferred for building purposes. It is said that the turpentine with which it abounds prevents the attacks of the white ant; and, moreover, it can be obtained from the States of America, sawn to any required scantling, as cheap, or cheaper, than timber could be procured from the adjoining forests.

—Mr. W. W. STODDART has made some interesting researches into the microscopic STRUCTURE of MUSTARD SEEDS, and finds that that of the white Mustard (*Sinapis alba*) is quite different from that of the black Mustard (*S. nigra*):—

"The seeds of both have a husk, built up with three layers of cells or tunics. The exterior tunic consists of a transparent series of hexagonal cells $\frac{1}{10}$ inch broad and $\frac{1}{10}$ inch long, arranged in a regular hexagonal pattern. The middle tunic is in the centre of each an aperture surrounded by an elastic spiral fibre, from which a long tube passes from the exterior to the interior. When wetted with water this elastic apparatus springs forward, projecting from the surface like the schoolboy's Jack-in-the-box, carrying with it the tube from which flows a mucilaginous fluid. It is distinctly different from the well-known spirals of the Colombia, but rather resembles the cushion-springs of the upholsterer, covered with an exceedingly fine membrane. The best method of viewing it under the microscope is by the use of a polarized light and a blue tannic stage. This curious compound cell is totally absent in the black Mustard seeds. The middle tunic is a single layer of very small cells, averaging only $\frac{1}{100}$ inch, and filled with the colouring matter. The internal coat of the husk consists of a layer of cells $\frac{1}{100}$ inch in diameter, and irregular in shape and size. The seed itself is formed of minute cells, which contain a large quantity of fixed oils."

The structure in question was described and figured some years since in Dr. HASSALL'S "Adulterations of Food."

THE MAXIMUM TEMPERATURES of the AIR in England during the week ending April 15, ranged from 66°.6 at Nottingham to 56° at Newcastle, with a mean for all stations of 62°.5; and in Scotland from 60° at Perth to 57° at Greenock, with a mean for the several towns of 58°.9. THE MINIMUM TEMPERATURES ranged from 41°.2 at Hull to 35° at Portsmouth and Greenock; the mean for all stations in England and Scotland being 29°.2 and 30°.2 respectively. THE MEAN TEMPERATURES in the southern country were above those in the northern, the value for England being 46°.1, and for Scotland 43°.1. In England the highest mean temperature recorded at any station was 48°.8, at Portsmouth, and the lowest was 42°.2 at Hull; but in Scotland the highest was only 46°.8 at Greenock, and the lowest was 38°.1 at Dundee. RAINFALL.—The falls during the week ending April 15 were much larger than those which took place during the preceding week, although as usual the heaviest falls were confined to Scotland, where 1.80 inch at Edinburgh, and 1.55 inch at Glasgow, were the chief falls; whilst in England, 0.97 inch at Eccles, and 0.85 inch at Manchester, exceeded the fall at any other station. The means for the two countries were for England, 0.64 inch, and for Scotland, 1.18 inch. (See Mr. GLAISHER'S Tables, p. 521.)

—Amongst the EDIBLE SEAWEEDS of NEW CALEDONIA, *Acetabularia Wrightii* is the most esteemed. It is said to be more nutritive than any other species, and is frequently collected and eaten by distressed or shipwrecked natives, many lives having been preserved by it when all other food has failed. Though so much sought after, it is said to have a very disagreeable taste. Perhaps the most important after the above of the New Caledonian Algae are *Enteromorpha compressa*, E. complanata, E. ramifera, and others, which are collected and eaten by women at the mouths of the rivers. *Turbinaia ornata*, *Ulva nematoides*, and

most of the species of *Cauleptra*, are also eaten by the natives.

In Bohemia a somewhat singular use is made of the larger species of *POLYPORUS*, such as *P. ignarius* and *P. foetentarius*. They are employed in rooms as flower vases. They are fixed to a wall or other surface by the portion by which they are attached when growing to the trunk of a tree, the fructification being, of course, on the lower side. Upon the surface are then placed such plants with trailing stems as can grow and flourish with very little water or soil; and the result is stated to be as remarkable as it is pleasing.

New Garden Plants.

LISIANTHUS CÆRSTEDII, *Grisb., Walper's Ann. v.*, p. 513.

Caule inferne tetrapetalo apice teretiusculo; foliis ellipticis obtusiusculis, inferioribus basi angustatis, superioribus arctius sessilibus; cymæ semel v. bis dichotomæ ramis stricte racemiformibus; floribus utrinque secundis; calycis 5-fidi lobis obtusatis; corollæ viridi-lutescentis tubo tenui superne infundibulati calycem plus duplo superante, lobis subrotundis obtusis; gentiliæ æquantibus, stigmatibus lobis obtusis; capsula oblonga rostrata.—*Hab.* In broken ground, slopes of hills in Nicaragua, between Matagalpa and Managua (Cærsted), and Esquipulas, Juigalpa and Pital (Seemann?).

Those who try to make out the natural order of this plant by the diagnosis in Lindley's "Vegetable Kingdom," and similar works, where the corolla of *Gentianæ* is described as regular, will not succeed, for the flowers of *L. Cærstedii* deviate from those of the normal type of the order; they are irregular, and remind us of those of *Fagrea filipes*. A. Gray (*F. viridiflora*, Seem.), of Viti. More-over the five stamens are of unequal size; four being didynamous, and the fifth, inserted between the shortest pair, the longest of all. In a future revision of the order, such as may be expected in Bentham and Hooker's admirable "Genera Plantarum," the generic separation of *L. Cærstedii* and its allies from the older species of *Lisianthus*, or the exclusion of modern species of the genus, will probably be found inevitable.

The plant, of which I sent a plentiful supply of seeds to Mr. W. Bull, is decidedly pretty, and called by the country folks of Nicaragua "Flor de Campanilla," or Bell-flower. It is used medicinally, on account of its tonic qualities. The largest specimens I saw were 6 feet high, but the plant generally does not attain more than 2½ to 3 feet. Prof. Grisebach

is probably correct in identifying *L. Cærstedii* with Aublet's *L. subata*, but Aublet's authentic specimens at the British Museum are too imperfect, and the published plate of Aublet's is too rude to enable one to endorse that opinion in an off-hand way. The following notes were made on one of the most robust specimens which I collected:—Biennial, root-stock ascending, root fibrous. Stem ½—1 of an inch thick, simple, 4-angular, narrowly winged. Leaves opposite, quite entire, 5–7-nerved, nerves depressed on upper surface, raised on lower; all parts of stem and foliage green, but lower surface of the leaf paler than the upper. Blade of leaf decurrent on a short amplexicaul petiole. Joints between the leaves 4–6 inches long. Inflorescence terminal, forming a bis-dichotomous racemose panicle. Flowers unilateral, nodding, a single flower in each of the furcations; branches 7–8-flowered. Calyx 5-partite, lobes ovate, obtuse, dark green, with whitish edge, imbricate in aestivation (2 lobes external). Corolla infundibuliform oblique (greenish-yellow, whitish at the edge), 5-fid, lobes ovate acute, strictly imbricate (none of the lobes exterior with both edges). Stamens 5, unilateral, and of unequal length, 4-didynamous, the

odd stamens the shortest, and inserted between the shortest pair; filaments in parts attached to corolla compressed, terete where free; anthers oblong, 2-celled, opening longitudinally; pollen white. Ovary seated on an entire glandular disk, oblong, 2-celled; cells many-ovuled; style compressed; stigma 2-lamellate, segments ovate-oblong obtuse. Capsule oblong, rostrate. *Berthold Seemann.*

G. F. WILSON, F.R.S.

AMONG our noteworthy horticulturists few are more deservedly popular than the subject of this notice. Well known in scientific circles for his attainments in chemistry, Mr. Wilson has known how to turn his acquirements to practical ends. To him, for instance, in conjunction with Mr. Payne, we are indebted for a process of preparing glycerine by heating fatty substances with water or steam, in such a manner as to obtain the glycerine in a pure state. This process may be said to have converted glycerine from a

been exhibited, and of those privileged to see them in the unpretending but thoroughly efficient houses in which they are grown. The splendid crop of Pears and other fruits borne last year by the pot trees of the Gishurst Cottage orchard-house was but recently noticed by us (see p. 349).

To a large extent Mr. Wilson is his own gardener, and his fruit trees, consequently, bear evidence of the master's love and care. Lilies, too, are another speciality of Mr. Wilson, whose collection of these beautiful plants is probably the most important now in the country. All flowers, however, find a warm and discriminative admirer in Mr. Wilson, who seems rarely better pleased than when he has the opportunity of sharing with others the happiness he derives from these sources.

As a man of business, Mr. Wilson's tact and good sense are well shown at the Council Board of the Society of Arts, of the Royal Horticultural Society, and of the Fruit Committee, of which latter body he is, and has been for some years, the president. Mr.

Wilson's services are always to be reckoned on when anything likely to promote the welfare of horticulture or of its votaries is mooted; and those who have to work with him know well how much the business habits, gentlemanly good feeling, and quiet energy of Mr. Wilson promote the end in view. At the present moment Mr. Wilson is acting as the treasurer to the fund raised for the relief of the distressed French horticulturists; and we do him no more than justice when we say how satisfactory it would be to him to see the fund he is called on to receive in his official capacity largely augmented!

THE AMATEUR GARDENER.

The Auricula as a Border Flower.—The Auricula, or "Bear's-eat," as it was called by our forefathers, has always been in high favour with florists of the amateur class, partly from its intrinsic beauty, and partly from the accommodating character of its habit, which allows it to flourish in a mechanic's window as well as in a conservatory, in the little gardens of Lancashire weavers as well as in the magnificent parterres of Chiswick and Chatsworth. As the fine sorts or "stage flowers" are best grown in pots, there is a compactness in the cultivation which recommends it to those whose time and means confine their gardening within a limited compass. Of this pot culture it is not our intention to speak at present, nor do we know that we should be thought competent to enter upon its

chemical curiosity to the valuable substance now in such large daily use.

Another illustration of Mr. Wilson's happy faculty of rendering science available to practical ends is afforded by his invention of the liquid known as Gishurst Compound, and which has been found so efficacious as a destroyer of insect pests. The name given to this compound is peculiar, and we believe we are not mistaken when we state that it originated in this wise. Mr. Wilson having taken possession of a cottage in the country, was desirous of finding some distinctive name for it. After some time the name Gishurst was decided on—the name signifying Fig-Gishurst [for Gis may mean pasturage]. At any rate some objections were raised to the appellation, which Mr. Wilson dispelled by stating that he would soon give world-wide popularity to the name. This he did by calling his newly invented fluid by this name. We need hardly say the promise has been kept; every gardener knows and appreciates Gishurst Compound. Mr. Wilson has other claims on our sympathies. He is an ardent horticulturist; his orchard-houses are models in their way; his trees have been the admiration of those who have seen them on the rare occasions when they have

mysteries. A regular Auricula "fancier" would probably scarcely deign to look at flowers which yet are very pleasing to us, so many curious points being necessary to their idea of perfection. Perhaps we might come within the sarcastic remarks of a writer on this flower as far back as 1732, who says—"It is certain that a number of pots of Auriculas well blown and orderly ranged will give a great delight, not only to good judges, but to those who have the least taste or fancy for flowers; in short, the whole pleases them; but it is only such as are nicely curious that are able to decide whether the whole composition deserves attention. These may be easily discovered by the short examination they give each flower, as well as by the determination they make of their value; whereas, on the contrary, ignorant pretenders to this kind of knowledge generally fly from flower to flower, and with so little knowledge and discernment, that they slightly pass over the most deserving, and bestow their applause with great injustice on some of the meanest flowers on the stage. This sort of censure often betrays themselves in the self-same instant that they would be esteemed among the most judicious connoisseurs, by desiring to be shown your finest



G. F. WILSON, F.R.S.

flowers, when possibly it is immediately before their eyes."

Yet we cannot think that any lover of nature could regard with indifference a border of Auriculas now in full bloom under our management, and possessing, certainly, a large measure of our admiration. The border is 40 yards long, and contains about 1 foot each, which for an established root is not too much. This long bed is under a north wall, and is separated from a wide gravel path by edging bricks of the cable pattern. Shortly after the snow disappeared in February these plants exhibited the various shades of tender green for which the Auricula is remarkable, and at the present time, apart from the flowers, there is not a more pleasing sight in the whole garden. They are very thickly studded with masses of flowers, so that we do not grudge collecting whole handfuls either for house decoration or to present to a friend; for all our visitors are sure to be attracted by the Auricula border. At this season there is nothing out-of-doors more useful for bouquets, when mixed with some foliage of other plants; the flowers will last a long time in water. They are of a large variety of colours, and most of them of a thick velvety texture and of the size of a florin. As we stated above, the "fence" of this flower would possess some quality in each, either in the pipe, the straw, the tube, or the paste, neither do all the trusses stand so erect as could be wished; yet, taking one thing with another, a bed of this class of the Auricula has been a great favourite with us for ten years past.

We must now relate how we came in possession of our stock, for that is the most interesting part of the matter. Ten years ago, knowing how much labour may be thrown away by cultivating poor seed, we made friends with a celebrated horticulturist, and received from him as a present a small packet, which became the parent of a numerous and fair progeny. We have several times since tried to increase our collection by purchasing from respectable seedsmen Auricula seed, described in their catalogues as "from stage varieties," but have never been nearly so fortunate as with our first venture. Let our readers who wish to be repaid for their labour, and the interest expended in the pursuit of the matter, be guided by the example of our friends, and then they may hope to be rewarded as we have been, but not otherwise. From our purchased seed we have, after a year's care and watching, been often mocked by pin-eyed, flimsy, and otherwise useless flowers, some no better than Primroses, which is a mortifying result. Being pretty sure of good seed, sow it in March, or later, if more convenient, in a seed-pan, and place the pan out-of-doors, where it will not easily get dried up, and where it can suffer no chance of being neglected. The seed is sometimes a long time in appearing, and the young plants grow slowly; but with proper management they will all flower the following spring, if sown in March. Transplant when the seedlings are as big as a Pea, and towards the autumn put them out in a bed where they are to flower, when the worthless ones should be thrown away. About every second year we make a new stock by division of the roots, the flowers are thus preserved from degeneracy.

P.S. If any sympathising amateur would send us a little really good seed, addressed to "H. B., at the Gardeners' Chronicle office, he would greatly oblige.

THE BEDDING-OUT SYSTEM.

THE practice of planting-out various kinds of tender or half-hardy plants about the middle of the month of May into beds, in the open air, with the view of producing a grand display of floral beauty in the parterre during the summer and autumnal months, is usually designated the "bedding-out system;" and although this may have been practised to some extent very many years ago, still its universal adoption as a system may be regarded as comparatively modern, probably dating back less than half a century.

This system has been necessarily progressive in its development, in accordance with acquired knowledge as to the capabilities of the various materials, and its use into use in producing desired results, and has also from time to time been aided and influenced by the introduction of novelties suited to the purpose in view, such novelties being due to the indefatigable exertions of collectors on foreign stations, as well as to the skill and labour of the hybridiser and cross-breeder at home.

Altogether the bedding-out system has attained a degree of popularity which is likely to be lasting; although it is by no means to be supposed that it has attained to the utmost degree of perfection of which it is capable, or that it is by any means at a standstill. Indeed the reverse of this is proved to be the case, inasmuch as in very many garden establishments each succeeding season is evidently an advance upon its predecessors, in regard to the selection of material, the arrangement of the same, and the satisfactory effect produced. The system may without doubt be regarded, even in its present condition, as a great advance upon that which it has in a great measure superseded, and which, although still applicable and well suited to some circumstances and situations, in too many instances consisted of a series of unmeaning clumps or beds, without any apparent order or arrangement, and which added little to the beauty or the inter-

est of the lawn which usually surrounds a country mansion or residence.

These clumps or beds were frequently of considerable dimensions, and were usually planted with hardy herbaceous plants, annuals, bulbs, &c., which though by no means deficient in interest to the lovers of flowers, were still without any pretensions to that concentrated display of floral beauty which is annually presented by the present popular system. The latter might indeed be considered to be so great an improvement upon its predecessor that it could hardly have a single opponent or detractor. But this is by no means the case, for there are at least a few writers upon the subject whose almost furious attempts to bring this style of flower gardening into contempt suggests the probability of there being some latent Pelargoniums, yellow Calceolarias, &c., which exercises some latent pathological influence upon certain temperaments, similar to that produced by a red flag upon the temper of a certain quadruped, otherwise usually quiet and docile in his deportment.

It is, however, to be regretted that the advocates of one style or system of decoration should think it necessary to denounce another, when there may be room enough for both, and each may be equally applicable to the tastes and circumstances. And I believe that there are few, if any, advocates of the bedding-out system who, grouping, who would for a moment wish to see the entire class of hardy herbaceous plants, or the still more interesting class of hardy alpine perennials banished from the flower garden; or who would be unwilling to admit that the herbaceous border, &c., possessed attractions of the most interesting character.

There cannot be a doubt that flowers are a source of great pleasure and gratification to nearly all classes and conditions of mankind, be they learned or unlearned, rich or poor. Few, indeed, can be said to be altogether indifferent to their attractions. It is also at the same time easy to conceive how that, to the eye of the botanist, the humblest flower that blooms wild on the mountain side or adorns the headland glade, may possess equal or even greater attractions than its more beautiful sister of the parterre. But as all lovers of flowers cannot be botanists, it follows that plants are for the general public generally appreciated and admired in accordance with the beauty possessed by their flowers and foliage, the grace of their habit, and the sweetness of their perfume; and to stigmatise any class of plants as glaring and vulgar, &c., because their habit happens to be floriferous and their hues bright, hardly seems reasonable and just.

It has also been urged as a powerful argument against the bedding-out system, that the effect produced, however striking and beautiful it may be, is at best but ephemeral in its character, or of short duration. This, however, can hardly with justice be said to be the case, as the time between the middle of May and the beginning of November, approaches very nearly to a moiety of the entire year. The beds are also said to be left in a desolate and unsightly condition, when the frost and cold winds of early winter have destroyed and swept away their gay summer occupants. This is no doubt to some extent true, but it is at the same time to be remembered that the ground over which man may be said to have little or no control.

In this country a winter garden can only exist and be enjoyed under glass, and the soil of the flower bed, when neatly dug up for the winter, harmonises tolerably well with the bright green of a well kept lawn, and is by no means an unpleasant or unwelcome sight when the absence of snow permits it to be seen. But it must also be remembered that a great many winter gardens are compelled (as it were) to do double duty, and to produce two grand floral displays each year. Indeed, the effect produced by bulbs, and other spring flowers, is hardly, if at all, less interesting than the summer and autumnal display. But this doing of double duty, although sometimes desirable and very successfully accomplished in many garden establishments, has nevertheless some disadvantages or drawbacks; inasmuch as it is found not unfrequently to be necessary to prematurely remove the spring bedders, in order to admit of the summer occupants, and in dry seasons, such as we not unfrequently experience, considerable injury is then sustained by both classes of plants. So altogether the question may be asked as to whether it may not, in many instances, be better to be content to do one thing well, than to attempt to do more than can be successfully accomplished. And certainly the spring flower garden is well deserving of a side by side with it.

It must be admitted that the somewhat too free use of large groups of flowers of intensely bright colours may have given just cause for criticism, and the principal object of this paper is to recommend the introduction to the parterre of some of the various picturesque tribes of plants, which are more remarkable for their foliage than their flowers, as I consider that the judicious admission of a few groups and single specimens of flowers, when used in some degree to modify and tone down the effect produced by a preponderance of bright colours.

The garden might be of a duplex design—a parterre within a parterre, so to speak—and then other groups, without a spring, or other to summer flowers, without any appearance of monotony. The spring beds might be filled in summer with flowers of the way, and the summer beds in autumn with flowers of the way, and the effect produced by a preponderance of bright colours.

Some of the species suitable for this purpose are known as "subtropical plants," but many of them being of rather large growth can only be sparingly used, unless the garden and its surroundings are of considerable extent.

But the class of plants to which I would more particularly refer, and which are already attracting considerable attention, are the various tribes of succulents, many of which are so grotesque and singular in their appearance that a few groups of them judiciously arranged cannot fail to give a new and interesting character to the parterre. They are, moreover, of such easy management, and adapt themselves so freely to open air culture, that they cannot fail to become popular.

Some of the varieties, such as *Echeveria secunda*, *glauca*, *Sempervivum californicum*, &c., have been freely used as marginal lines to beds of flowering plants for some years. But the best effect is possibly produced by growing these singular and interesting plants in beds by themselves, and at the same time avoiding anything like crowding, but arranging them in such a manner that each specimen may have sufficient space to fully develop itself, and to present an unbroken outline, while the surface of the beds should be densely covered by some of the many dwarf species of plants, the purpose of which is known as the embroidery or carpet style of bedding. So fashionable is this mode of planting likely to become, that some of the varieties of plants considered most suitable to this purpose, such as the *Alternantheras*, *Antennarias*, &c., are already at a premium. So rapidly and unexpectedly does the tide of fashion, even in the matter of flower gardening, sometimes set in, that we may possibly ere long find that, as in Corisande's garden, no flowers will be named eligible for admittance "unless they have perfume."

The following are the names of a few of the species of plants considered most suitable to the style of planting referred to, viz., subtropical plants for groups or single specimens:—*Agave americana*, variegated or striped; *Aralia japonica* (Sieboldi), and various sorts; *Arundo Donax*, and its variegated variety; *Bambusa* of sorts; *Canna Anni*, and many others; *Dracenas* of sorts; *Ferdinandia emimens*, *Ficus elastica*, *Gynierum argenteum*, several varieties; *Humea elegans*; *Phorix tenax*; *Reinckia* var. *Castor-ali*; *Solanum* of sorts; *Wigandia aracasana* and *impetris*; *Yuccas* of sorts; *Zea japonica* variegated, &c.; while of succulents suitable for this purpose may be mentioned the *Eonium arboreum* and its variegated variety; *Cotyledon pulverulentum*, *Crassula arborea*, *Doranthens excelsa*, *Echeveria metallica*, *E. glauca metallica*, *E. secunda glauca*, &c., *Pachyphytum bracteatum*, *Rochea falcata*, *Sempervivum arboreum*, *S. canariense*, *S. californicum*, *S. Bollii*, *S. urticum*, &c.

The above are the names of a few of the very many varieties of succulent plants, which are well suited to form very interesting and effective groups in the flower garden, and as plants adapted to the purpose of carpeting or closely covering the surface of beds on which plants of larger growth are thinly arranged, or of themselves forming artistic combinations of colour, as well as marginal lines to beds of considerable dimensions, lines in ribbon borders, &c. Many varieties of dwarf plants, hardy as well as tender, can be successfully employed, and the following are the names of a few of those considered most useful for this purpose:—*Achillea umbellata*, *Achyrocline Saundersoni*, *Ajuga reptans rubra*, *Antennaria tomentosa*, *Arabis albidia variegata*, *A. lucida*, *A. lucida variegata*; *Artemisia frigida*, *Aubrietia deltoidea*, *A. deltoidea variegata*, *Alternanthera amana*, *A. amabilis*, *A. magnifica*, *A. paronychioides*, *A. spatulata*, &c.; *Cerastium tomentosum*, *C. 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say (from the appearance of our own) most abundantly. As soon as the fruits have cast their calyx, and are clear, it is time to commence thinning them. Apricots should be done at once, leaving three or four on each shoot of 5 or 6 inches for the present.

Disbudding of the young shoots should be begun, thinning out from the thickest parts, and stopping the points of the strongest shoots only at first, which should be repeated again in a few days' time. It is a very bad practice to disbud much at any one time; the taking away of so many of the respiratory organs of the tree at once is a severe check, and greatly, often severely, injures its constitution. With pyramid or bush trees little actual disbudding is necessary—just a shoot here and there where too thick. The most of them are merely pinched back with the thumb and finger. Perform the operation carefully and rationally, by checking the upper and stronger growing portions, and encouraging the lower and weaker, by allowing them to grow a little more freely.

Insects.—See to keeping clear of them. The late prevalent east winds have somewhat encouraged the presence of greenfly, for which fumigate, where practicable, which is the most certain way, or dust the young shoots and leaves (previously syringed to make them wet, so that the powder may adhere) with Pooley's tobacco-powder, which is most efficacious in the destruction of green and black fly. Search for and destroy between the fingers the little caterpillars which are destroying the leaves of the Apricots and Plums, &c. Wherever the leaves are found fastened together in little tufts, there will be found one of these little pests, which, if allowed, would soon destroy all the leaves. Pick off all decayed yellow leaves which have been destroyed by the greenfly, &c., and keep the trees as thoroughly clean as possible. Syringe freely on fine mornings about 8 o'clock, and again at about 3 o'clock in the afternoon. If warm, maintain a nice, gentle, humid atmosphere in the house—the greater the warmer the day is. Ventilate according to the weather. Sharp, cutting east winds are to be avoided. A little ventilation is mostly at all times necessary. In warm sunshine the temperature may be allowed to rise to 70° or 80°, shutting up again early in the afternoon, thus bottling up the sun's rays to ward off the cold of the succeeding night. *Zea*.

BOTANY FOR BEGINNERS.—III.

It so happens that the examples we have hitherto chosen to illustrate the construction of flowers have all been furnished by trees. Willows, Poplars, Ash, and Elm have all woody stems of long duration, and their branches are but repetitions of the stem, originating in the leaf-buds. These leaf-buds are for the most part invested by small scales, which gradually fall off as spring advances, and disclose the tender leaves nestling among the young shoots. By-and-by the shoots will lengthen, the leaves will acquire their full proportions, and the shoot, now green, will ultimately harden into a branch, which it is its turn to repeat the programme in another season. The Tulip, which we select for our present illustration, is a plant of a somewhat different character. It affords a good illustration of what is termed a bulbous plant, the characteristic feature of which is, of course, the possession of a *bulb*. At first sight, no doubt, there appears to be but little in common with a bud and a bulb, yet a little attention will show that there is a close resemblance between them. In a bud, as we have seen, we have generally a series of scales closely investing a number of tiny leaves springing from a rudimentary branch. In many buds we have not only leaves thus packed up, but flowers also, or it may so happen that the bud may consist of flowers only. Now, let us look at a Tulip bulb—that of an Onion, a Hyacinth, a Lily, or a Narcissus, will answer the purpose equally well if a Tulip is not to be had, the difference in the bulbs of these plants being one of degree, not of kind. Proceeding to 'dismember' our bulb, we come first to a series of scales, dry and thin in the case of the Tulip; within these are others, of a thick fleshy substance, while from the centre, as is very apparent at this season of the year, rises a stem with well developed leaves springing from its sides, and bearing at its top a flower. If this arrangement be compared with that of the bud of a tree, as above described, it will be seen that the correspondence is close. In essentials, at any rate, the bulb and the bud are identical. There is this difference, however, that in an ordinary tree or shrub the buds remain attached to the branches, while the bulb has an independent existence of its own. Ordinary buds are not wholly destitute of this property of leading an independent existence. Every time a gardener succeeds in striking a cutting, he is indebted for his success to the power that buds or young shoots have under favourable conditions of shifting for themselves. In many Ferns similar little buds are formed on the fronds, which, after a time, become detached, fall to the ground, and set up housekeeping for themselves. The truth is, these bulbs contain in their fleshy scales a store of nourishment, which renders them, to a certain extent, independent of the parent plant or of the soil. This store is accumulated during the summer, and duly prepared for use, so that when in the following spring the season for growth recurs, every provision is made for a fair start. But although for a time, and to a certain

extent, the bulb may thrive upon its own resources, the necessity for a supply of water greater than that furnished by its own tissues is soon experienced. This want is supplied through the agency of the roots, a whole tuft of which may be seen in Mr. Worthington Smith's drawing emerging from the base of the bulb. The roots in this case consist merely of fine threads, and differ indeed in form and texture from the woody branching roots of the trees already mentioned, but they have the same office of imbibing from the moist soil the supply of water requisite for the full development of the plant. The stem, too, demands but little notice, it is an unbranched cylindrical column which will not harden like the shoot of a tree, but will shrivel and die when once the seed is fully ripe. Provident Nature, however, has already furnished another stem for a future season, as may be seen in the little bulb *b* at the base of the parent-bulb, and which is really an axillary bud, see p. 480, destined in another year to play the same part as the parent bulb now does. The leaves too demand at present but little notice from us.



FIG. 102.—VAN THOL TULIP.

A, Top view of flower; B, Section showing two stamens and the pistil; C, Longitudinal section through the pistil, showing the ovules; D, Transverse section across the pistil, showing its three cavities, each with two rows of ovals, the six stamens are cut across below the anthers; E, The new bulb at the base of the parent bulb.

It will be seen they are *alternate* (see ante, p. 480) and that they spring directly from the stem, not being provided with any stalk. Botanists call such a leaf *sessile*. Notice, too, that the leaves are not divided in any way; they are *simple* leaves, *i. e.*, in one piece, and *entire*, *i. e.*, not notched at the margin. We need not at this stage allude to their form further than to say that they are long, narrow, and sharp-pointed. It is worth noticing, however, that a number of fine lines run parallel with the edges of the leaf, so that it may be torn with a tolerably straight edge. These lines are the *ribs*. In an Elm, or in a Laurel leaf, these ribs are so arranged that on attempting to tear the leaf a jagged, irregular edge is left. We may revert to this difference by-and-by.

Passing now to the flower, which is here *solitary* on the end of the stem, we find it provided, as in the Poplar (fig. 89, p. 449), or the Elm (fig. 94, p. 480),

with a perianth, but this perianth is of a different character from those just alluded to. In the first place, it is brightly coloured, not green; then instead of being all in one piece it is here composed of six separate segments (a single not a double Tulip must of course be taken for examination). Moreover, if the flower be looked at before it is fully open—or on a dull day when it remains closed—it may be readily seen that three of the segments, though similar in form, and colour to their companions, are distinctly outside them. In fact, just as the outer scales of the bulb overlap the inner ones, so do the three outer segments of the flower overlap the inner pieces. In the expanded blossom also this arrangement can easily be seen, and the beginner should now have had sufficient experience with the use of his tools, easily to detach the three outer from the three inner segments of the perianth.

Our Tulip flower, then, is more complicated than those we have previously dissected, inasmuch as it has a double perianth, or a perianth of two rows, the segments of both rows being of the same character, and only differing in position. Within the perianth are six stamens, each with its *filament*, or stalk, and its pollen-case, or *anther*. The pupil should notice their isolated character, and the fact that they spring from the centre of the flower immediately below the pistil (a). The mentioned organ is of oblong shape, divided by three long furrows into as many rounded lobes, and is surmounted by three *stigmas*: the ovary, in other words, is three-lobed, is destitute of a style, but has three *sessile* stigmas. Now, the threefold appearance of the ovary, as we know already, indicates that the pistil is here composed of three segments, which, in this case, are called *carpels*, and which, unlike the stamens and perianth-segments, are combined together. If we cut across the ovary, we shall see its threefold character still apparent in the presence of three cavities corresponding to the lobes on the outside, and separated one from the other by three partitions answering to the furrows. The partitions meet in the centre, and to each angle of the triangle so formed are attached two rows of small white bodies, looking like the eggs of some insect, and which are the *ovules* or rudimentary seeds (b). It is hardly to be expected that the beginner can as yet do more than to satisfy himself of the existence of these bodies. Their form and structure are too obscure for him to make out without more practice than we can suppose him yet to have had. In the preceding illustrations, indeed, they are so small as readily to escape the beginner's notice. In the Tulip, however, he can, by cutting the ovary across and lengthwise, see that they are very numerous and arranged in two rows. The angles to which they are attached are so compact that it is called the *placenta*. As we have neither ripe fruit nor seed before us, we need not say aught concerning them at present.

The flowers we have previously described have all been *incomplete*. The Willow had stamens only, or pistil only; the Poplar had a perianth enclosing stamens, and no pistil, or a perianth enclosing a pistil only; the Ash had stamens and pistil, but no perianth; the Elm had stamens and pistil, with a perianth of one row. Here in the Tulip we have, at length, what, for convenience sake, we call a *complete flower*—complete because it contains in the same flower both stamens and pistil enclosed within a double perianth. Notice, further, that the parts of each series of this flower are about equal in size among themselves, that they are arranged in threes or sixes (twice three), and that they are all separate and uncombined, except in the case of the three carpels, which are united together. The pupil who has followed us step by step thus far, and has perfectly comprehended the structure of the flowers we have put before him, may rest assured that he has made good progress in the comprehension of floral architecture.

Home Correspondence.

Orchid Cultivation.—Allow me to thank "G. H." for his letter at p. 450. It enables me to read the extracts, which I alluded to, in a very different sense. I am, however, sorry to notice the tone in which his letter is written, and I assure him that it has been further from my thoughts to inflict a wound either by any remarks which I have made, or which I am about to make on this subject. No one can have read our correspondent's letters with more attention or greater interest than I have, but when I read such (as they appeared to be) contradictory statements, surely I could not be doing wrong in asking him to explain his meaning: at least I cannot think so. I am well aware that the genus *Dendrobium* was under consideration when the resting season was advanced, and that "all the year round" treatment was recommended, the general term "Orchid" was written, no name either of plants or of the country being referred to, and I read and understood it in the general sense. Again, a mean of 70° (not 80°) is either warm or cool—it cannot be both—and in my humble opinion both points are of too much importance in Orchid cultivation to be passed over lightly, especially when published in the *Gardeners' Chronicle*. "G. H." asks for my views and practice, and I must entirely to Nature's guidance; if the plant has distinctly formed pseudo-bulbs—as in the genera *Cattleya*, *Catasetum*, *Dendrobium*, *Odontoglossum*,

to. I believe that plant requires a season of rest; and if there are exceptions in our houses, it is due to our treatment or rather maltreatment, and not to the natural habit of the plant; but if the plant has no pseudobulbs, as in the genera *Cypripedium*, *Phalopsis*, &c., it does not require such a decided resting season, and had "G. H." mentioned this section of Orchids at p. 204, I could have agreed with him so far. I think he will admit that to apply a general term to a distinctive group is really misleading. My practice accords with the above views with very few exceptions, and as regards the first section I would make it invariable if I could. I also have much to learn, and furthermore very anxious to do so, and heartily thank "G. H." for the many useful hints which he has given in these columns, and I hope that he will continue to give us the benefit of his experience. *Ex-Canthab.*

Heliotropes.—After reading Mr. Gilbert's letter on the Heliotropes he planted out (p. 380), I was reminded of some beautiful standard specimens I had seen before, which were greatly admired. They were plants with stems fully 4 feet high, and drooping, spreading branches, and the flowers to within a very little distance of the ground. In winter and in spring they were kept in the conservatory, but as soon as the bedding-out season came round again, and all danger from frost was past, they were transferred to different places out-of-doors. Some were put out into the mixed borders, some were used as centres for small circles of bedding plants on grass, and others were plunged out singly in effective places on the lawn. These plants were valuable in yielding flowers more or less all the year through, though in summer especially they were all that could be desired. *Robert Mackellar.*

Barbarea vulgaris fol. var.—The enclosed plant, *Barbarea vulgaris*, fol. var., is, I presume, the *Nasturtium officinale* var. alluded to by Mr. W. Gardiner at p. 450. We have used it here for eleven years for the winter garden, and first picked it up in a nursery garden at Dunae, Berwickshire. Our plants grow in a cold, shady place, where the soil is seeds freely, and then are able to select seedlings of various or equal sizes for the winter beds. As *Arabis lucida* var. does not flourish here, we find this crop most useful for winter; it is earlier than *Sedum acre aurea*, or the Golden Feverfew. A bed of East Lothian Stocks carpeted and edged with the variegated Cress, looked remarkably well all autumn and early winter until the Stocks were spoilt. We do not consider it ornamental when flowering and seeding. *F. Hope, Wardie Lodge, Edinburgh.*

Flowers for Ladies' Hair.—Your correspondent "W. T." objects to my recommending "thin copper wire," upon which to mount flowers for the hair. I first used "copper wire" at the instigation of a clever lady's-maid, *une petite Française*, and one of the most skilful bouquettiers I have seen outside Covent Garden. This artist objected to hair-pins for two reasons: firstly, because she observed they were difficult to bend; and, secondly, because the weight of some flowers was sufficient to jerk them from their places. More especially is this last likely to occur in the ballroom. At the opera, theatre, or evening party, there is less exertion on the lady's part, consequently less danger of this occurring. The weight of some flowers adapted for the hair is very considerable, take for example *Lycaste Skinneri*, and its beautiful white variety *L. Skinneri alba*, than which nothing can be more beautiful. Again, a great white waxy flower of *Angreum sesquipedale* is very heavy comparatively, but when mounted on copper wire, and the wire is skilfully entwined with the hair, it is impossible to displace them except by sheer force. The odour of *Coleogyne cristata* closely resembles that emitted by bruised specimens of *Cimex lectularius*,—still musk and attar of roses may be sufficiently powerful to counteract this unpleasant quality. One of the most beautiful of all flowers for the above purpose is *Capagaria rosea* var. *alba*; its flowers are of the purest white, and of a very elegant contour. Many of the Himalayan *Rhododendrons* furnish beautiful flowers for the hair, so do many of the *Liliums*, *L. candidum* and *L. longiflorum* for example. The common white *Water Lily*, *Nymphaea alba*, and its ally *N. dentata*, furnish flowers that have the most chaste and refined appearance when artistically arranged. Flowers for the hair should possess graceful elegance of outline, purity of colouring, and good keeping qualities, and if they are odorous so much the better, providing that the odour emitted is of a grateful description. Simplicity and elegance are the words that best explain what floral decorations for the hair should be, in order to become effective. It is not every one who has a plant of the lovely *Adiantum farleyense*, but its allies *A. tenerum* and *A. Ghiesbreghtii* (scutellum) are nearly, if not quite, as effective. A portion of a spike of *Odontoglossum Alexandræ* or *Paeud.* *montanum*, mounted with a frond of *Adiantum macrophyllum*, *A. Ghiesbreghtii*, is a most beautiful object. *F. W. B.*

The Advantage of Saving your own Seed.—**Overestimated.**—Your correspondent, Mr. Morgan, asserts that the Nuneham Park Onion comes up in advance of most other varieties of Onion. Will Mr. Morgan tell me the reason why bought seed

should be sleeping when my own saved seed of that variety was growing, all having been sown the same day, and under the same circumstances? I could mention four instances in which my home-saved seed was superior to bought seed, and here is one. I have two large pieces of Cabbage, perhaps half an acre, all sown the first week in August. The plants from the home-grown seed are at this time everything that I could desire, whilst those from the bought seed are at least one-half running, the variety being Early Culham. I send you four plants of each, taken from each outside row. As regards Beets and Broccoli I could a tale unfold. In conclusion, I should like to see an especial favour if Mr. Morgan will tell me where I can procure a good stock of white or Sillescu Beet. My address is known to the Editors. *Kitchener.*

Cacti versus Orchids.—At p. 414 Mr. Croucher proclaims loudly in favour of Cacti, and I confess that they are a very interesting and beautiful class of plants. But in comparing them with Orchids does he not attempt to prove too much when he says, "The Cactus has the advantage of permanency, whereas the Orchid is fugacious." I presume the flowers are meant. Now some Orchids certainly do not retain their bloom long, neither do some of the Cacti, as witness *Coryanthes macrantha* and *Cereus grandiflorus*. So far we are equal; but if Mr. Croucher will name 20 Cacti to last in bloom longer than the 20 Orchids I name below, I shall be very much obliged to him, and I am sure it would also prove instructive to many of your readers.

Duration of Blooms, days.	Duration of Blooms, days.
1. <i>Cypripedium</i> 70	11. <i>Odontoglossum</i> Hallii .. 60
2. <i>Villousum</i> 70	12. <i>Odontium serratum</i> .. 60
3. <i>Odontoglossum</i> Cervan .. 60	13. <i>C. cruentum</i> 60
4. <i>Phalaenopsis</i> grandiflora .. 60	14. <i>Phalaenopsis</i> grandiflora .. 60
5. <i>Roseli major</i> 50	15. <i>Vanda</i> 60
6. <i>Alexandrie</i> 50	16. <i>Cordia</i> 60
7. <i>Phalaenopsis</i> 50	17. <i>Lycaste</i> 60
8. <i>luteo-purpureum</i> .. 50	18. <i>Cattleya labiata</i> .. 50
9. <i>triumphant</i> 40	19. <i>Frane</i> manyvars 60
10. <i>triumphant</i> 40	20. <i>Sophrontia grandiflora</i> 30

Allow me to point out that the above Orchids are nearly all first-class flowers, and I stipulate that the Cacti are to be of the same relative quality. *Ex-Canthab.*

The Potato Tournament.—Mr. May's remarks on this subject are timely. There are two seasons which caused me to let the subject drop last year, the first being that I was about to leave Digswell, and that too soon to enable me to take part in the contest, owing to the fact that those who supported the idea insisted upon a somewhat late date for the combat, notably so my respected friend, Mr. Fenn, of Woodstock. I cannot dispel from my mind the idea that the best time to show the noble tuber is whilst the bloom of robust youth is upon it, just anterior to the final "setting of the skin" and the assumption of the "appearance"; for are not fine dishes of finely developed tubers thus displayed fit to be placed with the finest productions of the vegetable kingdom? I did put in an appearance at the Oxford show, but had to put up with secondary honours, being beaten most thoroughly by an able compeer, whose name I regret to have forgotten [too bad of you], with the finest dishes it has ever been my lot to see. Mr. May's suggestions regarding the division of prizes are excellent, and though my duties for this season are of a most onerous kind, with Potatoes growing, any assistance that I can give is freely offered, and I am willing to act in any way that may near residence to the metropolis may suggest. *W. E. Clark, Telford, E.*

Calceolaria Culture.—I take my cuttings from good strong plants in October (the end of the month if the autumn is mild), about four joints in length, and prick them thickly under good hand-lights in plenty of sand and leaf-mould. I water them and shade for a few days, but never uncover them again until I pot them off in March. I have grown them in this way for seven years, and have covered them with nothing but an old sack, which sometimes was not removed for a month at a time, and I have not lost a single plant. Those that must have been frozen through this winter, I believe I can show as good a lot in 48's as any one. *A. A., Halford House, Richmond, Surrey.*

Gardeners' Discounts.—Being connected with the horticultural building trade, it is a matter of much surprise to me that no one so engaged has lamented the "old system" of practice, not general, still too common—the gardeners' discount. Finding that the effect of a discount, or douceur if you will, has been raised too generally by the gifts of builders, it is "refreshing" to have it refused; such instances, to the honour of gardeners, however, do occur. Would that all builders, and nurserymen, acted up to a good conscience, like the "Country Nurseryman" (p. 345). But if they can give their customers the corresponding benefit, they would seem their prices all round for the discount, and that it matters little to the purchaser as to quality, &c., squares with the other side, or other work as "G. P." thinks (p. 418), and the "Lover of Justice" questions. Experience scarcely bears this out, and I believe were the "bad system" abolished, customers would benefit; not because all prices and goods are now relatively the same, but that they suffer now, either in price or in quality of material, to pay

for these discounts, where there is close competition. I cordially endorse your remark (in first letter), "No honest tradesman will, in making out his list of prices, take into consideration the selfish interests of the go-between." Gardeners would do well to recognise this, and never countenance gifts, when arranging their servants' wages. Has it occurred to the public that in some cases owing to certain ties between nurserymen and gardeners, and possibly in order that some among the former have, of late years, entered into competition with builders of glasshouses and heating apparatus, by taking any orders they can obtain, for work they have not specially studied, or invested capital in?—thus interfering with a class who do not attempt to enter the seed trade, and who are not therefore in a position to be continually selling to the gardener's master, and of making one class of goods help to pay for another. The association you suggest in the leader of the 1st inst. would be a great advantage; and surely all builders would gladly enrol themselves as "Veritas" (p. 451) proposes, whether they have, or have not, given way to this common practice, as also would I, feeling it is not satisfactory that by silence or reticence, any one should connive at it. Though it may easily be suggested that a gentleman is not having a new glasshouse, &c., each year, and the percentage would never be likely to equal the 25 per cent. alleged to be given by some nurserymen, yet the system a builder has to protest against is, the general expectation and demand for a proportion of his profits, quite irrespective of any extra trouble or care the gardener may have taken of materials, or in facilitating the work in the employer's garden, which can be acknowledged (if need be) by the honest tradesman with satisfaction, without loss, and with mutual respect. [We believe the remedy is to be sought in improved position and higher salaries for gardeners. Eds.]

The New Vinerias at Gunnersbury.—Is it not a fact that the proposal for the new vinerias lately put forward by Gunnersbury, and the late gardener, Mr. Forsyth, and that he "passed" the plans? If this is so, should not his name in justice have been mentioned by "R. D." at p. 486, in reference thereto? Honour to whom honour is due!—to the retired worker in particular. *Gardeners' Friend.*

The Duration of Shows.—In reference to the remarks of "Committeeman," it is a fact that has been put down as one of the local committee of the Royal Horticultural Society, but when I allowed my name to be added to that list, I was given to understand that a branch committee was to be formed in the neighbouring towns, Grantham being one, and that the mayor of the latter had promised to start a local committee in Grantham, where I expected to have the honour of attending, but heard no more of it. I never intended from the first going to the National Meeting, owing to the inconvenience of getting there, and I hope your correspondent, "Committeeman," does not think I was hinting at the Nottingham arrangements more than any other, far from it; neither did I receive their schedule of prizes until a week after I had sent my letter to the *Gardeners' Chronicle*. I maintain that all weekly shows are alike in fault, and there is not one practical gardener can deny the fact that two days is quite long enough for any fruit to be staged in its prime. I am not a little surprised to hear you say the show would lose much of its interest as soon as the fruit was removed. With some it might, but every one that had a wish to see the fruit would go either the first or second day. I have often thought that if the fruit tent could be devoted, after the removal of the fruit the second day, to a grand display of hand bouquets and dinner-table decorations, &c., it would have a tendency to make the show of double interest. *Isaac Dall, Stoke, Rochford.*

Adjustment of Prizes at the Exhibitions.—There is a hitch somewhere; and, as we are sufferers, you will allow us perhaps to speak out. At the recent exhibition at Regent's Park prizes were offered for nine specimen pot Roses, and 1st and 2nd prizes were respectively awarded to Mr. Turner and ourselves. A handsome bouquet of pot Roses, of our own opinion, was admirably flowered; but regarded as specimens, in no way, we may say without vanity, comparable to either of the groups shown according to schedule; yet a higher prize was given to this group than to Mr. Turner's. Also, why choose three men as judges not known as Rose growers, and hence certainly out of place at a Rose show?—what may be described as square men for round holes—clever men out of place. See *the Standard* (Exhibition) for our own opinion on this latter point, see note on p. 239, col. 2. As to the former, we believe the "nines" and the "miscellaneous" groups had nothing to do with each other, so that we fail to see in what respect our correspondents are "sufferers," unless, indeed, the 1st and 2nd prizes were wrongly awarded, which they do not assert. Eds.]

Dendrobium nobile.—I have sent you a spike of *Dendrobium nobile*, having 24 flowers on it, to show what can be done in the way of cultivating this beautiful Orchid without any special means for the purpose. Four years ago the plant which produced it was given to me in the shape of one miserable shrivelled stem,

8 inches long, with a few small roots to it. It has been grown in a common small lean-to vinery, receiving the same treatment summer and winter as the Vines, only being well watered in the summer. I think that the best Orchid-house in the kingdom could not have done much more for the plant. I call the plant *Dendrobium nobile*, but I have the same plant also under the names of *D. ceruleum* and *D. Wallichianum*. Are there three such varieties?—or are they only three nurserymen's names for the same thing? I should be much obliged to you, also, if you would answer for me the same question respecting a Nerine, which I have under the names of *N. curvifolia*, *N. Fothergillii*, and *N. corsicana*. Whilst on the subject of Orchids, I should be much obliged to any of your correspondents who have been successful in the cultivation of *Epidendrum dichrochum*, if they would tell me the particular treatment which they have found suit it, because I have tried several experiments with it, and it refuses to grow under any condition that I have tried. Nothing, I think, can show the utility of general remarks upon the culture of Orchids more than Colonel Benson and Mr. Kingsley's account of the climates of the East and West Indies. I suppose that there is not very much difference between the temperatures for the whole year of Trinidad and Rangoon; yet Mr. Kingsley tells us that the temperature of Trinidad ranges from 70° to 90° during the whole year, whereas at Rangoon the thermometer will sometimes range from 70° to 120° in the same day! I would naturally suppose that any treatment which suited a plant from one of these places would infallibly kill any plant which came from the other; but I believe that this is not found to be quite the case in practice. Talking of the conditions which "Orchids" require to grow them successfully, is about as vague as it would be to talk of the climate which suits "trees." *W. Strickland*. [The *Dendrobium* sent was *D. nobile* var. *Wallichianum*. Eds.]

New Verbenas.—Mr. Eckford reminds me that his fine orange-red *Verbena Grand Monarch* received a First-class Certificate at the Royal Horticultural Society's Great Provincial Show at Oxford last year. I hasten to supply the omission, especially as Mr. Eckford thinks it to be the very finest of the set of his raising Mr. Keynes is now sending out. It will also be seen that in point of number of certificates obtained by each raiser, Mr. Perry and Mr. Eckford are on a perfect equality, each having obtained four First-class Certificates and one Second-class. *R. D.*

The Witley Court Boiler.—Mr. Bennett, of Enville, has recently made a few remarks upon this boiler in your columns. Since then the boiler has been fixed; and, as it is heating 600 feet of 4-inch pipe (it is intended to heat 10,000 with it), I think I am in a position to speak positively as to its merits. I may here remark that the boiler was manufactured at my suggestion by Messrs. Jones & Rowe, of Broad Street, Worcester, who have for years adopted a fixed saddle-boiler of wrought iron, and have consequently been the origin of the Witley Court boiler, with the exception of the check-bridge and the back, both of which are waterways, forming a portion of the boiler, thus exposing a far greater surface to the direct action of the fire, upon which the flame reverberates, instead of expending its heat upon the brickwork. This adds materially to its capacity. The boiler was put in to replace a horizontal tubular one—the second put in in five years; and that it answers the purpose completely I can confidently assert, as with half the labour, and half the consumption of inferior fuel, we get far more heat. I am not making this as a fancy statement, but as the result of careful experiment. With the tubular boiler nothing but the best fuel could be used, and half that would be wasted, while with this anything that will burn will answer—small coal, coke, and cinders being sufficient to give us the desired temperature, which is itself something remarkable. Without resorting to the usual platitude about all new boilers, that of "a handful of fuel being sufficient for 24 hours," I can safely say that this boiler, quantity and quality of the fuel considered, will do the required work at less than half the cost of the tubular boilers, which have been removed, while in point of durability it certainly cannot be at all inferior. In removing these water boilers I have invariably found that they had failed at the joints, split at sockets and split elbows being the weak places, and that not always where they were exposed to the direct action of the fire, but in several cases where they were protected. Hence every unnecessary joint in a boiler, whether exposed to the action of fire or not, may be regarded as a source of weakness. In the absence of joints will be found, I believe, the strength and durability of the saddle boiler; and this may be considered as a saddle with additional flues, and with also a check-bridge and waterway at the back which receives the whole force of the fire at every turn. It will be perceived that this boiler requires no skilled setting, a point of such great nicety with many boilers. In the first place, a cast-iron trough 12 inches deep, and the

length and width of the ashpit, is put down to hold water and receive the ashes, and walls to receive the boiler are carried up to the necessary height. This done, and the connections made, the boiler is cased in with fire-bricks, allowing a space of an inch or two all round, so that in point of fact the boiler stands in an air-tight chamber, but as it does not touch the brickwork, expansion and contraction are avoided. Those who understand the conservation of heat will readily perceive that with a water-jacket to the fire, and a nonconducting jacket of confined air around the boiler, it is impossible that there can be much loss of heat. No damper is used in the chimney; this is entirely dispensed with by the use of air-tight furnace doors, sliding on rollers, on the Sylvester principle, which are found particularly valuable on account of the perfect control which they give over the combustion of the fuel. I believe the proper place to regulate the fire is at the ashpit door, and that with careful stoking, after the fire is once fairly lighted, the smoke may be consumed with almost as much certainty as by using the most elaborate appliances for that purpose. These boilers are manufactured of wrought iron; and without entering into the vexed question of the value of that material as compared with cast, I may say that they are lighter, and, being more uniform in thickness, and consequently in strength, are less liable to fracture by expansion or contraction, or rough usage of any kind. Moreover, they are capable of being repaired in case of leakage, which is a valuable desideratum that cannot be attained with cast boilers. So far as my experience goes cast-iron tubular boilers have certainly not been a success, but that may have arisen more from their complicated construction and the varying expansibility of the different castings than from any positive infirmity of the metal, when that of the best quality is properly manipulated. The greatest and most short-sighted blunder that is com-

the succeeding crop. I admit that soil, air, and water have a great deal to do in keeping the Peach tree in a proper state of fruitfulness, but without practical assistance the trees would soon run rampant. All unnecessary wood, or as much as possible, being cut away in the autumn, now that the leaves are once more gone, there is not much that requires the knife, but the shortening of the fruit-bearing shoots and cutting in the spurs of the previous year's bearing wood. The growing shoots during the summer having been stopped occasionally, there will be no difficulty in pruning to a wood-bud, although some sorts are rather shy in making wood-buds, except at the points, and in very ill-conditioned trees the shoots upon those trees ought not to be pinched unless it is done early in the season. The great danger of pinching trees of this description is simply this: although they may flower well and look gay, yet for want of the terminal wood-bud every shoot will die back to the next wood-bud, from a foot to 18 inches. The object of disbudbing is to equalise the tree, and to secure well placed shoots for the following season's crop. I shall suppose that the shoots left for bearing after being pruned will be from 10 to 18 inches long, set as regularly as possible all over the tree, and likewise of an equal strength; these must be tied in with a little taste, which adds to the beauty of the tree without causing confusion. All Peach and Nectarine trees trained and cultivated upon a system, are much easier described and understood by those who grow them, than those trained in a mass of utter confusion, when the majority of the shoots will have neither well-matured fruit nor wood-buds, and hence the great cause of failure from imperfect flowering. On well-matured wood both fruit and wood buds come more robust, while the flowers come stronger and with stronger certainty of setting a good crop. This well-matured wood is only obtained by a thorough system of disbudbing and stopping the fruit-bearing shoots, so that every bud is rendered plump, with the full influence of the sun and a free circulation of air. When the Peach tree starts into growth, the flower-buds upon a healthy, vigorous tree will be round and plump, with plenty of wood-buds protruding between them. Disbudbing ought to be done as soon as the fingers can get hold of the wood-buds, going over the trees two or three times, and carefully examining as it were, the lowest buds nearest the leading branches to come away to form the bearing wood for another year, in order to keep the tree "at home," instead of running off to the top of the wall. The fruit-bearing shoots will require to be stopped once or twice until the fruit monopolises the whole strength of the shoots; and, when the fruit has set plentifully, many of the said fruit-bearing shoots may be cut away at once with one needless wood, as they only cause confusion, and prevent the proper ripening of the shoots intended for fruiting the following season.

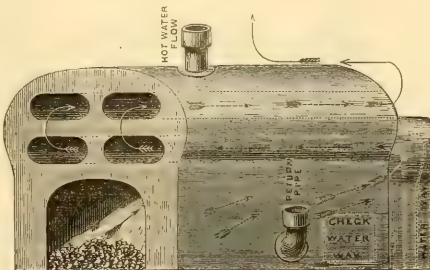


FIG. 103.—THE WITLEY COURT BOILER.

mitted in hot-water heating, is that of expecting a small boiler to heat a large quantity of water. A boiler, to work economically, should be able to heat the water to the desired temperature without at any time being forced; and if it was not so, then an immense loss of heat "up the chimney" is inevitable. This is a great waste, and the weak point of all vertical boilers—the tubular especially; and in that boiler it is, in hard weather, not an unusual circumstance to find the chimney intensely hot, with a lurid glare vomiting from its mouth like a blast-furnace. This boiler has been conceived with a view to simplicity of construction and true economy, that is, the daily economic use of fuel; and in the latter particular I have no hesitation in saying, after careful consideration, that the Witley Court boiler is the most powerful and economical which has ever come under my cognizance. The accompanying engraving (fig. 103) will speak for itself, and the boiler will be made of various sizes, so as to suit the requirements of small as well as extensive garden establishments. *George Westland, Witley Court, April 12.*

Pruning, Pinching, and Disbudbing the Peach Tree.—The Peach and Nectarine may be kept in fruiting order by due attention to the above practices; by neglecting any of them the trees soon become unsightly, and to a certain extent unfruitful. Suppose we begin with an established old tree that has filled its space or the space allotted to it. If it has been systematically trained it will look all the better; besides, it already shows that its training and its cultivation have been reduced to a system which even the non-practical can almost discern at a glance, namely, the leading branches radiating from a centre, and furnished with bearing wood of the previous year's growth, either upon one side or both sides of the leading branches. The tree having been properly disbudbed during the growing season, the bearing wood for the next fruiting season will have come away near the main branches as possible, with buds well up. I presume that the trees had been gone over carefully, shortly after the fruit was gathered, and that the old bearing wood was cut away, which would at once admit light and air into the trees, for the proper ripening of the wood for

Make this a particular point, to clear away all superfluous shoots previous to commencing the summer tying and stopping. *J. Miller, Workshop Manor.*

The Wild Garden.—I thought of Mr. Robinson's book on this subject, and the many excellent suggestions and illustrations it contains, when visiting Lord Radnor's seat at Coleshill, Wiltshire, a few days ago. There is a considerable extent of shrubby walks on one side of the park, and beneath the trees, where the underwood was scarce, were to be seen very large patches of the common white wood *Anemone*, *A. nemorosa*, growing luxuriantly, and flowering profusely. In the immediate neighbourhood of these, in some instances a few feet, in others a few yards, distant were patches of plants, apparently much younger in development. Were these the produce of seed, carried there it may be by the passing breeze? or does the plant extend itself beneath the surface in some way, and so capable of growing in the neighbourhood of the light, if the sylvan breeze and also the sunny patches of wild flowers could have been alternated with some of even less size, formed by the pale lavender-blue *A. pennina*, what a pleasant contrast would have been afforded. This species does as well under trees as the common wood variety; in fact, there may be seen at Ealing Park, once the well-known residence of the late Mrs. Lawrence, a large patch of *A. pennina* growing in the midst of a shrubby garden, and almost hidden from view beneath the many branches above and around it, and where, notwithstanding, it flowers most profusely. *A. pennina* is one of those charming flowers so easy of culture, that it simply wants to be let alone; and there, often unheeded by man, it discharges, as each recurring spring brings the appropriate season, its pleasant floral service—one of the most exquisite attendants on

"Fair, blue-eyed Spring, who at one mighty bound,
Bearing her gifts, hath leapt into the land."
The somewhat showy *A. hortensis* flore-pleno, of the Dutch bulb growers, also the dazzling scarlet *A. fulgens* (which though a little later in blooming would yet help to continue the display), might also be used in conjunction with the foregoing. Along the summit of a low wall overgrown with grass, which

forms the boundary of the park, with a ditch on the park side, could be seen a minute growing Myosotis, scarcely rising above the level of the dwarf grass about it, and so profuse of small deep cerulean blue flowers as to form a radiant carpet. What species is this? Mr. Edford said he had not seen it elsewhere than at Colehill. Though so minute, its early blooming quality seemed to make it valuable, and I brought away a few plants to see what a higher cultivation could do with it. The transfer from a warm, dry, sunny nook to the influence of the cold easterly winds of this somewhat cold locality, does not appear to affect it injuriously in the least; and it is rapidly recovering from the effects of the journey, wrapped in a piece of paper. I noticed, besides, that it was growing on spongy sheltered by overhanging trees, where there was more of moisture, together with some shade; but here also the low dense growth was clearly perceptible, as on the more exposed position. I can send you a blooming plant, if it would aid identification. *Richard Dean, Ealing, W.* [We can't pretend to name any plant without seeing it, least of all a Myosotis. Eds.]

Cynoglossum Omphalodes.—Happily the tide of fashion in matters horticultural is undergoing a change, and the interest which is, and is still to a certain extent, lavished on colour massing, is subsiding in favour of those flowers which all should love and admire for their individual beauty. *Cynoglossum Omphalodes* may be derived from a contemplation of their many intricate forms, their subtle blendings of colour, and their inimitable fragrance. I therefore need not make any excuse for bringing to light again a very old subject, which, having outlived our utmost neglect, is not even now surpassed for the beauty of its colour or the star-like form of its miniature flowers. *Cynoglossum Omphalodes*, or, to give the modern version, *Omphalea verna*, is one of the hardest kinds of *Venus' Navelwort*, of which genus several annual varieties are, not altogether unknown to us. This lovely gem, the brightest blue in colour, which exceeds the *Forget-me-nots* in beauty, was introduced more than two centuries back, and equals even the severely tried *Periwinkles* in its ready adaptation to growing in the most shaded positions and in maintaining its own thoroughly amongst our grossest indigenous weeds. As I have made a comparison with the *Forget-me-nots*, I should like to say that I do not flower so freely as they, nor does it furnish such a display of brilliant colours, or, rather, lends a charm, by the almost "speaking beauty" of its individual blooms, to the recesses of rockwork, shady fissures, &c., becoming as it were—

"A mirror, wherein the sun bedsucks his quivering beams."

It is as readily propagated as it may be grown, by means of the young growths, which are produced freely by the old rhizomes in the early autumn months, when these root readily if taken off and dibbled into a cool, shady position. Is it worthy of remark also that this old introduction occurs along with an equally old and beautiful hardy plant—*Lilium chalcedonicum* of Linnaeus, which raises its bright bell-shaped bloom aloft on the mountain tops of Carniola, whilst the less pretentious "spring" *Navelwort* thrives in the shady ravines beneath. *William Earley, Valentines.*

Frost on Roses.—In your last number you ask for the experience of rosarians respecting the effects of last winter's frost. For the first time, and in consequence of an oversight, not one of my Tea or Noisette Roses had any protection about the head; but every Rose I have, had been well mulched with good long dung to the depth of 5 or 6 inches. They are mostly standards and half-standards worked on the Brier—the Teas and Noisettes chiefly against walls. I find that two or three plants each of Lamarque, Sol-faire, and Vicomtesse de Cazes, and one of Colonel Foyatier, are also on half-standards of Madame Villeroi, in an open border, though plants of that Rose in nearly the same position are not killed. *Maréchal Niel* is everywhere uninjured, and I have seven or eight standards of it in exposed borders. I have not lost a single Bourbon or Hybrid Perpetual Rose, and as this is decidedly a cold situation I attribute their preservation to an early and thorough mulching. At the same time the slight protection to the heads of Tea and Noisettes during the winter, which you recommend, ought never to be neglected. *J. Borlase Tibbitt, Barton Seagrave, Kettering, April 8.*

Horticultural Boilers.—I think Mr. Browne, my successor at Gopsall, is wrong in assuming (at p. 451) that Ormson's convoluted boiler is superior to the others named by him, simply because he found it so easy to command the necessary heat for his forcing-houses during the past severe winter. The fact is, it would be a poor boiler indeed that would not allow him to do this, because the houses are so well supplied with fuel. To suppose that I have allowed me to use Ormson's boiler, because I thought it was the best, and that I liberally, believing, as I did then, and still do, that this is the best way to economise fuel. Doubtless hundreds of boilers have been taken out as useless for no other cause than that they have not had sufficient piping attached to them to radiate the heat produced, and which consequently has gone up the chimney. I question if there are any forcing-houses that are better

supplied with piping than those at Gopsall, yet I believe they are far below the required amount to arrive at the maximum of economy, at the average price of coals in England; and I would strongly advise those who felt a weakness in their heating power during the past severe winter, to try and ascertain if they have not got up to the want of piping in their own houses. The whole of the boiler range of vineries at Gopsall, about 170 feet by 18 feet, was heated for 14 years with ease by a 5-foot saddle boiler, at I believe, a cost under £10. To do the same work now is placed one of Ormson's, at a cost of £30. Now, practically speaking, I believe the extra £20 would have been better spent in piping; and in this case I would have used it as what I will term auxiliary in severe weather, so that by means you would avoid the danger of over-heating. In October last, on leaving Gopsall for this place, I too had to cause a boiler to heat, for early forcing, a span-roof vinery 120 feet by 18 feet. I made choice of one recommended to me by Mr. Stevens, of Trentham, called the cylindrical, and I am pleased to say that I think it very simple and very useful. Mine is a 6-foot one, and it is really surprising how rapidly it heats the water of piping. I think it has the power of two saddles, length being equal. I will say, in conclusion, that although I have 12 rows of pipes in this house, it will pay me to place six more, and that, too, with coals delivered into the stoke-hole at a cost of 6s. 5d. a ton. *Emanuel Sage, Glasshouse and Grapery, Atherton.*

Prunus triloba.—Where does this shrub or small tree come from? It is a great beauty; now in full blossom, with pale pink flowers, like those of the double Plant. Every one is struck with the profusion of splendid blossom. *G. Bath.* [It is a native of China, and was introduced from there by Mr. Fortune. For its portrait, see Fl. d. Serres, t. 153; Revue Hort. 1862—3, p. 91; or L'illust. Hort. viii. 308. See also our volume for 1870, p. 628. Eds.]

A Plea for Keens' Seedling Strawberry.—I have had more than 30 years' experience in forcing the above Strawberry; and with a few exceptions, as occurs in other sorts, it has always proved true to its colours with me. This year the fruit is as fine and constant as it has ever been. Although I force other sorts with equal success, I am very loth to discard a tried friend. During the forcing season any pots of any of the sorts which do not prove fruitful are consigned at once to the rubbish-heap (as suspicious), and that takes place more or less at the beginning of the forcing season. When all the fruit is gathered off the fruitful pots, the plants are put carefully under shelter if early in the season, and properly attended to with water until hardened off a little before planting out. In the following season the result is generally an abundant and fine crop. I only let them remain two seasons, trenching them in immediately the second crop is gathered. My forcing plants are, if possible, stronger from the plants which have been planted out the previous season. I find the best way to get the runners properly attended to is to plant out the plants of the different sorts intended for layering, in rows about 5 feet apart, when the fruit can be got at easily without treading on the runners. As most of the success in forcing Strawberries lies in duly preparing them for that purpose, if this is not done at the proper time, so as to get the buds well matured, I am not surprised to hear of failures. I believe, that with all the above precaution in throwing away all barren plants, that a change of plants for amusement and because of fruitfulness. When I came to the Manor my predecessor had just planted a fresh introduction of the Strawberry in question, with several other sorts; I layed my first batch as soon as I came (about July 1) with runners from the young plants, and I am sure nothing could have answered better: so on looking up my garden book I find we began to gather ripe fruit by the end of February, and by the middle of March we were gathering plentifully; with early forcing, for four or five years in succession, I gathered 10 per cent. more than I have since, from unfruitfulness. Last season I lost more than I have from this barren plants from the same stock. At the same time this year's fruit is equally as good as it has been other seasons. To prove the matter thoroughly I am planting from a fresh stock. *F. Miller, Workshop Manor.*

Plant Exhibitions.—When I am desirous of lowering the peaceful and pleasurable occupations of the garden to the level of the gambling booth, Mr. Baines' challenge may receive some notice; till then I can only be sorry that he is pushed to such an extremity. I grow plants for amusement and because I love them; but from a nice change from my daily brain-work; but from what I read, all the glass I have would go comfortably inside one of the houses in which Mr. Baines "stalls his elephants." Sometimes I see my plants daily again, I see them in the next day, and I see them in the next day, the conditions must be equal, and if Mr. Baines does not introduce a grower to conditions equal to his own, I know a young man, who never exhibited a plant in his life, who can be backed to grow and show a collection of 50 stove or greenhouse flowering plants in May, June, and July, for 50 each event, and if Mr. Baines does not do so, he is the main. Mr. Baines appears quite indignant at the idea of the exhibitions of a quarter of a century ago being superior to those of the present time. In this age of boasted

progress it must be confessed the admission is humiliating, but "facts are chieftains that winna gain," and it is useless for any one to carp about them. The collections of Mrs. Lawrence, John Fraser, and the West Kent and other collections, have been well known, and will be until Mr. Baines and his followers can win, notwithstanding their prejudices and grow plants for their intrinsic beauty, though it be only of a few days' duration, and not because the same old pensioners, battered and torn, those who can sustain the heat of the sun, and those who are judged plants merely by the auriferous quality which their exhibition may yield, the transient plant, however great its beauty, can have no charm. Perhaps it is because they are rubbish that the Hoveas, Leschenaultias, Adenandras, Crotolobiums, Ampholobiums, Pimeleas, Clerodendrons, Crows, Cantus, and others, which have been so long Zeychias, and Polygalas, have fallen out of cultivation! Why, another sight of the Adenandras, Boronias, Polygalas, and even Gardoquia Hookeri, as John Fraser used to produce them, would be an extra seven years' lease of life to all old friends. It seems almost a pity that some of us should have been born so soon and have such retentive memories, as our experience certainly clashes with the aspirations of some of our would-be-leading plantmen. When the honest heart-stirring enthusiasm of former years is once again in the place of the present, I shall have much pleasure in registering the fact, till then I will not say, I shall record my convictions without fear or favour. Mr. Baines has taken the trouble to exhume from the tomb of 1847 the history of some of my plants. Let me add a few words to the history of my own situation in March, 1849, when I was in the garden of the late Mr. Baines, who had remodelled and built the place in 1847, and in 1848, 1849, and it was not until March, 1845, that I had a single exhibition plant upon the premises; so that if they had attained the size mentioned by Mr. Baines in two years (1847), it shows that the grower had not been asleep. Mr. Baines, at an early age, was a collector of plants. I own part, I would rather see at a July meeting a fresh and really well done Balsam or Pelargonium than the flat, stale, and unprofitable Heaths and Everlastings to which we are now subjected at that season. Mr. B. asks me to spare no pains to get the best plants, and I have been driven to purchase Messrs. Fraser's collection of plants. If there is any presumption in the matter, it must be on the part of Mr. Baines, who assumes to question a transaction, with the facts of which he must necessarily be entirely ignorant. The lady in question asked permission to see my plants, she came here, and I showed her all I had with her, and after lecturing him in the good terms for which she had an unenviable notoriety, for the inferiority of his plants, she re-entered her carriage, and told the coachman to drive to Leyton. Three or four days afterwards it was my turn to see her, and she purchased the collection, but also that she had retained the right of its charge. The danger at the time was not entirely that I should beat her, but that Fraser and I also should be able to do so, and put her third, and hence the only reason I was to let her see the collection she could procure. Of the quality of my plants I am not sure, but I have gone to one establishment, and that for some years, under the care of my neighbour and pupil, William Cole, they were sharp thorns in the combined force of the Lawrence and Fraser collections—as the plants of his sons have been in good and bad luck, and I have seen many of them past, and will be for some years to come. A gentleman near Bristol, paid me from 15 to 25 guineas each for specimens to upwards of £150; two others, near London, little short of £100 each; while odd plants, at 5s to 10s, were sold, and I have seen many of them. My plants made considerably more money than Messrs. Fraser's, principally from the fact that my collection was richer in scarce and valuable Heaths, and that my plants were all young and growing into profit. Again, it by no means follows as a natural consequence that the use of large pots should necessarily give large plants. With the same size of the pots for Pelargoniums was unlimited, a house of those plants was something like a field of Cabbages with a flight of butterflies upon them, so gross and flowerless were they; but no sooner were they restricted only to the small pots, than they were all young and vigorous. At Oxford Mr. Baines had a specimen of *Bougainvillea glabra*, which was described at the time as a very superior specimen. At the same place I had the portrait of a plant limned by the lens which cannot lie, a few days previously, which was described as a very fine plant, but smaller than that used by Mr. Baines, was a double the size, and had at the least four times as much bloom upon it, being literally a sheet all round from the pot to the apex. It is quite a mistake to suppose that a large pot must necessarily give a large plant. If large plants are wanted quickly, the best way is to use small pots and other plants and give them a large shift. In that manner such Heaths as *hymaleis*, *Bergiana*, *persolata*, *hybrida*, *campanulata*, *grandinosa*, *Westphalia*, and only a few of the many others, may be raised in a 4-inch to a 24-inch pot in two seasons. But unless they are used with the greatest care their lives will be as short as their growth has been rapid. For plants in which it is desired to combine the qualities of health, vigour, floriferousness, and long life, no matter what Mr. Baines may say to the contrary, nothing is more certain than that the best way to secure it. Besides, who wants a score of plants to fill a house when five times the variety may be grown into really handsome specimens in the same space? For really decorative purposes, in most establishments, large plants are not wanted, but what they do need is for the failing attraction of the metropolitan exhibitions is, in these free trade times, a novelty. In all artistic exhibitions it is not the quantity but the quality of the thing which pays. If the exhibitions of to-day are only one-and-a-half the number of those of yesterday, and if twenty years ago, why should people go to see them? To me they are positively irksome and annoying; so much so, that I would not go half a mile to see the best show in England did not my occupation compel me to do so. The London shows are ever after to be remembered as they were once—centres of attraction, it must be by the ing the beaten and stereotyped path of mediocrity and introducing new and original, if not sensational, features,

Limited collections of "elephants" had had their day, the Cabbage and Rhubarb class of foliage plants is growing into the sea, and yellow leaf, and cut flowers, in flat boxes, are simply monstrosities. Art will not be restrained by stays, nor confined by time and rule any more than by ignorant pedantry; and until our leading showmen lay in a stock of new ideas, and use them vigorously, our exhibitions must continue to go down, down, down, as the remnants of what was never a great art. I am sure that Mr. Baines is not to show at Nottingham, as it is not unlikely I shall do the same, as I find myself between two stools—poor too large for the 12-inch class, and plants too small for the "elephants." However, if shown, the plant will be open for inspection within a five minutes' walk of the show grounds, so that if any gardener goes from Nottingham without seeing them it will not be the fault of *William P. Ayres*.

Societies.

ROYAL HORTICULTURAL: April 19.—W. Marshall, Esq., in the chair. The preliminary business of the meeting being concluded, the Rev. M. J. Berkeley said, though he had never seen a specimen of the meeting, there was no competition for Narcissus on this occasion, but the Rev. Mr. Ellacombe, of Bath, had sent a very interesting collection, notwithstanding that the season was nearly over for them in that neighbourhood, and that many of them would never see the sun, if it rains; other examples of interest were also shown by Mr. Moore, of the Botanic Garden, Chelsea, and by Mrs. Lloyd Wynne. Amongst Mr. Ellacombe's contributions, remarked Mr. Berkeley, there were specimens of a *Chionodoxa*, *Frithia*, *Ornithogalum*, *Androsace*, *Hebe*, *Hebeborus lyvidus* and *H. orientalis*, excellent plants for planting in shrubberies; as well as *H. fetidus*, a species which was once plentiful in Northamptonshire, but which had unfortunately been nearly all grubbed up. There was also a specimen of *Ornithogalum*, which grows plentifully in the neighbourhood of Bath, the shoots of which, when young, were sold in the market there as a substitute for Asparagus. He (Mr. Berkeley) then read the following communication, which will be of interest to all concerned in the matter of heating by hot water:—

"Having to draw up some remarks upon the circulation of water in hot-water pipes, it occurred to me that the flow and return might be managed by the use of a single pipe, instead of two, as now universally adopted.

"I directed the experiment to be tried by affixing to the socket end of a 4-inch pipe an inch supply pipe from an ordinary boiler, and a second pipe communicating with the bottom of the boiler, and the bottom of the boiler. As I expected, the circulation was most perfect and rapid, the hot water flowing along the upper surface of the pipe, and the cold returning along the lower surface. Two currents in opposite directions were created in the pipe, and the action was so perfect as to be ordered, from to be fitted up forthwith, which has been in operation ever since.

"This mode of heating by a single pipe may be, no doubt, of frequent use, and manifestly from the simple and portable nature of the apparatus, the arrangement will commend itself to the attention of horticulturists.

"But engineers whom I have consulted considered that the plan could not possibly answer; but, having occasion to write to the eminent hydraulic engineer, Mr. E. Easton, I put a postscript to the effect, 'I have done it with a single pipe?—I can.' He replied that, by accident, a single pipe had once been arranged by one of his pupils instead of two, and this to his surprise was found to answer. After having my arrangement explained to him, he stated that there were many in which he would not adopt it.

"With this exception, every practical engineer has considered the plan impossible; nevertheless, it is most easy of construction and perfect in action, and I commend it strongly to my brother horticulturists in all cases where a single pipe is sufficient to circulate the water necessary heat. *Alfred Smea, 7, Finsbury Circus, April 17.*"

He concluded by directing attention to some examples of Vine disease prevalent in Australia, further particulars of which will be found at p. 512.

Mr. Bateman then made some comments on the Bazaar which had been held at Nottingham, and said that Lord Londesborough had kindly placed the cut flowers of the Orchids which he exhibited at the disposal of the conductors of the Bazaar, an example which he hoped others would follow.

Scientific Committee.—Dr. T. Thomson, F.R.S., in the chair. On this occasion a communication from Mr. Carson, of Melbourne, was read relating to a vine disease in that country. The substance of Mr. Carson's communication, together with Mr. Berkeley's comment thereon, are given in another column, p. 512.

Dr. Gilbert related the results of the measurement of the amount of rain, as collected in some new gauges established by Mr. Lawes, at Rothamsted. The gauges are of the dimensions of the thousandth part of an acre, and are placed in the open field, so as to collect the rain at depths of 20, 40, and 60 inches respectively below the surface—the passage of the rain below the level of the surface being intercepted by a plate of sheet iron. It appears from these experiments that from the rain of the 15th inst., inclusive, the total amount collected amounted to about 370 lb., or about one inch and two-thirds, and that there was collected during the night of 18-19th inst. about 20 per cent. of the total quantity, below 20 inches; 15 per cent. below 40 inches; and 10 per cent. below 60 inches. From pipe drains sunk at 30 inches depth in an adjoining field no rain at all was collected during the same period. It is clear, then, that water was collected in the gauges at the depths mentioned, in which the passage of the water was intercepted by the rain, and drains during the same period none was collected, the soil absorbing and carrying off the water which fell. It is evident, therefore, that the amount of water col-

lected from drain pipes affords no trustworthy evidence as to the real amount of rainfall.

Mr. Smea read a communication on a simple and effective boiler, having but a single pipe for flow and return, as more fully described in another column. The principle is of course the same as that by which the warmer and colder currents of the ocean pass over one another without intermingling, so that at different depths we meet with a hot or a cold current, as the case may be.

Dr. Masters exhibited drawings showing the structural peculiarities of the Primrose exhibited at a recent meeting, and also a drawing of a stem of a Tree Fern, *Alsophila excelsa*, sent from the Sidney Botanic Garden by Dr. Bennett, and in which a stem about 7 feet in height threw out lateral branches. From the appearance of the branches it appeared as if the original crown had at some time been injured, and the adventitious branches had been produced in consequence. Dr. Masters also showed drawings of a double flowered Rhododendron, in which two adventitious styles proceeded direct from the axile placenta, with which they were continuous. These adventitious styles were completely concealed within the central cavity of the ordinary style, and were not exposed till the latter was cut open. This state of things is not uncommon in double Rhododendrons, though it is rarely so well exemplified as in the specimens shown. Dr. Masters made some further remarks on the peculiar floral water-pipe roots of certain species of *Crocus* alluded to by Mr. Berkeley on a previous occasion. (See p. 387.) From an examination of several other specimens in various varieties of *Crocus*, he had been enabled to confirm Mr. Berkeley's views, and to state that their history appears to be this: The old corn shrivels as the new one grows, while from the base of the latter these peculiar roots (shown in our illustration, fig. 104), proceed. They appear to supplement the resources of the old corn, for in many cases where the old corn does not so speedily



FIG. 104.—FLESHY ROOTS OF CROCUS

shrivel—in other words, where its stores of nourishment are not so speedily exhausted—the peculiar roots in question are not formed, the new corn gaining sufficient nourishment from the old one. In structure they consist of spongy cellular tissue, enclosing a central mass of spiral vessels, among which may be seen in certain instances one or more larger reticulated vessels, remarkable for the intricacy of their network.

The Azalea and Auricula Show.—A very wet morning, followed by a day in which showers and sunshine were intermingled, was not at all favourable to the prospects of this exhibition, nevertheless the stages were well filled with attractive objects, and the attendance of visitors was rather large. The classes for greenhouse Azaleas were very poorly represented, and the plants shown for the most part were of a very ordinary description. In the nurserymen's class for Azaleas there was only one group staged, and to that, which contained well-flowered examples of *Murrayana* and *President Humann*, and which came from Messrs. Lane & Son, the 1st prize was given. For 6, the Messrs. Lane were also, with very well-flowered pyramidal specimens about 4 feet high. Messrs. Dobson & Son also competed. In the corresponding class for amateurs, the 2d prize was awarded to Mr. G. Wheeler, gr. to Sir F. H. Goldsmid, Bart. Messrs. Lane & Son also contributed the best single specimen, a very fine one—of *President Humann*, and took the first award. In the open class for 6 distinct flowered Rhododendrons the 1st prize again went to Messrs. Lane, and so did that for 12 cut trusses. In the former class the plants were remarkably well flowered, especially those of *Minia*, *Maculata grandiflora*, and *Sir Isaac Newton*. The 2d prize lot, a very creditable one, came from Messrs. Standish & Co., and the 3d from Mr. J. Woodward, gr. to Mrs. Torr, Garbrand Hall, Ewell. These were an excellent lot, large, well-flowered, and fresh, but the varieties were not so good as the first. Very nice cut flowers were staged, 2d honours being divided between Mr. J. Woodward and Messrs. Standish & Co. Only one collection of hardy spring plants in

flower, in a basket not exceeding 4 feet in diameter, was exhibited, and to this, which contained the usual description of plants in flower at this season, from Mr. G. Wheeler, the two Floral Societies, viz. the Victoria and Fuchsia, offered two liberal prizes to amateurs for three plants of Princess Christian Rose, but there was no competition.

The Society offered several prizes for Auriculas, and in conjunction therewith was another series given by the Metropolitan Floral Society, viz. a collection of the Arranged, being eminently satisfactory. The competition for the Metropolitan Floral Society's prizes was not very large, but of the excellence of the productions exhibited there can be but one opinion, as will be evident from the fact that the two Floral Societies, viz. the Victoria and Fuchsia, in the class for 6 distinct varieties, the Rev. H. H. Dombrian was 1st; H. Little, Esq., Cambridge Villas, Twickenham, 2d; and Mr. James, gr. to W. F. Watson, Esq., 3d. Mr. Dombrian's flowers were unusually good, the following varieties being staged, viz. *Marionette* and *Parley*, Metropolitan; *Self*; *George Lightbody* and *Mayflower*, green-edged; *Poppewell's Conqueror*, grey-edged; and *Clegg's Crucifix*, white-edged. Mr. Turner had the best single self, *Bessy Bell*, Mr. James being 2d with *Miss Smith*, and Rev. H. H. Dombrian 3d, with *Campbell's Pizarro*. The best of the three was *Marionette*, which was also adjudged to by Mr. James, Mr. Turner's *Prince of Greens* being 2d, and Mr. Butcher's *Mrs. Butcher*, 3d. Mr. Turner's *Richard Headley* was 1st in the grey-edged class, Mr. Dombrian being 2d, and Mr. James 3d. The best of the three was *Marionette*, which was also adjudged to by Mr. James, Mr. Turner's *Prince of Greens* being 2d, and Mr. Butcher's *Mrs. Butcher*, 3d. Mr. Turner's *Richard Headley* was 1st in the grey-edged class, Mr. Dombrian being 2d, and Mr. James 3d. The best of the three was *Marionette*, which was also adjudged to by Mr. James, Mr. Turner's *Prince of Greens* being 2d, and Mr. Butcher's *Mrs. Butcher*, 3d. Mr. Turner's *Richard Headley* was 1st in the grey-edged class, Mr. Dombrian being 2d, and Mr. James 3d. The best of the three was *Marionette*, which was also adjudged to by Mr. James, Mr. Turner's *Prince of Greens* being 2d, and Mr. Butcher's *Mrs. Butcher*, 3d. 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that "endosmosis" is a wrong term; and any other way than feeding, as there stated, must be a fallacy and a delusion. I therefore beg for some scientific naturalist to put me right, and state he never heard or read of such a possibility, so totally contrary to all past experience and facts. The honey-bee cannot be raised, as I have stated, by "endosmosis," for the writer had seen the larvae of wasps and bees fed. *W. Augustus Munn.*

Obituary.

WE HAVE to record the decease of MR. WILLIAM BRIDGEWATER PAGE, which took place at Hill, Southampton, on the 12th inst., at the advanced age of 81 years. Thirty years since, when Mr. Page was in the prime of his existence, he was in possession of one of the most flourishing and extensive seed and nursery businesses in the south of England, and there are numbers of able gardeners in the various parts of the kingdom who look back with pride and pleasure to the period of their early connection with the Old Sea Gardens at Southampton, and the nurseries at Hill. As a landscape gardener Mr. Page enjoyed a high reputation, and ranked amongst the foremost men of his profession in a past age; the late Mr. Loudon frequently bore testimony to his abilities in this respect, and which he continued largely to exercise until within a recent period.

THE WEATHER.

STATE OF THE WEATHER AT BLACKHEATH, LONDON, FOR THE WEEK ENDING WEDNESDAY, APRIL 19, 1871.

1871. MONTH AND DAY.	At 9 A.M.				Hygrometrical Reduction from Glaisher's Tables, 5th edition.	Degree of Humidity.	Weight of Vapour in a Cubic Foot of Air.
	Reading of Barometer reduced to 32° Fahr.	Therm. in Shade.	Therm. in Sun.	Therm. at 5 P.M.			
April.							
13. Thurs.	29.89	50.9	59.1	49.7	76	68	0.00
14. Friday	29.78	50.9	59.0	47.6	76	68	0.00
15. Satur.	29.78	51.2	59.5	47.6	76	68	0.00
16. Sunday	29.74	51.2	59.4	47.6	76	68	0.00
17. Monday	29.79	51.2	59.4	47.6	76	68	0.00
18. Tues.	29.54	51.1	59.2	47.6	76	68	0.00
19. Wednes.	29.54	51.1	59.2	47.6	76	68	0.00

1871. MONTH AND DAY.	TEMPERATURE OF THE AIR.					WIND.	RAIN.
	Highest.	Lowest.	Range in Day.	Mean.	Mean of Month.		
April.							
13. Thurs.	62.9	47.1	15.8	55.0	55.0	S.W.	0.00
14. Friday	62.5	45.9	16.6	54.2	54.2	S.W.	0.00
15. Satur.	60.4	45.8	14.6	53.1	53.1	S.W.	0.00
16. Sunday	57.0	47.0	10.0	52.0	52.0	S.W.	0.00
17. Monday	63.0	46.3	16.7	54.7	54.7	S.W.	0.07
18. Tues.	55.1	45.6	9.5	48.8	48.8	S.W.	0.44
19. Wednes.	59.3	44.8	14.5	59.5	59.5	S.W.	0.04

- April 13.—A generally fine day; cloudy till night. Cloudless after sunset.
 — 14.—Various amounts of clouds prevalent throughout. Haze.
 — 15.—Overcast till night; then cloudless. Frequent showers of rain during the day.
 — 16.—A very variable day. Frequent heavy showers of rain accompanied by heavy gusts of wind.
 — 17.—Generally cloudy. Rain fell heavily in the morning.
 — 18.—Overcast. Rain fell almost continuously from 10 A.M. throughout the day.
 — 19.—Overcast till night. Rain fell in the morning. Fine at night.

TEMPERATURE OF THE AIR AND FALL OF RAIN AT DIFFERENT STATIONS, DURING THE WEEK ENDING SATURDAY, APRIL 15, 1871.

NAMES OF STATIONS.	TEMPERATURE OF THE AIR.					FALL OF RAIN.
	Highest.	Lowest.	Range of Day.	Mean of Day.	Mean of Week.	
Portsmouth	58.4	35.0	23.4	46.7	46.7	0.39
Blackheath	60.5	30.0	30.5	45.4	45.4	0.39
Bristol	58.4	35.0	23.4	46.7	46.7	0.39
Birmingham	61.8	30.0	31.8	45.9	45.9	0.39
Wolverhampton	65.7	30.1	35.6	47.9	47.9	0.39
Gloucester	60.5	30.0	30.5	45.4	45.4	0.39
Nottingham	64.0	27.5	36.5	45.8	45.8	0.44
Sheffield	61.0	27.2	33.8	44.3	44.3	0.56
Manchester	60.0	33.4	26.6	46.7	46.7	0.70
Salford	60.3	30.8	29.5	45.6	45.6	0.97
Bradford	59.0	30.8	28.2	45.0	45.0	0.44
Leeds	60.0	28.0	32.0	44.0	44.0	0.44
Peter	59.0	28.0	31.0	43.5	43.5	0.44
Newcastle	59.0	31.0	28.0	45.0	45.0	0.39
Edinburgh	57.7	30.0	27.7	43.8	43.8	0.80
Glasgow	58.5	30.5	28.0	44.5	44.5	1.35
Dundee	59.0	30.0	29.0	44.5	44.5	0.80
Aberdeen	59.2	32.1	27.1	45.7	45.7	0.80
Falshy	59.0	27.0	32.0	43.0	43.0	1.00
Leith	59.0	28.0	31.0	43.0	43.0	0.80
Perth	58.0	28.0	30.0	43.0	43.0	0.80
Dublin	65.1	34.8	30.3	48.4	48.4	0.83

JAMES GLAISHER.

Garden Operations.

(FOR THE ENSUING WEEK.)

PLANT HOUSES.

MANY stove and greenhouse plants will now require pruning or pinching back, if bushy specimens are desired. This will be especially necessary in the case of such as *Genistas*, *Coronillas*, *Pontas*, &c., and occasionally with *Leuchnautias*, *Polygals*, *Eriostemons*, *Pionias*, &c. Besides conducting to the formation of better shaped and nester plants, there can be no doubt but that their flowering capacity is greatly increased thereby; providing always that it is done with judgment, not only in the matter of cutting them, but also as to the time when this should be done. After being cut back, there should be time enough allowed for the subsequent growth to form sufficiently early to insure the wood being well ripened—this is the key to the point which the growers should work by. Where there is a properly arranged forcing pit, or command, it will be found an excellent house, for a few weeks, in which to place all those *Indian Acaens* which have done flowering. A high temperature, heavily surcharged with humidity, will assist them greatly in forming prominently both wood and bloom buds for the ensuing season's display. *Heaths* (*Ericas*) and *Epacris* will now thrive well in a cold frame, the lights of which can be removed bodily during fine days. They should, however, always be placed upon slates, on a good thickness of cinder ashes, &c., or, in fact, on anything that will ensure perfect drainage and immunity from worms. Pot off the spring-struck cuttings of flowering *Begonias*, and, by pinching back the grosser shoots, encourage them to form plants of fine habit at once, preparatory for next winter's display. Individual specimens of the showy *Begonia velutina* may be put in a pot, in succession by growing them on with that intention. *Begonia digynifolia*, a seedling of my own raising, certificated some years since by the Royal Horticultural Society, and spoken of in the highest terms by a correspondent in a late number of the *Florist* and *Pomologist*, should always—except where the plants are old and large—be grown in comparatively small pots; indeed, the utmost growth which a plant is capable of making in one season is best maintained in a pot not exceeding a 32-size. In stove plants, the vigorous growing season has commenced; hence every possible aid must be administered to them. Where it is at command, plunge *Isoetes*, *Clerodendrons*, *Allamandas*, *Gloriosas*, *Dipladantias*, *Thunbergias*, &c., in a brisk bottom-heat. Place *Cactuses*, which have made prominent growths, in a somewhat sunny position, the better to ripen them, so that they may be induced to flower more freely and somewhat earlier than those which have been afforded a shady situation. Syringe *Citruses*, *Oranges*, and *Camellias* with tolerable freedom, whilst making their young growths; and do not be afraid to use the pruning-knife in all instances where irregular branches hang about in a desultory untidy manner on such as are now starting into growth.

FORCING HOUSES.

It is not an absolutely essential qualification in a gardener that he should be more or less a weather prophet at this particular period; but it will require a great amount of watchfulness and attention on his part to enable him to keep the temperature in his earliest forcing-houses as uniform as possible, otherwise a sudden fall in the temperature, if he does not act instantly, is likely to neutralise all his past endeavors. This is especially the case with Grapes, which are now stoning, or which may even be more advanced in growth, for frequently at this season, following a few days of fine weather, with a moderate external warmth, the thermometer falls suddenly, with but little warning, to 28° or 32°, with it, it is needless to remark, commencing a period of internal darkness. This slight chill is often given in an early crop, the effect of which is not immediately seen, but which nevertheless greatly interferes with the success that would accrue did no such check occur. Those who possess *Orchard-houses* with no means of affording artificial heat in case of need, should be prepared to give some kind of aid should a sharper frost than usual occur; as it sometimes happens that a good crop is lost through the want of a little temporary protection. This may consist of mats, or of some of the many other devices which amateurs are proverbial for calling to their aid in emergencies. *Cherries* and *Figs* being forced in pots should, if the fruit is swelling perceptibly, receive copious root-waterings, using every alternate time strong wholesome manure-water properly prepared. Syringe at least twice daily with tepid water, and afford a liberal amount of the other useful accessories to an active growth. Stop the points of young shoots upon *Cucumbers*, if young plants are under treatment, generally upon the fifth or seventh leaf, and the young subterminal shoots formed upon such as are pinched back, at the second or third leaf, or one leaf in fact beyond that, at the axil of which the young female flower or embryo fruit is seen. Encourage the four main shoots upon *Melon* plants growing in frames, back to reach the four extreme corners of the light, and when the shoots are well advanced, stop them, and encourage the next shoots which form, until the fruit-bearing blossoms are seen, when these shoots

should in like manner be pinched back at one joint beyond the bud. Remove the grosser leaves which have ceased to be of use, in all instances where they interfere unduly between the sun and the younger more thrifty ones. But never, either as regards the *Cucumber* or the *Melon*—and many good gardeners add, or any other kind of fruit—remove or injure the leaf, from the axil or at the base of which the fruit forms. Without this leaf the fruits do not prosper nearly so well.

HARDY FRUIT GARDEN.

In instances where *Peach* and *Nectarine* trees have made a strong growth, and as yet no buds have done in Essex, it is important to remove the covering boldly as soon as it is anticipated that no frost likely to injure the youthful crop will occur. For invariably this kind of protection, used unnecessarily, aids the formation of aphid pests, which multiply to an alarming extent even thus early under such favourable conditions. Remove the superfluous breastwood, and other young shoots, as occasion requires, in every instance where the young branches have fairly formed, without in any reasonably disrobing the trees of a fair amount of foliage, which is useful not alone as a protection against cold winds or weather, but as inducing spontaneous root action.

HARDY FLOWER GARDEN.

Bring the transplanting of *Cerastium* to a close where delayed thus long. Divide stools of *Tritoma*, where they exist out-of-doors, or transplant out permanently such as have been wintered under protection. The dead old leaves upon specimens of *Pampas Grass* (*Gynerium argenteum*) should be now neatly pruned away, to afford opportunity to the young leaves to grow. Fork the surface soil around young plants, giving them a liberal allowance of good strong decomposed dung. Uncover and remove finally the winter coverings from *Magnolias*, *Banksian Roses*, *Myrtles*, *Fuchsias*, *Escallonias*, *Ceanothuses*, &c. Transplant *Arabis*, after first removing the bloom-stalks, and make all necessary preparations for the early arrival of the bedding-out season.

KITCHEN GARDEN.

Earth up thoroughly the earlier *Potatoes* now pushing freely through the ground, so as to protect them from frosts. Break off the young growing shoots forming on *Terracotta Ardicules* selected for present culinary uses, if they keep so much better subsequently. Sow a good breadth of *Turnip* seed; sprinkle a mixture of soot and lime upon young seedling plants already through the ground of the *Cabbage*, *Cauliflower*, and *Borecole* tribe. Plant out the whole of the autumn-sown *Cauliflowers*. Harden off both *Tomatoes* and *Capicinas*, by gradually inuring them to full and free exposure in a cold greenhouse, or other similar structure. In cutting *Asparagus* for use, cut every second growth as well as large; to permit the small to grow but impoverishes the future growth of the stools, by inducing weak shoots to grow up as the basis for the crop of the following spring. *W. E.*

Notices to Correspondents.

ARAUCARIA IMBRICATA: *W. B. H.* Dioecious; but not possible to tell the sex of the tree in the absence of cones.

ASSESSMENTS: *J. J. C.* See *Gardeners' Chronicle*, May 30, 1863, p. 555.

BIRCHING PLANT AT KEW: *F. A. S.* The pale lilac (or mauve) flower, which you saw at Kew, is *Aubrietia deltoidea*, var. It may be obtained at any nursery.

COMPOSITION FOR VINE BORDERS: *X. L.* Three parts good fibry loam to one part fine rubbish, &c. More of the latter if the loam is clayey. Then, for every cubic yard of this, add one cubic yard of bone, but no manure. It may be applied after dressing by top-dressing.

CONIFER SEEDS: *Conifer*. We do not expect that your seeds of *Conifer*, five years old, will be of much value now, or that many will germinate, although we know of instances where *Conifer* seeds, 20 years old, have grown. Test their vitality by sowing ere throwing them away.

FLOWER STICKS: *F. A. S.* Write to Messrs. Dick Radcliffe & Co.

FUNGUS ON CONIFERS: *S. G.* Your *Fungus* is undoubtedly a species of *Podisma* (*P. Juniperi-communis*), a genus closely allied to the mildew of Wheat, but distinguished by its gelatinous texture. The only way of getting rid of it is to cut out the affected branches. It is said to be a form of the *Rostelia*, which is so destructive to Pear trees on the Continent. *M. J. B.*—*W. F. Stroud*. See answer to *S. G.* above.

GARDENERS' EXAMINATIONS: *Curious*. No.

INSECTS. *An Enquirer*. The minute black insects found in vast numbers outside your vineyard are the little Spring-tails, *Podura pinnatifida*. They are bred in decaying vegetable matter. Gas-tar water will destroy them, or you may burn the surface soil. *J. O. W.*—*T. C. S.* Your "monster" grub is the larva of the common stag-beetle. The smaller one is that of the common cockchafer, *Podura pinnatifida*. They are bred in decaying vegetable matter. Gas-tar water will destroy them, or you may burn the surface soil. *J. O. W.*—*T. C. S.* Your "monster" grub is the larva of the common stag-beetle. The smaller one is that of the common cockchafer, *Podura pinnatifida*. They are bred in decaying vegetable matter. Gas-tar water will destroy them, or you may burn the surface soil. *J. O. W.*—*T. C. S.* Your "monster" grub is the larva of the common stag-beetle. The smaller one is that of the common cockchafer, *Podura pinnatifida*. They are bred in decaying vegetable matter. 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and Aubrietia Campbelli probably— but the specimens are wretched scraps.—*M. E. 1.* We cannot undertake the task; send to some nursery where a good collection of varieties is grown.—*E. 2.* Salix Smithiana? 2. *S. purpurea*; 3. *S. viminalis*. We cannot be quite certain about No. 1 without better catkins.—*Curious.* Ceanothus punicus.—*W. F. G. 1.* Davallia bullata, probably, but *O. sassa* macrophylla; 2. variety of the rhizome. *Pteris hastata* macrophylla; 3. *Pteris cretica* albo-lineata.—*O. S. 1.* No doubt *Solanum crispum*.—*F. E. D.* Narcissus Macleanii. *G. B. W. W. T. C. 1.* Narcissus incomparabilis; 3. *Hacquetia* (or *Dondia*) epipactis. *C. Beatty 1.* *Androsace* verucosa? 2. *Androsace* sp. *C. Your* Cap. bulb appears to be *Geissornia obtusata*.—*G. B. W.* The Blood-root of N. America, *Sanguinaria canadensis*.—*F. W. B.* Echium vulgare.

PORTABLE MICROSCOPE. *G. H. You* do not say for what purpose you intend it. If merely for dissecting flowers, a cheap, portable instrument is sold for the purpose by Messrs. Matthews, Portugal Street, Lincoln's Inn.

RIBBON BORDER. *Auxious Gardener*, in filling out the proposed ribbon border, might adopt the way line indicated, filling in the back of the border with *Coleus Verschaffeltii*, or *Amaranthus melancholicus* ribbon, edged with a single row of centauria, rather than scarlet Pelargoniums and blue Verbenas, the way line being made straight by filling the recesses with Golden-leaved Pyrethrum, the whole being margined with a broad belt of *Cerastium tomentosum* next the grass.

SEEDLING APPLE. *S. 7. S.* We do not recognise it as any named variety. It is tolerably good for the season, but nothing superior to many others in cultivation.

SPOT IN PELARGONIUMS: *Conjee Waddee.* The spot in Pelargoniums arises from the bad condition of the roots, brought on either by over-watering, or by suffering the roots to get perfectly dry, and then running in the soil, and extending to the leaves. No attention is paid there is no spot. In one case the mischief has arisen from drops of water resting on the leaves and destroying the subjacent tissues. As a general rule Pelargoniums ought to be kept dry in winter, but not so dry as to suffer the roots to decay.

SPRING VINES. *A. W. B.* You should allow the leading rod or main stem to extend as far as there is room for it to do so, and then stop it. The side shoots, also, we would allow to extend in the same way, so as to get as much leaf action as possible, and thereby a corresponding root action, as you have had last year.

COMMUNICATIONS RECEIVED: R. S. D.—G. B. (Sydney).—J. V. W.—P. A.—A. B.—H. M.—J. C.—S.—Lateny.—N. G. N.—W. B. H.—W. S. C. (next week).—D.—F. W. B. Fuchsias, p. 100. G. B. W. W. T. C. H.—E. M.—J. W. M.—E. L.—W. M.—D. L.—T. F.

Markets.

POTATOS.—Southwark, April 17.

During the past week the arrivals coastwise have been still in excess of the demand, and the railway stations are very full. Trade dull at the following quotations:—Yorkshire Flukes, 60s. to 110s.; Yorkshire Regents, 60s. to 75s.; Lancashire, 60s. to 75s.; Perth, Forth, and Fishie do, 45s. to 60s.; do, 60s. to 75s.; York, and Fishie do, 45s. to 60s.; do, Rocks, 40s. to 50s.

COVENT GARDEN.—April 20.

The trade generally is less brisk than it was, and some things are far in excess of what is required. Continental supplies are very uncertain, comprising the usual rough goods imported at this season. Hothouse Grapes are in steady demand, Strawberries less so, prices ranging from 6s. to 12s. per lb. In the Flower Market, Pelargoniums, Fuchsias, Heaths, and the usual description of spring flowering plants are plentiful.

FRUIT.

Apples, p. 1 sieve	10 s. 6 d.	Oranges, per 100	60 s. 0 d.
Grapes, per lb.	10 s. 10 d.	Pears, per doz.	30 s. 0 d.
Lemons, per 100	10 s. 0 d.	Pine-apples, per lb.	60 s. 10 d.
Strawberries, p. lb.	60 s. 10 d.		

VEGETABLES.

Artichokes, Jerusa.	10 s. 0 d.	Herbs, per bunch	0 s. 10 d.
Asparagus, p. bundle	4 s. 0 d.	Lettuces, per score	6 s. 0 d.
Beet, per doz.	10 s. 0 d.	French-cobs, each 9	0 s. 0 d.
Cabbages, p. doz.	10 s. 0 d.	Mushrooms, p. doz.	4 s. 0 d.
Carrots, p. bunch	0 s. 4 d.	Onions, per bunch	0 s. 4 d.
French, p. lb.	0 s. 8 d.	Parsley, p. bunch	0 s. 6 d.
Cauliflowers, p. doz.	10 s. 0 d.	Radishes, long, p. bunch	10 s. 0 d.
Celery, red, p. bun.	1 s. 6 d.	Rhubarb, p. bundle	0 s. 2 d.
White, do.	0 s. 4 d.	Scauliflower, p. bundle	0 s. 2 d.
Cucumbers, p. doz.	10 s. 0 d.	Shallots, per lb.	0 s. 8 d.
Green, do.	10 s. 0 d.	Spinach, p. doz.	10 s. 0 d.
Potatoes, Regents, per ton	20 s. 0 d.	Kidneys, 80s. to 12s.	
Kidneys, 80s. to 12s.			

E. T. ARCHER'S "FRIGI DOMO."—Patronised by the Royal Horticultural Society and used for Frogmore and Kew Gardens. It is made entirely of pure wool, and a perfect non-conductor of heat or cold where it is applied.

PROTECTION AGAINST FROST.

WOOL NETTING, 2 yards wide and 12.6d. per yard.

FRIGI DOMO CANVAS.

Two yards wide, 11.9d. per yard.

Three yards wide, 21.6d. per yard.

SCOTCH CANVAS, 7 inches wide, 70 yards long, 54s. to 80s. 2d.

SCOTCH CANVAS, 40, 50, 60, 70, 80, 90, 100, 120, 140, and 160 yards long.

LINEN CANVAS, 40, 50, 60, 70, 80, 90, 100, 120, 140, and 160 yards long.

NOTICE.—Removed from 7, Great Frimley Lane.

RUSSIA MATS, for Covering Garden Frames.—*ANDERSON'S TACKANOG MATS* are the cheapest and most durable. Price List, which gives the size of every class of Mat, forwarded post free on application.

JAS. T. ANDERSON, 7, Commercial Street, Shoreditch, London.

BROWN'S FLORAL SHADING, for Shading Plants and Flowers from Frost, Blight, Birds, &c. Bloom of Wall Trees from Frost. Sold by Nurserymen and Seedsmen. No. 1. 38 inches wide, 20 yards long, at 4d. per piece. No. 2. 38 inches wide, 20 yards long, at 4d. per piece. No. 3. 48 inches wide, 18 yards long, at 4d. per piece. No. 4. 48 inches wide, 18 yards long, at 4d. per piece. Samples on application to CHAS. BROWN, Greenhouses, Manchester.

NETTING FOR FRUIT TREES, SEED BEDS, KITCHEN STRAWBERRIES, &c.—TANNED NETTING for Protecting the above from Frost, Blight, Birds, &c. 1 yard wide, 8d. per yard; 2 yards wide, 6d. per yard; 3 yards wide, 4d. per yard; 4 yards wide, 3d. per yard; 5 yards wide, 2d. per yard; 6 yards wide, 1d. per yard; 7 yards wide, 1d. per yard; 8 yards wide, 1d. per yard; 9 yards wide, 1d. per yard; 10 yards wide, 1d. per yard; 11 yards wide, 1d. per yard; 12 yards wide, 1d. per yard; 13 yards wide, 1d. per yard; 14 yards wide, 1d. per yard; 15 yards wide, 1d. per yard; 16 yards wide, 1d. per yard; 17 yards wide, 1d. per yard; 18 yards wide, 1d. per yard; 19 yards wide, 1d. per yard; 20 yards wide, 1d. per yard; 21 yards wide, 1d. per yard; 22 yards wide, 1d. per yard; 23 yards wide, 1d. per yard; 24 yards wide, 1d. per yard; 25 yards wide, 1d. per yard; 26 yards wide, 1d. per yard; 27 yards wide, 1d. per yard; 28 yards wide, 1d. per yard; 29 yards wide, 1d. per yard; 30 yards wide, 1d. per yard; 31 yards wide, 1d. per yard; 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have no doubt that he will have the countenance to the fullest extent of the Viceroys. The Madras farm is managed by a practical farmer, and the seeds, with proper instructions, are sent out to the civil officers of districts, who also are encouraged to make experiments, but, above all, to introduce the seeds to native agriculturists. I was very much interested in the specimens which were remarkably fine, and certainly the experiment is one of considerable importance."

— We are glad to direct the attention of our readers to a letter on EMIGRATION to CANADA, from a gentleman who formerly occupied a prominent position in the English agricultural world, and whose present communication will be read with interest. Something like a quarter of a century has passed since Mr. CHARNOCK took part in the formation of those Drainage Companies which have done so great a degree the agricultural progress of the country. He will also be remembered as the author of the Royal Agricultural Society's Prize Essay on the farming of the West Riding of Yorkshire, as well as of other articles in the Journal of the Society. As regards emigration to Canada we have long felt that something more than direct official publications was needed to give the people of this country all the information they require. We are glad, therefore, that the correspondence which we pay to visit, and give us in person, those fuller details of Canadian life and agriculture which his experience will make valuable. There is not, we are sure, a Farmers' Club in the country but will most readily afford him an opportunity of addressing them.

OUR LIVE STOCK.

CATTLE.

MR. WALDO, of Stoneval Park, Edenbridge, who has, in previous years, had considerable experience in breeding Shorthorns, recently bought five remarkably good heifers from Mr. Torr, of Aylesley. One of these is a "Water" named *Wandee*, two are of the famous "Flourish" tribe, one is a representative of the "G" family, and the remaining one is a "Syph." Accompanying these heifers is a handsome red Ayles-bull, BEADSMAN. Mr. Waldo also secured *Bracelet*, a cow purchased by Mr. Torr at the late Bromley sale for 70 gs., and which has just produced a roan heifer calf to Mr. Barne's LORD NAPIER. With this excellent nucleus Mr. Waldo proposes to start a new herd, and in fact, taken in connection with the information we gave last week as to Mr. M. Tracey's proceedings, leads us to expect Edenbridge, ere long, to be again famous for first-rate Shorthorns.

— At the Dublin Spring Show, last week, 233 Shorthorns were entered for competition. This may be favourably compared with the 158 animals exhibited in the corresponding classes at Oxford last summer. In the aged bull class Mr. Chaloner once more secured the first place and the Townley or *Irish Farmers' Gazette* 150-gs. challenge cup, with the famous bull SOVEREIGN, to whom similar honours were awarded in 1868 and 1869. The prize for the best young bull in succession entitled Mr. Chaloner to take permanent possession of it, but he acted more nobly by presenting it to the Society. SOVEREIGN is an animal of the right stamp, having both personal attractions of a high order and a most excellent pedigree. He is by ROYAL SOVEREIGN, a sire full of BUCKINGHAM (3239 blood), and out of *Village Rose* by BLOOD ROYAL (14,169), of Aylesley origin, and in whom centered GRAND DUCHESS (10,284) and the prize-winning Sovereign succession. Further back in his lineage we find the pedigree again closely connected with the famous BUCKINGHAM through *Charity* and *Cherry Blossom*, and finally we are taken back to three consecutive crosses with WESTERN CORNET (689), according to the much-criticised method of in-and-in breeding practised by the earlier promoters of Shorthorns, not without good effects.

— Mr. M. Tracey is much pleased with his purchase of CHERRY PRINCE 4TH, which we hear, is of a deep red colour, with the Grand Duke patch on the forehead. He combines, in an extraordinary degree, the characteristic points of the best Booth and Grand Duchess types, and has the full set of ribs and unequalled shoulder and forequarter of the Booth, with the mellow touch and grand contour of a Duchess bull.

— The catalogue of the Ashdown herd, the property of Mr. J. W. Larking, is before us. It was at Didmarton, during the dispersion of Mr. Stiles Rich's famous stock, that Mr. Larking first appeared as a Shorthorn purchaser. It was there that he secured the first six animals of his interesting collection, and subsequently the list contains no fewer than 15 heifers either bought or bred from Mr. Rich's herd. These include *Duchess of Bedford* by CUPID (14,359), and several specimens of the "Florienta" tribe. The first-named family is descended from the late Earl Ducie's *Flourish* by USURER (7553), d. *Florienta* by ZENITH (5702), and previously traceable through an excellent strain to a cow by the renowned FAVORITE. Whilst at Didmarton it was further crossed with Mr. Sainsbury's CUPID, Didmarton bulls, and 7TH DUKE OF YORK; and we cannot think it will have lost ground in Mr. Larking's hands from alliances with

2D DUKE OF COLLINGHAM (23,730), DUKE OF MONMOUTH (25,987), and 2D and 3D DUKES OF WATERLOO. The original *Urvula* was out of *Crystal* by USURER, and was bought by Mr. E. W. and S. Rich at the Tortworth sale. This strain also extends back to FAVORITE (252) and the best Colling blood. The remaining animals are mostly directly, or by descent, derived from Mr. Betts' stock, thus we again meet with *Maddie* by 6TH DUKE OF AIRDIE, and such good-sounding names as *Flora*, a descendant of *Elvira* by KALAFAT; *Lady Knightley*, a grand-daughter of *Combind* by JANUARY; and *Purity* 2d of the *Tanetta* 6th by CARDINAL (11,246) stock. The bull list contains the names of LORD KNIGHTLEY by 2D DUKE OF WATERLOO, and of the "Combind" Knightley tribe; PRINCE WILLIAM, out of *Purity* 2d, and by DUKE OF KIRKLEVINGTON (25,982), and many others worthy of notice. Lastly, we must mention that 3D DUKE OF WATERLOO, DUKE OF KIRKLEVINGTON, and GRAND DUCHESS OF GENEVA, bred by the Messrs. Leney, are now being used in the herd.

— We acknowledge the receipt of Mr. Christy's catalogue of the entire herd at Boynton Hall, near Cheshamford. This announces the sale on May 4, of 30 Shorthorns, constituting one of the oldest herds in Essex. In briefly noticing this herd we find the largest family numbering 14 females and 3 bulls to be representatives of *Censlip* by ROAN ROBIN (10,721), purchased at Mr. Barnard's sale at Gosfield Hall, and since crossed with bulls presently to be mentioned. Next in number, we find about a dozen representatives of *Raspberry* by BUCCANEER (11,218), and tracing back to CHARLES COLING's ALFRED WINNOR, and obtained at the dispersion of Mr. Grenfell's herd in 1857. There are also six of the *Ratapia* tribe descended from Mr. Booth's KING ARTHUR and Mr. Wright's *Lauristina* by CORNET (155), bought at the Edenbridge sale; about as many Frills from the original *Prill* by ROCKINGHAM (2550), five Celias from the late Mr. Jonas Webb's herd at Babraham, and four of Mr. Crawley's Myrtle tribe. Upon these good stocks have been used first-class sires, such for instance as the ROYALIST (10,242), Mr. Grenfell's VICTOR (15,458), by a son of OLD DUKE OF GLOSTER (11,382), from *Victorie* by USURER, Mr. Adkin's COMEDIAN (15,789) of the Chamer blood, and Lord Penrhyn's DUKE OF GRAFTON (21,594), by DUKE OF GENEVA from *Duchess* 1st, of Kirklevington blood.

— The 12th number of Thornton's Circular has appeared, and contains a continuation of the interesting Shorthorn information commenced in the last issue. This sketch of American herds opens with a description of the pastures of Kentucky, where the celebrated "bluegrass" flourishes. The soil is derived from limestone, and is "strong" in quality, "growing a long but rather coarse grass that will feed cattle all the year round." Steers are sometimes grazed until 6 or 7 years old, and are of a size and condition which "would not disgrace Birmingham and Smithfield shows." Seldom housed, the cattle are "pastured from pasture to pasture, as required," and "in winter a little corn (Maize) is given to them in the fields." This well bears out the account of the richness of Canadian pastures quoted recently in these columns from Viscount Milton and Dr. Cheadle's "North-west Passage." Another pleasing feature is the tameness of the animals, which "come to call and are easily handled," or, as stated in another place with respect to Mr. Edwin G. Bedford's large herd, "400 or 500 head of cattle, and could be handled or milked with the greatest ease." Still more quaint is the picture of "cows and heifers called from the fields by a lot of negroes—men, women, and children." The following sentences are interesting, as presenting to us many familiar names formerly only associated with our own country, but now destined to spread over a much vaster area.

"One of the leading herds in this country is that of Mr. A. Alexander of Woodburn, bred chiefly from stock imported nearly 20 years ago by his brother, James Alexander, who for several years had annual sales, and thus dispersed many good and useful animals. With the exception of some calves and the bulls, the animals were grazing (December 26) in the fields. Among a lot of excellent and one-year-old heifers, several of the 'Mazurka' and 'Miss Wiley' tribes were particularly noticeable by their thick, heavy-fleshed frames, good colours, and hairy coats; also a good red 2-year-old heifer, *rich Duchess of Airdrie*. Most of them were by ROYAL OXFORD (18,774). A large, deep, aged bull, with inferior forequarters, was also present, and was in an adjoining field; and here again the same tribes were conspicuous, *Mazurka* 5th—by DUKE OF AIRDIE (12,730), and *Mazurka* 4th, by ORONTES 20 (11,877), g.d. Mr. Smith's *Mazurka*, vol. 2, p. 506, being a very massive cow; also *Mazurka* 8th and *Miss Wiley* 4th—by FORDHAM DUKE OF OXFORD (by DUKE OF GLOSTER, from Oxford 5th, and *Miss Wiley* 3d, vol. xi, p. 589). The *Duchesses of Airdrie*—bred from *Duchess of Athol*, vol. xi, p. 419, a daughter of *Duchess* 5th, sold at Kirklevington, vol. xi, p. 419, and *Miss Wiley* 4th—by FORDHAM DUKE OF OXFORD (by DUKE OF GLOSTER, from Oxford 5th, and *Miss Wiley* 3d, vol. xi, p. 589). There were also some of the 'Lady Barrington', Mr. Fawkes' 'Mina', 'Jubilee' (vol. xi, p. 506), 'Vellum' (vol. xi, p. 733), and 'Filigree' (vol. xi, p. 442) tribes, the latter being deep and of good form. The bull in use with ROYAL OXFORD was the 4TH DUKE OF GLOSTER (pure), a very long red bull. There were also two red yearling DUKES OF AIRDIE. The calves were very promising and well managed; they were in good houses and reared by a nurse."

POULTRY.

It is common for those who undertake to be poultry correspondents to be asked what is the food to make fowls lay? High feeding of any sort will do it, but more particularly hemp seed, and fallow-chandlers' groves. The former is given whole, the latter should be chopped fine, and then put in a bucket and covered with boiling water. The mouth of the bucket should be covered with a double sack or other cloth, so completely as to exclude air and confine the steam till the groves are thoroughly softened. When they are nearly cold they may be given. These will make them lay, but it is only for a time: premature decrepitude comes on, and disease in many forms appears. The most common is dropsy of an incurable character. The fowl will then have laid for years, in the most common course of nature, being forced to produce in two that which should have been the work of several years, loses all beauty and usefulness, and yet it is often considered matter of wonder that the most prolific hens in the yard should suddenly become barren. *Bailly on Fowls*.

A WALK OVER THE FARM.

April 17.—Seasonable weather—abundant April showers—so different from last year. What a splendid prospect for our 23,000,000 of acres of permanent pasture. Holders of old hay (who were not satisfied with £7 per ton) should look sharp, and get rid of their stock, or they will be caught napping. Lean stock will be in demand to consume the abundant grass that must follow these nice, seasonable rains. Walking over the farm to-day, I came to the pleasant conclusion that the crops never promised better than now. My crops are:—

	Acres.
Wheat	42
Barley, after Wheat	49
Oats after Tares followed by Cabbage	64
Spring Beans	9
Winter Beans	91
White Peas for picking	8
Winter Tares (to be followed by Cabbage)	61
Red Clover	24
Yellow Globe Mangel	7
Long Red Globe Mangel	3
Spring and Winter Cabbage	2
Kohi Kabi	2
Italian Ryegrass (half first, half second year)	14
Permanent pasture	14
Total	1583

I generally grow from 50 to 60 acres of Wheat annually. About two-thirds of the land is a strong, cold, yellow, plastic clay, or tile earth, when wet as slippery as butter, but yet as sticky as birdlime. The natives call it a loving soil. The other third is an odd mixture of clay and sand, and white sand, conglomerate, or pudding stone, with narrow vertical veins of stiff clay at particular intervals—neither side of the farm contains naturally any calcareous matter, but a good deal of iron rust and some black peroxide. The light side of the farm is the most difficult and uncertain. It was once full of spring water, but deep drainage and very deep cultivation some 28 years ago completely altered the condition of all the land; and it has ever since, aided by plenty of live stock and ample manure, produced crops that may fairly compete with some of the best in the kingdom. What has been done here might be done elsewhere where there is will, capital, and intelligence.

Our Wheats, drilled 9 inches from row to row, are sown, as usual, with 1 bush of seed per acre. Date of sowing from October 20 to end of November. In two cases of very late sowing the quantity was increased to 6 bush after Mangel, where the Wheat does not branch so much. The bushel per acre appears abundant enough—rather too thick. As usual half an acre is drilled with only 2 pecks per acre, and that looks thick enough to be a good crop. My brother farmers had better come and have a look at it. It may remove some of their ideas about thick sowing. Mind, I don't recommend any general fixed quantity, which must depend upon a variety of circumstances; but I do object to any and every practice of always sowing the same quantity of seed without ever having regard to half acres, comparative and various quantities. How can one know which answers best, except by comparative trials? I am very glad to see, in the editorial article of the *Agricultural Gazette* of April 15, a recognition of the value of thinner sowing. I have been a good deal ridiculed, snubbed, and occasionally abused for my agricultural proceedings. This I do not mind, because the practice of always sowing the same quantity of seed without ever having regard to half acres, comparative and various quantities. How can one know which answers best, except by comparative trials? I am very glad to see, in the editorial article of the *Agricultural Gazette* of April 15, a recognition of the value of thinner sowing. I have been a good deal ridiculed, snubbed, and occasionally abused for my agricultural proceedings. This I do not mind, because the practice of always sowing the same quantity of seed without ever having regard to half acres, comparative and various quantities. How can one know which answers best, except by comparative trials? 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opposed to the utility or necessity for draining stiff tile earth. The same remark holds good in respect to deepening cultivation by my process of following one plough by another in the same track—trench ploughing. People seem ashamed to admit that they have been obliged by their own interest to change their practice and opinion, and adopt those which they at one time condemned or ridiculed. Personally, I do not complain of this; but it would be very much for the good of agriculture if farmers would candidly make known their changes of opinion, and the advantages they have derived therefrom.

But to return to the farm. Winter and spring Beans look well. Barley (after Wheat) well planted. Winter Tares first-rate. Peas a good plant, and vigorous. Oats not yet up, having been sown after a double crop—Tares followed by Cabbage. Mangel gone in under favourable conditions, the land having been, as usual, heavily manured and deeply trench-ploughed before winter. Two and a-half acres of Cabbage planted in March growing well. Two fields of red Clover full

washed it in, and the consolidation rendered their quarters uncomfortable.

This saved most of the plants, which now look healthy. We saved a heavy-land field of Wheat after Clover by Crosskilling. On drained light loose land, the use of Crosskill roller and of salt is much to be commended, and even on heavy land I never sow guano for my Wheat or other cereals without mixing it with at least 2 bush. or 1 cwt. of salt per acre.

One of my heavy-land fields gives interesting evidence of the advantage of what is called high farming (drainage, deep cultivation, and plenty of under-covered manure).

In 1868 it grew 8 qr. of white Wheat per acre, after red Clover.

In 1869 it was again sown with 1 bush. of Rivett Wheat per acre, and produced $7\frac{1}{2}$ qr. of Wheat, and an immense crop of straw. There was no manure applied to the first crop of Wheat, but for the second 2 cwt. guano and 1 cwt. of salt was ploughed in before sowing.

THE GARDEN OF THE FARM.—No. IV.

ITS SIZE AND FORM.

The site of farm gardens to a great extent determines alike their size and form. However large the farm there is frequently a lack of space around the dwelling-house. The fields encroach upon, huge hedges or trees overshadow it. There is little of it, and that little is of less use. Huddled into a corner, drained dry of productive force by the greed of devouring roots, it seems to court the neglect it so generally receives. Even where there is no lack of space it is freely sacrificed, as we have already seen, to the muddy surroundings of the universal horse-pond, or that useless compromise between a cattle-yard and a road that is often found near to farmhouses. But when these two fertile sources of waste are utilised, much in many cases will still remain to be done; a fence here and there will have to be removed, a broad ditch filled up, and a new and larger boundary line formed. If in these pushing times the garden of the farm is to receive the

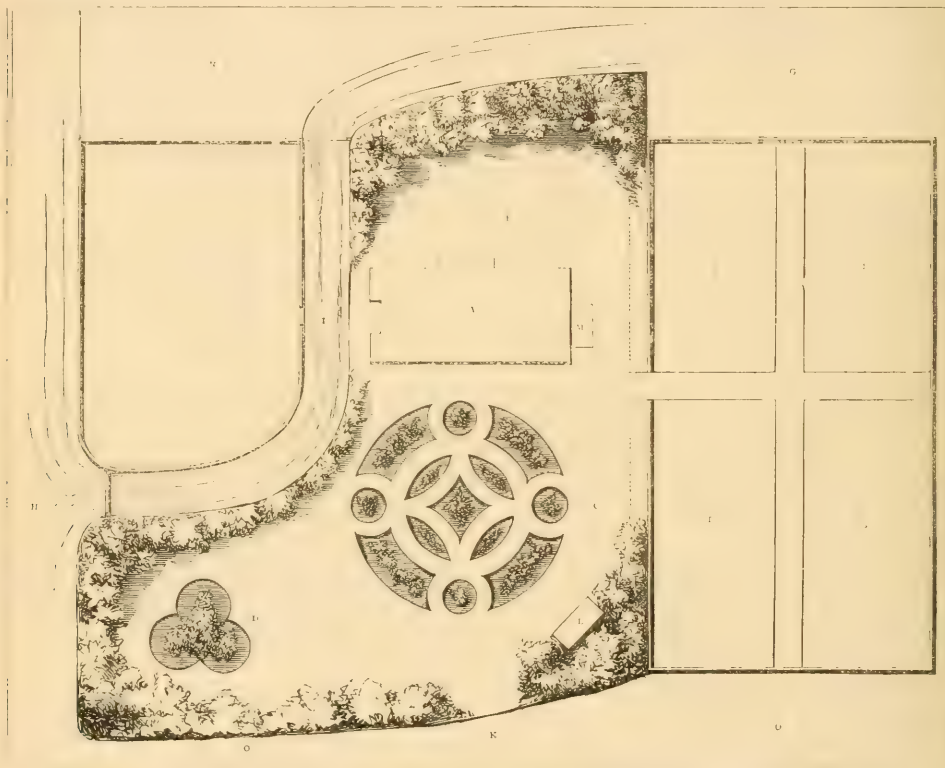


FIG. 105.—PLAN OF FARM-GARDEN (INCLUDING ORCHARD, OF THREE-QUARTERS OF AN ACRE), FOR A FARM OF 400 ACRES.

REFERENCES:—A, House; B, D, Kitchen garden; C, Flower garden; D, Flower-bed; E, Orchard in grass; F, Crocus lawn; G, Farm buildings; H, Public road; I, Farm road; J, View; K, Summer-house; L, Greenhouse; M, Home meadow; N, Orchard land; O, Arable land.

plant and healthy; $13\frac{1}{2}$ acres of red Clover, on stiff soil, sown last year in a heavy crop of Wheat, is a thin plant, much of it having been destroyed by the summer's drought. We had intended to plough it up, but my experience has taught me that, if the weeds are kept down by hoeing, and if the land is in good condition, a Clover plant will branch and spread out, and throw such strong stems that a very thin plant soon fills up; so we shall give it a chance. I do not attempt red Clover often than once in eight years, and seldom lose a plant; the strong Wheat crop is apt to dry it up more than a Barley or Oat crop. The late severe winter has raised or thrown out of the ground many plants of Wheat and Clover.

I have found our heavily loaded Crosskill roller most useful in pressing the plant roots into the earth again. For want of this many fields of Wheat have been ploughed up. All our Wheats have been twice horse-hoed—a man and pair of horses doing about 12 acres a day, at a cost of 1s. per acre. Wireworms have been most abundant and annoying; on one light-land field, although 6 bush. of salt were ploughed in with the Wheat, they commenced their havoc this spring. We immediately twice Crosskilled the young Wheat, and sowed 8 bush. or 4½ cwt. more salt per acre; the rain

In 1870, it grew 39 tons per acre of long red Mangel, &c., having my usual dose of 20 loads of rich manure per acre, and 3 cwt. of guano and some salt; and now, in 1871, after Mangel, it has again a fine plant of white Wheat, from 1 bush. per acre, manured with 2 cwt. guano and 1 cwt. salt. I expect at least 5 qr. per acre. So this will make three Wheat crops and one heavy Mangel crop in four years.

This I have often done, and it convinces me that the poor heavy lands of this country could do likewise under similar circumstances. The fact is, we don't half farm, having regard to profit for ourselves, and bread and meat for the people.

The absence of trees and hedges on this farm has not been found inconvenient or unprofitable. We have a nice shrubbery, of course, for the birds to nest in.

Live Stock on the Farm.—Eighty ewes with their 120 lambs. One hundred of last year's lambs sold at 54s. each, 50 of them yet to go away. Twenty young bullocks, now fat, worth, on an average, £18 each; they cost £6 10s. each on July 20, 1870. Nine bullocks were sold, fat, at £24 10s. each, about two months ago; they cost £9 10s. each on July 20, 1870. *J. J. Mechi, Tytree.*

attention its social and utilitarian importance demands, it must be made a more demonstrative feature in rural economy. It should come out from its obscurity and form in size and beauty. I hope my readers will not be alarmed about size. I am not an advocate for large gardens. It would be a mere waste of money for a farmer to attempt to grow all the Potatoes consumed in a large family in his garden, or all his Carrots or Turnips either. Such crops are better grown in a field, in a bit of fresh soil every year if possible. But early crops of these, and a daily supply of all other vegetables, should be forthcoming from the garden. Again the size should be determined very much by the size of the farm, the number of the family, and the means of the farmer. Speaking in general terms, from a quarter of an acre to an acre, or at the outside an acre and a half, is large enough for any farm garden. In these areas I include flowers and lawn, as well as vegetables; the smaller size would suffice, probably, for a small holding, of from 100 to 150 acres; the large ones, from 500 to 1000 acres.

Of course there are gentlemen farmers and farmers who are independent gentlemen, and these may have gardens as large, or larger, than the squire's. But it is not of such that I am now writing, and with the

limits I have assigned, the wants and enjoyments of most farm households could be liberally supplied and abundantly provided.

The form of the garden is of well nigh as much importance as its size. It is also in most cases entirely under the control of the occupier. There may be—there often are—many difficulties in the way of extending the area of a farm garden; there can hardly be any insuperable obstacle to altering and improving their form. I have written as if to alter were to improve; and, in a majority of instances, such would be the case, for there are thousands of farm gardens which may be said to be without form, as far as the term means design, order, shape. They are a shapeless medley; a sort of hedge-podge of Gooseberry bushes, flowers, Potatoes, Cabbages, Turnip, or Mangel seed, &c.; and the ground itself seems as if it were a common gathering of all the corners of all the fields on the farm that the plough could not reach, carted home, had it shot down without altering their form, and named the garden. I know of many notable exceptions, especially in Suffolk, where there are many farm gardens nearly all that one would wish to see adorning every farmhouse throughout the kingdom; but still, it must be admitted that the majority of farm gardens may be correctly described as of no particular form.

Form is important for at least two reasons—utility and beauty. A regular shaped, properly arranged garden, is easier cropped, and yields a larger return at a cheaper rate than one of the same area without any definite form. As most farmers have been busy for many years past re-arranging their fields for these very reasons, it may be assumed that they will admit that the same rules apply to a garden. And, as a man cannot, in the forenoon, and when the horse cannot, but time is lost by the man in doing so, as well as by the horse. And as to beauty of form, all, whether they admit it or not, are unconsciously influenced and gratified by it; simplicity, regularity, definiteness of form, have charms for all eyes. Order is Heaven's first law, and man can never be happy unless, even in such simple matters as the cropping of a field, or the formation or furnishing of a garden, he strives to render obedience to it. The farmer is not averse to regular sowing, though the crops would be Everything appears not in its proper time, but in its right place. Here Wheat, there Barley, there green crops, yonder grass, all distinct and separate, enough of each to fill the eye with one thing at a time, and each in succession. But supposing every field a mixture of everything together—there a patch of Tares, yonder a bit of Wheat, further on a Piece of Beans, there Barley, Flower, Mangel, grass, Oats, Potatoes,—all regular stretches, though the ground would be enough, but in irregular blotches, as if the seed of each crop had been borne across the land on the tail of a whirlwind—how the farmer would hurry us past that field, with the simple announcement that Mr. Ratbtrain, who would crop it so, was now in the middle-row, poor fellow!

And yet what are many gardens but just such a field in miniature? Ah, yes, but gardens are different, and the farmer is different. The garden is a pleasure once only strengthens the plea for beauty of form, for plan and system of cropping in the latter. For the garden is near at hand, always under the eye of yourself or family; and a properly disposed garden, like a well-cultured farm, is ever an object of pleasing interest and satisfaction. One of the chief charms of a well-ordered garden springs from the idea that it is ordered. Design is evidenced by its outline and division. These alone should harmonize with utility and congruity. For instance, the first would be satisfied if we grew Potatoes and Cauliflowers, but the latter would be shocked if we planted them under the sitting-room window. It is in accordance with these universal rules of taste, that the vegetables and the flowers should be separated in gardens, large or small; and if this is impossible, then each should have a distinct place to itself in the same garden. Then, again, the form of flower gardens, or beds, should be such, that the eye is drawn to where the setting is to the diamond—it does not add to its brilliancy, yet it largely assists our enjoyment of it. Besides, flower-beds are often robbed of their brilliancy, and then the setting demands all the simple graces of form that art can give it, so that we may not be wearied or disgusted with shapeless lumps of bare earth. So much in vindication of definiteness of arrangement, beauty of design or form in gardens. When once made, such gardens are easy to keep, more beautiful to look upon, and yield a fuller harvest of pleasure or profit, than those that are destitute of such qualities. But I hasten to give some example. My descriptions are, however, offered rather as suggestions than as perfect models of what ought to be. Most of them possess the merit of simplicity, and easy of transference from paper to the earth.

Plan A (fig. 102) is a garden of a holding of 400 acres. Its area may vary from one-half to three-quarters of an acre. The farm buildings are to the south-east of the dwelling-house, and these and a belt of wood completely shelter the house and garden from the east. The public road skirts the north side of the premises, and the road to the house and farm enters between the lawn and the orchard, and passes round the back of the house and croquet-lawn to the farm. The kitchen garden, on the east, south, and west, is bounded

by a hedge, while the north is parted off from the flower garden with a glass wall, which allows the sun to pass through, making the northern side as cheerful as the south, and warming the border defined by the dotted lines for choice and early spring flowers. The windows in front of the house open on to the lawn, and a small greenhouse is shown on the south end of the house. A summer house is likewise placed at the corner of the flower garden, and the garden is crossed by shrubs to give that chief charm of the garden, privacy—keeping out all prying eyes, and the equally, it can hardly be more so, penetrating wind. D. T. Fish, F.R.H.S.

THE DOUBLE FURROW PLOUGH.

THE history of this implement was brought out in a trial the other day before the Scottish Court of Session. The following is an abridged report.

The facts in the action were Messrs. John Fowler & Co., steam-plough manufacturers, seeds, and assignees of Thomas Pirie, of Nether Kinnmundy, Aberdeenshire, implement maker; and the defenders were Messrs. John Gray & Co., Uddingston Ironworks, by Glasgow.

It was stated on behalf of Messrs. Fowler that Mr. Thomas Pirie having obtained letters patent in January, 1868, for his invention, of "improvements in ploughs," the invention was described as having for its chief object the diminution of the labour of draught. The greater part of the weight of the implement was supported or carried upon wheels, so that the sole or side plates were dispensed with, by which means the great friction attendant upon the plates was avoided to such an extent that the horses could draw the improved plough, cutting two furrows at once of uniform breadth and depth, for about the same expenditure of energy required to draw a plough as hitherto constructed, cutting only one furrow at a time. The patentees claimed as secured to them under the said letters patent—1st, the general arrangement and combination of parts constituting the plough; 2d, the construction of ploughs without sole or side plates, and wholly supported and guided in their work on wheels; 3d, the use of set screws on the under-side of the level, to regulate the depth of the furrow, and to prevent the furrow from stopping the plough. It was alleged that the defenders had infringed the patent by making, using, and vending the invention aforesaid, without leave or licence from the complainants. The defenders, on the other hand, averred that the specification, as altered, set forth no patentable subject-matter. The invention claimed by the complainants had been published and publicly used in the United Kingdom prior to the date of the said letters patent. Ploughs with wheels had long been known and used, and the principles or ideas involved in the construction, combination, and arrangement of the complainants' plough had been in public use and application to the construction of ploughs prior to the date of the letters patent. Accounts of the construction of ploughs without sole plates, and of the use of set screws, to be found in numerous works relating to agriculture and mechanics, and the respondents referred to a long list of books, patents, and specifications, beginning with "The English Improver Improved," published in London in 1662. The defendants also averred, and their contention claimed in the specification as amended, being different from that originally claimed, was not protected by the letters patent founded on.

Mr. F. J. Bramwell, C.E., London, and consulting engineer to the Royal Agricultural Society of England, deposed that he had been for many years, and had been called to the attention of agricultural implements, and for some years he had acted as one of the engineering judges at the Agricultural Society of England, Mr. Pirie's patent consisted of a rigid frame supported by three wheels. One of these wheels was at the front, and the leading furrow wheel and the trailing wheel—being placed at an inclination, and having their circumference so shaped as to be suited to roll both upon the bottoms and upon the sides of the furrows. The leading wheel was the largest, and the trailing wheel was the smallest. The wheel in the furrow in the process of being cut. By this arrangement sole and side plates were dispensed with. Witness described the means used for guiding the plough, for varying its position, and for adjusting the depth of the furrow. The essential point of the invention was the combination of the leading and trailing wheels. Being shown models of Messrs. Gray's ploughs, he deposed that he considered the defenders' plough to be constructed on Mr. Pirie's specification. It did not contain any combinations, or ideas, or principles, or all that was essential and peculiar to Mr. Pirie's invention.

Professor Macquorn Rankine, Professor of Engineering in the University of Glasgow, having examined Messrs. Gray's plough, stated that he considered it had been made on the specification of Mr. Pirie's patent. He had the three wheels attached to a rigid framework. The wheels were angular rimmed, the land wheel upright, and the two other wheels in an oblique position. Witness had referred to a great many documents to see whether they had anticipated the discovery in Pirie's specification; in none had he found any anticipation of Pirie's patent in regard either to the first, second, or third head of his claims.

Mr. Thomas Pirie, residing at Nether Kinnmundy, in the county of Aberdeen, deposed that he had followed the discovery of the plough for upwards of thirty years. Before maturing his invention the object of his inquiries in view was to improve the implement as to lightness of draught and guiding itself on wheels, and to save the great amount of unnecessary power spent in dragging the sole plates over the land. He had seen the English swing plough, with its pendulous sole plate, regulating the depth of the furrow, but the principle on which it was constructed would not suit the object he had in view. To obviate the pressure that formerly fell on the

sole and side plates, he had recourse to angular rimmed wheels. Calculating the pressure he considered the wheels should stand at an angle of 30°, except in heavy land, where it would go as high as 45°. Fifteen or sixteen of his first ploughs were made. The average cost was £100.

The farmer complained of the price, and a simplified form was made for the same purpose. The simplified machine wanted the lever for raising or lowering the leading wheel. Witness had made arrangements with Fowler & Co., under which he had disposed of his patent right in return, retaining an interest for himself. There was a great demand for these ploughs. He himself made 200 or 300 in the course of a year at Kinnmundy. He had never seen ploughs working on the same principle before constructing his own. Messrs. Gray & Co.'s ploughs (which he was shown) were the same as his own, so far as the arrangement and position of the wheels were concerned. The essential parts of his invention were copied in Gray's plough.

Professor Jenkin, Professor of Engineering in the University of Edinburgh, deposed as to the efficiency and originality of the Pirie plough, and the clearness of the specification.

This closed the pursuer's case.

Mr. Campbell pressed the case for the defenders. It was intended to show, he said, that in all essential respects, everything had been found out and applied before Mr. Pirie patented his plough; that Mr. Pirie had added no new idea, and had given nothing to the public for which he should get a monopoly; that, in fact, both Gray and Pirie had worked on a common stock of materials.

Mr. David Denholm, farmer, Carberry Mains, deposed he had frequently acted as judge at ploughing matches, and had some experience in ploughs. There was one of Pirie's ploughs in his son's farm, which was one of Gray's. Pirie's plough cost £25, and Gray's £13. Both ploughs were good, but he preferred Gray's for its simplicity. Gray's had always taken most prizes at the ploughing matches.

Mr. John Pirie, the defender, deposed he had been 30 years at the business of implement maker. Sometimes he made an many as 3000 ploughs in one year. His grandfather had made the first iron plough in Scotland. Since 1844 the witness had exhibited at almost every Highland Society show. In 1846 he made a subsoil plough, first with one and then with two wheels. He possessed a lever precisely similar to that now adopted in his double-furrow plough. It was used in Pirie's plough (among others), but he found that that lever had been previously employed by a Suffolk farmer. That plough was very successful, and he had sold it for £100. In 1858 he began to make double-furrow ploughs. For nearly twenty years he had seen such ploughs exhibited at English shows. The ploughs he made had not set screws, and they had small sole and side plates. Ploughs with sole and side plates, however, were quite common, and he had made them twenty years ago, just putting a wheel where the sole was. In 1862 his attention was directed to a Canadian plough (Sovereign's) exhibited at the Royal Agricultural Society's show at Glasgow. Pirie's plough was a double-furrow plough, and he described the ploughs now before him (the models of his own and Pirie's). It was supported on wheels, guided also without stilts. Some of the ploughs had three wheels—one running on the sward, another in the furrow, and a third in the middle of the furrow being cut. There was a leverage in connection with the wheels precisely like the leverage of the land-wheel in Pirie's. The plough had no sole or side plates. He considered that steam cultivation and the old wheel ploughs had been the means of producing the new plough. He had commenced to make the double-furrow plough in August, 1860. At every competition in 1860 and the spring of 1870 he got the first prize, save on four or five occasions. He (the witness) had not copied Pirie's plough. Every detail of his plough was different, and bodies being very different from Pirie's. He was not concerned parties were concerned. There was greater facility for widening the furrow; the frame was more advantageous in point of strength and simplicity; and he did not rely upon the obliquity of the wheels only to lessen the friction, but upon the leverage of the wheels, and the adjustment of the line of draught. He endeavoured to avoid lateral pressure upon the front wheel. The hind wheel was set at an angle, which was a very old invention, he did not think it necessary that both furrow-wheels should be angular in order to resist the lateral thrust of the furrow.

Mr. James Howard, M.P., deposed he was a partner of the firm of J. & F. Howard, implement makers. He had been 20 or 30 years in business. For a great many years his firm had been making ploughs, and had been very successful. He had considered Pirie's specification. The main features of it were not new. There was nothing new in supporting and guiding the plough on wheels, or dispensing with sole and side plates, nor in the use of set screws. Pirie's ploughs, as he had seen, his firm had made triple-furrow ploughs, supported on wheels and guided from behind, and without side plates—the sole being removed according to the nature of the land. It was very undesirable, he thought, that the front wheel should press on the furrow. With a properly constructed mouldboard the pressure was very small. If Pirie said his discovery consisted in making the lateral pressure fall on the two wheels, it was not a discovery—it was a mistake. It was certainly not new to set the furrow-wheel obliquely—the old Suffolk plough worked on that principle.

Mr. William Clay, engineer and ironfounder, Ellesmere, Shropshire, deposed that he had been in business for about 37 years. In 1843 he began to make double-furrow ploughs, and they were exhibited at Shrewsbury in 1845. He had seen Pirie's ploughs, and he had seen Gray's ploughs being in the furrow, and one on the unploughed land. The wheels were fixed to a rigid frame, the sole-plate was dispensed with, and the side-plate was used simply to

keep the furrow clean. The front furrow wheel was at a slight angle (but as often straight), and the hind wheel was at an angle. There was an apparatus for raising or lowering the hind wheel without stopping—the front wheel being regulated by clips and screws. On ordinary land the plough would go without guidance. The front wheel ought not to press against the face of the furrow, and would not if the line of draught were properly adjusted.

Mr. Wm. Smith, mechanical engineer, Glasgow, deposed that in regard to the patentee's claim on Gray, he was in possession of the first claim as to the general arrangement and combination of parts. He understood the second claim to refer to the construction of a plough without sole and side plates, to be supported and guided in its work on wheels. There was nothing to lead him to suppose that the plough was to be guided by wheels, and he did not read the claim as a claim for the obliquity of the wheels. Witness corroborated the opinion of those who had stated that there should be no side pressure upon the front wheel.

Mr. John Cook, plough-maker, Lincoln, was well acquainted with double-furrow ploughs moving on wheels. He did not think it was necessary that the wheels should be oblique. If there was any lateral thrust, it should fall mainly on the hind wheel, and it was nonsense to talk of the two furrow wheels being adjusted so as to bear the pressure. The pressure would be obviated by the proper set of the collar and by the yoking.

Mr. James Finlayson, farmer, Stirling, deposed to having constructed plough-guides about 1855. He used set screws and rods, so that the plough could be guided from behind the stiles. Pirie's screws were in principle the same as he thought.

On the 4th day of the trial the Lord Chief Justice Clerk summed up, and the jury after a consultation, which lasted two hours and a-half, unanimously returned a verdict for the pursuers on all the issues—finding that the defendants had infringed the patent by using the invention; that Mr. Pirie was the true inventor of the invention; and that the invention had not been publicly known or used previous to his patent.

WOOLSTON DOINGS.

A HISTORY OF STEAM CULTIVATION.

(Continued from p. 492.)

"W. B.'s" next point is—"Ought not my much-esteemed friend Smith to have one of Fowler's steam-ploughs to do his ploughing?"

My mother taught me to hold fast, therefore I will hold fast to my money rather than spend it in buying a plough to plough on an average of years about 20 acres, a part clover-lea and a part for Barley after roots, to burn coal in waste, to keep horses quite in idleness. Let me remind him that harvest carting is not yet done by steam, and until that is done some horses must be kept.

"W. B.'s" next point is—"When he says he has abandoned his seed and manure drill, I am attempted to ask,—What's the matter? Did not the turn-bow answer? Facts speak for themselves, for Fowler's drills are in successful use."

The turn-bow did answer, and well, too, upon all occasions and purposes, and as Fowler's drills are in successful use, it must have been found so with them, for without turning drilling could not well be called a success. Yet, for that, the matter of drilling, even by Fowler's customers, may be questioned, and I do very much question its usefulness.

Take Wheat drilling in the autumn first. The land to be in a state fit for seeding must be damp, whether the autumn is a dry one or a wet one. Let the two thunderers bring the drill to drill a 20-acre field of heavy land; they may pull the drill to and fro and do the drilling, but, what with their own weight and the carting of water as well as coal, they would make the land looking compassed hands, that they would find it very difficult to drill at all, and if they did there would be no corn on the plot compressed by the engine, and, besides all that, thunderers like those ought and must be employed at work that is worth more than 2s. an acre (the cost of such work when done), or how will the contractor get on?—even a private worker would gain money by letting his engine stand idle, and let the horses that he will be obliged to keep for the next carting be not yet done by steam-power, not even in Scotland.

Now, take spring seeding, Beans first: the first fortnight in February is the best season—that would be a nice time to take the thunderers upon dirty clay land; the damage done to the land must be very great. Now take Barley: the land must be damp, and the engines would do great damage. Skip Oats, and the same remark would apply. Go on to roots—a mere 1s. 6d. acre job to horse, yet "W. B." would bring his thunderers out to do it. Then the "What's the matter?" will apply to "W. B." for it is clear that he is talking without a book practice. But then he says, "Long ago I have sown artificial manure by hand; but is not the practice out of date? The Suffolk drill, with four horses up to the knees, at this season, is preferable to hand sowing." Well, I have had a Suffolk manure and seed drill for near upon 26 years, and I have found it to be an excellent implement, doing the double or single work well, and the seedling part pleased me so much that some years back I provided myself with a Suffolk seed drill, and that I find to be an excellent implement. For

some years past I have abandoned the use of the manure drill, for I find it a very troublesome and costly way of applying artificial manure. Some people fancy that if they do not put the manure in a drill the plants will not find it. I have no fear of that, for I know that if I put it upon the land the roots of plants will find it, and the more it is dispersed the better chance all the roots have of getting it; and my 1½d. an acre is a first-rate way of dispersing it, for a man carrying the manure in a seed scuttle steadying it with the left hand, can with a little hand-shovel, made on purpose, in the right hand, disperse it quite as evenly as any machine can, and at no end less cost; but if people will spend money in waste they must, that is nothing to me, I merely tell what I do. But then "W. B." says, "When told in a season like this that horses' feet in ploughing, drilling, and harrowing, do no harm to the land, I am tempted to conclude that my noteworthy friend is either daft, or talking without practice." It is quite clear that "W. B." is daft, for he does not understand what he reads. Here are my words that he is carping at: "What!—harrow my beans and wheat by steam-power! Why "W. B." must be daft, or talking without practice!" Why, there is not a word said about ploughing and drilling, but I go on to show that harrowing is in cost by horses only a trifle, 2s. or 6d. John and I have sown by steam, the land must be damaged at a wasteful cost in money. It is much too bad for "W. B." to thrust ploughing upon me, when it is so well known that I condemn it in practice to be done by steam-power, because he and others will stick to "red tape." Kirtlingham has abandoned it, and so must others, before they will get on well by steam-power.

"W. B." then says—"When the fertilisers are applied in autumn, as they should be, with the steam manure drill to supply the young plants with proper food in the first stage of life, the expense of hand sowing in spring is saved, whilst the Wheat plant is in a more healthy state for the formation of the ear, and so on."

For some years past I have applied artificial manure in the autumn, and I have nothing to say against that practice, but I made up my mind last autumn that I would try a bit of spring practice. It is quite clear to me that my 53 acres of heavy land Wheat, to which the remarks will apply, did not need fertilisers last autumn, and they are looking strong and well, not thin and weak as report says they are in many quarters; and I do hope that the fertilisers now given will put them in a "healthy state for the formation of ear, and so on."

"W. B.'s" saving of 1½d. an acre in the spring for manure seeding is not worth talking about, for there must be a cost of some sort or other to shove it through a drill in the autumn.

"W. B.'s" next point is—"Even when neglected to be drilled in with the seed in the autumn broadcast, steam manure-distributors make cheaper and better work than the hand, all things considered."

It was no neglect on my part to leave my manure sowing till the spring, for I did it purposely, and my plant has not suffered a bit, for it looks first-rate. There is my 1½d. an acre for "W. B." to test his cost against, and it would be quite impossible for his steam manure drill to do better work than my men did with their little shovels.

Upon the next point "W. B." runs to some extent with me—"I do not advise my old friend to work his heavy loam land at this season by direct traction, although something this way may one day be done on light land, which I have rolled with a heavy roller to adapt it for a Bean crop."

We agree as to how best to apply steam-power upon heavy land, and I will leave him to work up a novelty such as he has in his mind, leaving him also to do his Bean dibbling as well.

Here is "W. B.'s" next bit: "It will be time to talk of direct traction when he gets one of Ransome's rubber engines."

Why I talked with Mr. Allen Ransome and Mr. Robert Ransome at the show at Carlisle in 1855 when I saw a Boydel engine ploughing land with their ploughs. That fact did not deter me from trying my own plan, for my opinion was then the same as it is now, viz., that weight must damage the land when it is in a state fit for seeding; and besides all that, there are a thousand-and-one jobs in a year on every farm needing only 1-horse power to do them, therefore it would be wasteful to try to do them by steam-power. But then "W. B." gives me a word of advice thus: "If he would take wholesome advice in this direction good would be done, for no one is better qualified to solve the problem of steam cartage than the father of steam culture." I thank "W. B." for his advice, but for the reasons shown above, I shall not go in for the steam-plough, the steam-harrow, or for the steam seed and manure-drill, even if Woolston practice "is worth less as an example than it otherwise would be." But then "W. B." would have you believe that "The turn-bow, although a mighty triumph for the time, has been superseded by the more efficient improvements of Fowler & Co., so that the latter may honestly be commended." What are these "mighty" "improvements of Fowler & Co.?" At the Leicester show, in 1868, I found and wrote thus of them:—

"On the other side of this field I saw a 9-tined cultivator set to clear a width of 8 feet 6 inches, with other framing and tines lying by to be added, to make its width 13 feet 6 inches, with the name of John Fowler & Co. upon it; yet it was a thorough-bred Smith, for it was constructed upon Smith's principle, and with his patent turning-bow upon it."

That was what I saw on the Monday; and on the Tuesday I saw and wrote thus:—

"I arrive at the field, and find the weighing of the various implements that had been in trial going on, and after a time the thorough-bred Smith that I have before told you about was brought to the scratch. I stepped in at once, and told John Fowler & Co. that it was an infringement of my patent to test Mr. Amos and the judges of the fact. Mr. Amos kindly told me that if I would enter my protest it should be attended to. The implement was tried at a width of 8 feet 6 inches, and it did good work at such a width, with the land sun-baked at it was, and I saw it turned at land's end, strictly in accordance with my patent No. 87, of 1856." Here ended my second day's work, "except that I saw some child's play going on in the shape of rolling, harrowing, &c. Yesterday (Wednesday, the third day) I saw in the showyard, at John Fowler & Co.'s stand, several other thorough-bred Smith's cultivators of various widths, with a Smith's patent turning apparatus on each of them. Such evidence of an infringement as this, with what I have before told you, set me to think a bit as to how best to defend my position as an inventor. After turning the matter over in my mind, I determined that I would not spend my money and money in setting the lawyers to work to defend me, but that I would give up my invention at once to the manufacturers and farmers of England for them to manufacture, and use it without any charge or license from me, so long as they would give me a fair share and share with John Fowler & Co. in the manufacture and use of it. This is, therefore, to give them notice that they may do so. William Smith, Woolston, Blechley Station, Bucks, July 16, 1868." (See your paper, p. 707, 1868.)

I saw this thorough-bred Smith cultivator worked in the trial field with one engine driving a double detached windlass, therefore it was shown at work strictly upon the Woolston mode of working. These implements are generally worked by two engines, with a windlass under each engine. In this way they are pulled to and fro across the field by the engines; therefore, wherever Fowler tackle goes, the windlass mode of application (the Woolston mode of application) is the order of the day, especially so with the contractors. Contractors like it, and here are the reasons why:—

1. Because the implement clears a wide space, and thus enables them to scratch a lot of land over twice in a day.
2. Because this mode of application works only rope enough to cross the plot or field over which they are working, and as the contractor has to find the rope this is of some consideration with him.
3. Because the farmer has to find the coal and water, and that is very considerable, for these two-engine sets of tackle need two water-carts to supply them with water; therefore the consumption of coal is great (I have all this from a man using such a set), and I find that the consumption of coal is so great per acre, in addition to the expense of the engine workings, that a windlass, with the double windlass and single engine mode of application saves enough in coal to provide itself with a new set of ropes on every 480 acres of work done. As this extra supply of coal comes by litters from the farmers' pocket the contractor laughs quietly in his sleeve at them, and then gets paid a pound an acre for double work; and Mr. Isaac Robinson's reasons why contractors must have a high price for the work may be found at p. 355, 1871.

4. Because the cost of a set of tackle is £1700, therefore contractors are few and far between, and get a good chance of growing, but at the cost of some farmers—a 20-acre man here, a 30-acre man, and so on. A farmer told me the other day that he should like to have 8 acres done, therefore to the extent of £8 he would help to feed the contractor. Mr. Robinson is right, for farmers will not part with their horses, and they are unwilling to afford to do so. My letter freely, indeed, intended to afford to do so. The evidence given is conclusive that England cannot be farmed upon the contract plan, Mr. Robinson's reasons are dead against it.

"W. B." must see by this that "the more efficient implements of Fowler & Co." are thorough-bred Smiths, worked upon the Woolston mode of application. The once boasted balance implements are now out of fashion, and the rope-grinding, clip-drum, and peeting quite as much so, yet the Woolston man remains as he started, and Fowler & Co. are following him upon all points, excepting the work done by my ridger and subsoiler. "W. B." would have you believe that they are a little ahead of him with a drill. Let them drill if they like, for if they do they are then only followers of Smith; and they will find, as he has done, that the 1s. 6d. an acre work will pay even the farmer, to say nothing about the contractor. I do not mean and am not saying that the more efficient implements of Fowler & Co. for my fields are my witnesses as to the efficiency of my own implements and application, especially so when the cost of seed-beds, as shown in this letter, are taken into account. William Smith, Woolston, Blechley Station, Bucks, April 3, 1871.

SHORTHORNS IN AMERICA.

BEFORE the present century dawned, some of our best Shorthorn cattle were imported into America; since that early period, both the States and Canada have bestowed great attention on their breeding, and no countries have made so many importations or paid such large sums for good animals of the most fashionable blood. A history of American Shorthorns is now being compiled by Mr. Lewis F. Allen, the editor of the *American Herd Book*; and therefore my purpose in the following paper is to give merely a sketch of those herds that I saw in a short trip of nine weeks, during which time only several of the leading herds in the States and Canada could be seen, and many good and well-known stocks were passed by, with regret, unseen. Shorthorn breeders, ere this, have been able to form their own judgment upon the cattle that have, since 1861, been sent back into this country, and their opinions have, by their own merit, shown that the blood has suffered little if any degeneration, even under a change of climate and on different soil and food. Many difficulties present themselves in writing a short narrative of a winter journey. I shall, consequently, endeavour to set down only such things as came before an impartial eyewitness, for, if I mistake not, the public, hitherto, has never received any account of American Shorthorns in their native homesteads and in the *American Herd Book*, and it is easy to say to the greatest advantage, but if animals look well at such a time, due allowance can be made for their appearance under more favourable circumstances. It has been generally considered that the American climate is against the growth of hair. The majority of those animals I saw, especially the younger ones, showed as much hair as may be seen in many herds in this country. Nature and fashion, however, adjust themselves to circumstances. The summers in many parts of America are exceedingly hot, hence Nature throws off that coat which is a protection against the cold in winter, and at the shows those animals attract the most notice that are sleek and as well groomed as a horse; consequently, in summer the cattle are well brushed, sheeted against the heat and flies, and not exhibited with that coat of hair so much admired here.

Few strains of blood have created of past years more attention than that of the "Duchess" tribe; the scarcity and demand for it in this country led to re-importation from America, where, consequently, it has drawn forth as much or even more notice. Although *Duchess 34th*, generally admitted to be one of the finest of the tribe, was offered by Mr. Bates, in 1853 (whilst in calf with *DUKE OF NORTHUMBERLAND 1945*), by BELVEDERE, to the Ohio Company for 150 gs., she was not purchased, and the first exportation of Duchesses was made by Mr. Thorne from Earl Ducess's sale in 1852. A period of depression in America ensued afterwards, and it is considered that Thornedale, Duchess County, New York, situated in a cold hilly district, near the Hudson River, in its deficiency of limestone, was unfitted for the growth and development of Shorthorns. Mr. Thorne sold most of his herd to Mr. Sheldon, whose estate at White Spring Farms, Geneva, is in a good grass region, has a fine open hill, and is thoroughly adapted for cattle. Here the tribe increased, and domestic circumstances led to the sale of Mr. Sheldon's herd to Messrs. Walcott & Campbell, of New York Mills, Utica, where this branch of the tribe is at present located. There are (December, 1870) ten cows and heifers, varying from two to ten years old, two heifer calves, one 3-year-old bull, and four bull calves; but all these cows and heifers are not in a breeding state. There is at the present time great demand for the pure pedigree; and the present time is here used technically, and is intended to convey the blood of the successive bulls used on the family since the death of Mr. Bates in 1850. It may further interest the uninitiated breeder to know that after Mr. Bates obtained the tribe in 1810, he used *KETON 2D* (710), whose dam was by a grandson of *FAVOURITE* (252), out of a cow by J. Brown's *RED BULL*, then a pure bull, *THE EARL* (646), bred from the "Duchess" tribe, who in his turn was succeeded by three bulls, of different blood, *THE HUBBARD* (1423), of the "Red Rose" tribe; *BELVEDERE* (1606), of the "Princess" tribe; and *NORFOLK* (3377), bred by Mr. Whitaker, from *Nonpareil*, with the blood of *NORTH STAR*, *PUNCH*, and *HUBBARD*; and these three bulls, be it remembered, were all of Robert Colling's best blood. *THE CLEVELAND LAD* (3407), a bull with three crosses, now generally known as the "Red Cross," was produced in 1825, four years before Mr. Bates' death; and it is only this stock now that is admitted as pure. Since the tribe has been in America, some of the animals have been kept pure, and the blood of the others has been intermingled with three different families, viz., the Booth blood, through *3D DUKE OF THORNDALE* (17,749), and *3D DUKE OF AIRDRIE* (23,717); the Knightly blood, through *IMPERIAL DUKE* (18,083); and the Burghley or *ROMEO* (33,619) blood, through *DUKE OF GENEVA* (23,752). It is considered that the Booth and the Knightly crosses are failures, because being very closely or strongly bred tribes, with a fixed type, they disturbed the strong current of the Duchess blood; but *ROMEO* was looked upon as being rather a loosely bed bull, so he therefore seems to have navigated

the tribe without disturbing their good qualities. *ROMEO* was first used with the Oxforde, and produced a very fine cow, whose son, *OXFORD LAD* (24,713), was the sire of *3d Duchess of Geneva*, the dam of *2D DUKE OF GENEVA* (23,752). This strain occurs also in Messrs. Lacey's *7th Duchess of Geneva*, and Mr. McIntosh's *3D DUKE OF GENEVA* (23,753), re-imported and sold at Windsor in 1867. It may be possible that this blood, being introduced in an indirect and diluted form, was more beneficial than the others introduced more directly.

The few still pure, not attract additional notice. One of the handsomest Duchesses (*10th Duchess of Geneva*) in the New York Mills herd was by *2D DUKE OF GENEVA*, who was used by Mr. Edwin G. Bedford, an old established breeder in Kentucky, where there are several of his offspring. The bull's skull is still retained, and Mr. Bedford affirmed that it was the skull of the finest bull he ever saw. The chief merit, in the American Duchesses appears to be in their production of calves, who used in other herds, produce a fine quality of stock; the cows themselves were stylish looking and large, in one or two cases almost approaching coarseness; the chest deep but often narrow, causing the fore-legs to stand somewhat closely together, the ribs well sprung and round, with great space from them to the hip, and great length of quarters, which had the effect of lowering the body, and causing the calves to have a head and sweetly-curved face for which the tribe is distinguished. The eyes were singularly bright and prominent, but this was noticeable in the majority of American cattle. The calves were being excellently managed—each had a good dairy cow as nurse, and they showed much vigour and wonderfully good coats of long hair. *4TH DUKE OF GENEVA*, the sire in use, was a fine noble looking bull, having several good calves, a deep red in colour, and with rather harsh hair.

The Oxforde, at New York Mills, comprised ten cows and heifers, only one pure—a hopeless breeder; two aged bulls, *BARON OF OXFORD* (23,371), 15 years old, and *ROYAL DUKE OF OXFORD*, 12 years old, both pure; three yearlings and two bull calves. Mr. Sheldon disposed of two of his best Oxford heifers to Col. King, of Minneapolis (who has since re-sold them to Mr. Cochrane), before the tribe was sold. The herd at Messrs. Walcott & Campbell's heifers, with the *MARQUIS OF CARABAS* (11,789) cross, was a very good yearling, and *Gem of Oxford*, by *2D GRAND DUKE* (12,961) from *OXFORD* by *ROMEO* (13,619), a good cow, rather small, but of excellent quality, and very full of rich roan hair. The two aged bulls were still in use. This tribe is considered in the States to be slightly coarse, but improved by the Duke crosses.

The herd at New York Mills was first started with *Rosendale*, a cow by Mr. Mason Hopper's herd, and descended from the "May Rose" or "Georgiana" (by Fitz-Remus) tribe. There were several of this family, one of which, *Rosamond 7th*, beat the recently imported prize heifers, *Baron Oxford's Beauty* and *Charming Rose*, in the 2-year-old class at the New York State Fair in the year 1870; although a good animal in high condition, she lacked length and elegance. Several good descendants of Mr. Wetherell's *Roan Duchess* (the "Blanch" tribe), and of Mr. Holmes' *Victoria* (Mason's No. 1), the latter with excellent forequarters. The herd also contained some of Col. Towneley's Bampton Roses, some Gwynnes, and J's. There were two or three fine animals of the "Mazurka" family, a very favourite strain in America, which will be mentioned hereafter. The herd was well managed, and the cattle housed in large, airy, commodious houses; being seen inside them, they appeared somewhat to a disadvantage, and, although a good lot, apparently wanted uniformity of character. The farm is large, and one portion near the River Mohawk is very fine pasture land. Good hay, hardly so full of herbage as in England, is grown and stored in lofts over the cow-houses, very little cake is given, and shorts (fine bran) with a little corn (Maize) meal, is the principal food.

Two years ago the British public was much astonished at Mr. Cochrane's purchase of *Duchess 9th* for 1000 guineas, by Captain George Cochrane, and two more Duchess heifers, besides a very large number of the best animals that could be obtained throughout the country. In 1867, prior to the purchase of *Duchess 9th*, his agent, Mr. Simon Beattie, selected and bought Lady Pigot's prize heifer, *Rosdale*, at the Duke of Montrose's sale, and the bull *BARON MOUTH*, of Lancaster, from Mr. Barclay, of Keavil. These were more direct imports, and demand for the last shows (called State Fairs) in Canada and the United States, and carried everything before them. Indeed it was difficult to keep the crowd from them, as these shows are much more numerous attended than at home, and are held on the same ground year by year, the sheds or boxes, with a large covered amphitheatre for judging, remaining fixed. As they were so to be of Booth blood the attention of breeders was more directed to the Duke and the strain arose. This led to further importations, and last year nearly 40 animals were sent out in one vessel, most of them at high prices. A few of these animals have been sold, but the larger and better portion has been kept for breeding; so that the herd, undoubtedly

about a hundred head, is looked upon as one of the best and finest stocks in the country.

With most of these animals, several of them being our Royal prize winners, the public is pretty well acquainted; the short time they have left England has not altered their character; indeed in several instances they seemed to have improved.

Mr. Cochrane's farm at Compton, Province of Quebec, is situated in a comparatively new country; the rough timber fences trailing snake-like across the fields, tree stumps standing a couple of feet high, the slight wooden houses and three-storied farm buildings, the water-troughs of hollowed logs, present a striking contrast to one accustomed to Old England. White Clover and Timothy-grass grow luxuriantly in summer, and make good hay; capital Turnips are also grown. These are pulped, mixed with chaff, and with the addition of cake and mixed meals make an excellent food when the cattle are housed. The face of the country is generally white with snow for at least four months in the year, and the thermometer often marks 20° below zero, yet the cattle thrive exceedingly and do well; the calves suck their dams, or a nurse, and pick a little hay or meal as soon as they will, consequently they are in good condition, and have long coats of hair. One bull calf by *14TH DUKE OF THORNDALE*, from *Duchess 9th*, of great substance, and with abundance of deep red hair, was particularly promising. The two *Duchess* heifers had improved since they were shipped last year, each having produced fine healthy heifer calves; and the cattle generally showed the great attention and excellent management that was bestowed upon them.

11TH DUKE OF THORNDALE, purchased in 1867, by *6TH DUKE OF THORNDALE*, out of a sister to *Duchess 7th*, was in service; he is a fine animal, red, with the distinctive white spots on the forehead and flanks, and of great depth and substance. Mr. O'Connell, of ROYAL COMMERCE, also in use, had grown into a very handsome yearling.

One large wooden house, built on a stone foundation, contained 32 cow-stalls, and 30 boxes on the ground floor, with places for Turnips, pulping, and mixing; two inclined roads led to an entrance at the side of the building on the second floor, which contained 28 heifers and a large number of bull boxes; over this the hay and straw were placed. The sheep were also housed, but had a yard to run in as well. The houses were warm, clean, comfortable, and well ventilated; all the animals were turned out twice a day to water, and appeared in as good condition and as well managed as at home.

Except during severe gale cattle crossing the Atlantic usually stand the voyage well, losing their food only for a day or two after starting, but in a storm their belly-wool seems to denote their fright and suffering. One of the shipments last year met with a heavy gale, some of the animals burst from the strong boxes that had been put up between decks for them, and getting much bruised took a long time to recover. A handsome mare broke from her box, and was so cut and knocked about by the rolling of the vessel, that she was obliged to be thrown overboard. It is found that cows and heifers usually travel better in calf, and if warmly housed a few days before going on board do better on the voyage. The judicious and careful feeding they keep up their condition well, and when unshipped, often by their antics appear to show their joy at landing. Few know the sufferings of sea life, and the risk and anxiety occasioned by the transport of valuable stock. From Mr. Thornton's *Shorthorn Circular*.

GRAZING v. CORN GROWING.

(The following extract from Mr. Fonblanque's report on the Agricultural Statistics of 1870 compares the two divisions under which English counties may be arranged in reports of the census and averaged the results of the two divisions.)

THE English counties may be divided into grazing and corn districts of an acreage so nearly equal, that a Table has usually been compiled to show the chief results of the agricultural returns for such divisions of England, and the following Table is given for 1870. The grazing, or western division includes (arranged from north to south) the counties of Northumberland, Durham, Westmorland, Yorkshire (North and West Ridings), Lancashire, Cheshire, Derby, Stafford, Leicester, Salop, Worcester, Hereford, Monmouth, Gloucester, Wilts, Dorset, Somerset, Devon, and Cornwall. The corn growing, or eastern division, includes (arranged from north to south) the counties of York (East Riding), Lincoln, Nottingham, Rutland, Huntingdon, Warwick, Northampton, Cambridge, Norfolk, Suffolk, Bedford, Bucks, Oxford, Berks, Hants, Hertford, Essex, Middlesex, Surrey, Kent, and Sussex.

After showing the total proportionate acreage in each of the divisions, the Table gives the acreage and percentage proportions of the agricultural distribution of the land in each division; then the acreage under each crop, and under grass in the two divisions respectively, and the percentage proportions of the acreage of the crops and grass in the grazing and corn counties to the total acreage under each crop, and under grass in England; and, lastly, the relative number of each kind of live stock in the grazing and corn counties, and the percentage proportions of the stock to the total number in England.

The following are the chief results indicated in the Table:—The corn crops occupy 24 per cent. of the acreage in the grazing counties, against 41 per cent. in the corn division. Permanent pasture (not for hay) in 1870 covered 38 per cent. of acreage in the grazing counties, against 21 per cent. in the corn counties. The acreage under Wheat and Barley, in proportion to the total for England, was 40 and 38 per cent. in the grazing, against 60 and 62 per cent. in the corn counties. Potatoes were grown to the extent of 60 per cent. of the total acreage of the crop in England in the grazing, against 40 per cent. in the corn counties. Permanent pasture (not for hay) in 1870 was in the proportion to the total of such pasture in England of 66 per cent. in the grazing counties and 34 per cent. in the corn counties.

The horses returned as used solely for agriculture were in nearly equal numbers in the two divisions. But unbroken horses and mares for breeding were in the grazing counties in the proportion of 54½ per cent. of their total number in England, and of 45½ per cent. in the corn division. Cattle were in the proportion of 66 per cent. in the grazing and 33 per cent. in the corn divisions. Sheep and pigs were both in nearly equal proportions in the two divisions. The number and proportions for the live stock have reference only to the 25th of June, the date when the returns were made.

	In grazing counties	In corn counties
Acreage.	Acreage.	Acreage.
Total acreage returned under all kinds of crops, bare fallow, and grass, &c.	12,322,176	11,680,942
	Percentage of total acreage returned in the grazing counties for England.	Percentage of total acreage returned in the corn counties for England.
Acreage under—		
Corn crops ..	2,974,477	4,595,532
Green crops ..	1,194,714	1,615,112
Clover and other grass under rotation ..	773,153	752,118
For hay ..	747,728	447,773
Not for hay ..	29,243	26,495
Permanent pasture—		
For hay ..	1,648,880	955,648
Not for hay ..	4,595,532	2,372,880
	Percentage of total acreage returned in the grazing counties for England.	Percentage of total acreage returned in the corn counties for England.
Acreage under—		
Wheat ..	1,211,747	2,036,626
Barley ..	717,881	1,285,783
Oats ..	791,141	791,341
Beans ..	145,045	358,415
Peas ..	82,027	292,310
Turnips ..	714,152	292,310
Turnips and Swedes ..	138,152	161,334
Mangel ..	89,638	212,062
Cabbage, Kohl Rabi, &c. ..	52,474	87,650
Cauli and Rape ..	98,668	266,750
Vetches, Lucerne, &c. ..		
Clover and other grass under rotation ..	773,153	752,118
For hay ..	747,728	447,773
Not for hay ..	29,243	26,495
Permanent pasture—		
For hay ..	1,648,880	955,648
Not for hay ..	4,595,532	2,372,880
	Percentage of total acreage returned in the grazing counties for England.	Percentage of total acreage returned in the corn counties for England.
As upon June 25th—		
Horses used solely for agriculture ..	422,641	495,664
Unbroken, and mares for breeding ..	212,046	100,837
Cattle ..	2,404,613	1,665,213
Sheep ..	9,671,527	9,614,813
Pigs ..	1,009,783	905,818

* 4.6 and 3.6 upon the arable land only in each division.

Home Correspondence.

Land Tenure.—Some time ago one of your correspondents remarked on the very small number of freeholders in England; and, further, that this small number was yearly diminishing. From what had come under my own observation I disbelieved these statements altogether, and now, from a perusal of the Census papers, I think I see how the mistake originated. In all probability your correspondent was misled by the Census returns. In the first place, the

returns pointedly exclude persons holding less than 1 acre. This alone must place the number of freeholders in England at a great disadvantage in comparison with the number in France, where property is much subdivided. But besides this, no direct question is put whether you are a freeholder or not, but you are requested to read the long instructions, which very few will ever take the trouble of doing. Those that do will find a direction, first to state their occupation, and then to add, as a mere parenthetical observation, that they own land. I imagine that this is seldom attended to, with whom I was coming down in the train, whether they had noticed their freeholds in their returns, and both said that they had not. The question is not merely one of inaccuracy, for unfortunately the small supposed number of freeholders forms a ready topic for evil-minded people to descant on. G. S. [It is a subject most proper, also, for right-minded people to descant upon. E.D.]

Growing the Drumhead Ox-Cabbage.—When I first came to Welbeck some thirty-four years ago, I found that the kitchen garden there was looked to for an immense supply of Drumhead Cabbage for planting out. In May and June in the home farm, for the South Down sheep and lambs in February and March. The late Duke of Portland was very particular about this crop, and used to have from 12 to 16 acres planted out every year. I used to sow the seed in August or beginning of September, according to the season, and the plants were kept in the seed-beds till planting-out time in May and June. After the farm bailiff had supplied his wants, some of the tenants were allowed the plants that were left for the pulling, and they were accounted a great boon by them, for all were eager to plant a few acres according to the size of their farms. I charged so much per 1000 to the farm for the plants, and as about 300,000 to 350,000 were wanted every year, it was a nice set-off for all the carting done in the gardens by the farm horses. I always raised some seed every year by selecting a few stumps of the largest and best cabbages in the spring, and planting them out in some corner of a field, and leaving them to grow, and when they were crossed with any other of the Brassica tribe. When the seed began to ripen a large net was made on purpose to cover the patch over to prevent birds from taking the seed. This net was likewise useful in keeping the birds from the seed when sown in the autumn, and the hint may be useful to growers of Cabbage and Turnip seed on a small scale, for if such precautions are not taken the birds will be sure to have the greatest share unless strictly watched. I have seen enormous crops of the Drumhead Cabbage grown in Yorkshire, where the farmers near the sea were mixed. The market gardeners, likewise, near seaports grow quantities of them, as captains of ships going long voyages prefer them for their crews for their keeping qualities. They likewise (barring the colour) make as good a pickle as red Cabbages, and small barrels of them pickled on board ships can be used as a great preventive against the scurvy. I have myself, in trenched garden ground, and heavily manured with rotten sea-weed and dung, grown Drumhead Cabbages to the weight stated by Mr. Robinson (p. 493), and Broccoli heads to the weight of 14 lb. each. William Tilly.

Mr. Allen Ransome and Mr. W. Smith.—[We have received a letter from Mr. Smith, of which only a part can appear, for it does not seem desirable to continue a merely personal discussion. In so far, however, as it relates materially to the history of steam cultivation we give a portion.]—We all know that neither he nor John Fowler became very quickly "possessed of my ideas," for my ideas were very much too simple for either of them. I was self-attended with the grabber; they must and would have been. But the late Mr. Allen Ransome is trying to make a mountain out of the order I gave to "John Fowler and their firm" to construct for my use an ordinary 7-horse power engine and a simple double windlass; and then he would have you believe that I gave "no instructions or even suggestions." It is an undisputed fact that I did contract at the Carlisle show with Ransomes for a 7-horse engine, and it needed no "instructions or suggestions" as to how they should make it, for I required no alteration whatever from their ordinary engines then in make. It is also an undisputed fact that I (through an introduction by Mr. R. Ransome to "John Fowler") let Mr. Fowler know, at the said show, that I wanted a double windlass, and it is also well known that I did then and there contract with the said "John Fowler" to make for me such a machine. How on earth could this have been done if I gave neither "instructions nor suggestions?" Surely any blacksmith would know how to put two drums upon a shaft to be put in motion alternately by a pinion. Such things were then to be found all over England in use in one way or another. The simple fact is, this "John Fowler" was not the first to make a draining-plough, but he did make a draining-plough, and he showed it in operation at some of the Royal Agricultural Society's meetings. At the Lewis meeting I saw it worked by horse-power. The Lincolnshire Agricultural Society then publicly at a Royal Agricultural Society's meeting by steam-power. Messrs. Dray had a steam draining-plough

out that meeting, therefore "John Fowler" did not stand single-handed upon the point of steam draining even at that meeting." At the Carlisle meeting in 1855 "John Fowler" showed nothing but his steam draining-plough. I saw it there myself at work, and after he had contracted with me for a windlass, he laughed that a farmer should be such a fool as ever to attempt to farm by steam-power. When he found that I got well off, he, with the aid of "J. Allen Ransome," tried then and ever since to link his old worthless draining-plough to steam culture. Draining by steam-power is not worth a rap. It can do a few bits of clay without tiles, and that is all, yet steam culture is good, and I am the practical starter of it. Neither "J. Allen Ransome," nor any other man, will ever deprive me of that honour, let them try as they may to link the old draining-plough to the steam-power grabber. "John Allen Ransome" says, "Whenever the full history of steam cultivation shall be written by a competent pen, Mr. Smith will be entitled to credit for the sagacity which induced him to obtain the assistance of others in his desire to realise the advantage of steam traction to subdue his stubborn clays." I thank Mr. Ransome for this, for even he gives me the credit for the sagacity of obtaining the assistance of others to enable me to "subdue" my "stubborn clays." That is the true summing up of the whole matter, for I did obtain all the assistance I needed, and I did "subdue my stubborn clays." The proof follows "J. Allen Ransome's" letter, at p. 491 of your paper, therefore all the honour that I am striving for is awarded to me by "J. Allen Ransome." A higher place than this may be assigned to "John Fowler" by the hereafter writer of a full history of steam cultivation; but it would be wrong to give him because I have not individually to secure perfect success." Is there any other man but myself who can show such "perfect success," as stands printed in your paper at p. 491? The "sagacity" (as Mr. Ransome tells you) of the Woolston man, was to get a soundly constructed smasher to enable him "to subdue his stubborn clays," and that sagacity has been followed at last by John Fowler & Co., by supplying soundly constructed implements upon the principle of the Woolston man to their customers, to all the "stubborn clays" in the subduing the steam clays throughout England. William Smith, Woolston, Blackley Station, Bucks, April 15, 1871.

Woolston Doings.—I see that "W. B." has been Mr. Smith's irascible soul, for he speaks of him ("W. B.") and Lord Dunmore as "such inexperienced men." Nevertheless, "W. B." asked a very sensible question when he said,—"When ploughing, harrowing, and drilling are all done by horses, is he (Smith) justified in holding up Woolston as 'an example' of a steam cultivated farm?" If Mr. Smith would not so obstinately shut his eyes, he would find in Fowler & Co.'s implements the elements of doing ploughing, and harrowing, and drilling, and rolling, and clod-crushing with steam-power quite as easily and economically as the Woolston machine does its so-called steam-smashing. Let Mr. Smith pull the beam out of his eye, which impedes his sight and distorts his vision, and when he has the magnanimity to acknowledge himself beaten he will find a great many men willing to give him quite as much honour as is his due, as a deal more consideration than they give him now, for his "self-assertion" can incline him to pull him down more than possibly he deserves. G. A. H.

Growing Cabbages.—Mr. Cadle has given us a great deal of interesting information in his paper on Cabbage cultivation, read before the Farmers' Club, and which you so opportunely reported. I cannot, however, see how Cabbages is to be got to stand the winter, so as to be a trustworthy crop in May and June. In my garden last winter every Cabbage, except Scotch Curly Kale, was destroyed. What was Mr. Cadle's own experience last winter? I have a deal more to say on the subject of the previous winter. I have seen, but not seen, the yellow Turnips I frost through neglecting to pit them. My friend at Woolston never accepted my offer to sell him 200 tons at 10s. per ton, and so the roots have gone to manure the ground on which they grow—a serious loss to me, and no doubt a great loss to Woolston. G. A. H.

Foreign Correspondence.

CANADA: *Lennoxville Province of Quebec.*—*Emigration and Canadian Farmers.*—I have often in past times been accorded space in your valuable paper on drainage and other agricultural subjects; and now, after a lapse of many years, I venture once more to ask for a renewal of your former kindness.

Since I left England 17 years ago I have resided in this country, following, with a brief exception, the "grand old gardener's" occupation, and endeavouring, as was my wont, to impress on our farmers the necessity of agricultural progress. During the few years I was in the western province we did induce the legislature to pass a modified Drainage Act, I have ever since remained a testimony of mispent efforts and public apathy. But I must keep to my purpose.

* He was not alone, but he was "single-headed"—that is to say, the idea was his originally, and, I have every reason to believe, he had not known that the idea had occurred previously to some one else who had not carried it out. E.D.

My object is, through the medium of your widely-circulating journal, to bring, as briefly as space will allow, before my fellow-countrymen, the advantages which Canada, and particularly this eastern portion of it, offers both in a social and in an agricultural point of view, to respectable emigrants of all classes from the rural districts at home; and, in doing this, I wish more especially to address myself to the agricultural labourers, to the yeomanry, and to the gentry; and I venture the more earnestly on this duty because, in the first place, the class of emigrants we usually receive through the instrumentality of our Government agents, are assuredly not those to be very much benefited by the change; and, in the next place, because we have good reason to know that such agents, sending themselves to the large centres of population, have no opportunities, and, for the most part, but few qualifications, to make our advantages understood in the country districts of England. Englishmen look with much distrust on advertising effusions; and we in Canada know full well, by this time, that really desirable emigrants are seldom, if ever, influenced by any other than reliable information from private sources.

First, then, as to the agricultural labourer: the sober well-conducted labourer, I mean, for we have more than enough of the opposite kind—who, if he hears anything about Canada, is sure to be told that he can earn something like double the wages here that he can at home. I say emphatically this is not correct, and is only deceiving him; and I assert that in this respect, all things considered, he is full as well off in England as he would be here; and if this were the only or the chief inducement, he had better remain where he is. But there is an inducement here for him and his family which is both tempting and substantial, namely, that by ordinary industry and prudence he may in a short time become the owner of real estate—a prospect which it is utterly hopeless for him to attain to in England, and may settle himself and his children after him in comfort and security on his own property. Places in good locations, of from 10 to 15 acres (quite a half lot), are partially cleared and under some cultivation, can be bought at from 10 to 15 dols. (£2 to £4 sterling) per acre, payable by instalments. These with management and economy will provide the family with necessary supplies; and at the same time allow the man to work out for wages during several months in the year. It is a very common practice, and a very advantageous one for the workman. Good hands will get on an average of from 12 to 15 dols. per week, for the whole year's service; and through the summer and autumn, working long hours, first-class men may get a dollar (£4 sterling) a day. I would not advise any emigrant to purchase entirely wild land. It seems a hopeless task to subdue the forest. Leave this to the habitans, who are used to it; and whose long experience has taught them how best to accomplish it: they are in their native element at the work, and the more desirous to impress this, because in the several emigration publications I have seen that have emanated from, or been issued under the authority of the Canadian Government, there is an evident impression prevailing there that emigrants, on coming here, are at once to take up and settle upon the wild lands of the country, than which nothing could well be more detrimental to their welfare.

Now a few words to the yeomanry and their sons. The renting of farms in England at this day is not what it was formerly, when tenants of character could obtain holdings with what is now regarded as very inadequate means. Few landlords in these times let land to any but those who have capital commensurate with the requirements of the age for its profitable cultivation; and there are, consequently, I believe, many of the sons of these men who are unable to obtain a comfortable rent and farm in the style they are accustomed to see at home, could yet raise sufficient funds to place them in more comfortable positions here as owners, and be at the same time a sterling and welcome addition to the community.

And so also of the gentry, to whom I speak with more especial sympathy, for I know from personal experience what a boon emigration to this country would be to hundreds of the men of this class. The association and the habits of gentlemen, with small capitals, and sanguine hopes—who would willingly free themselves from the conventional requirements of their order, which they can ill afford to support, and yet from which they know not how to escape without loss of caste. There are, I say, hundreds of such men idling away their time in the vain hope of obtaining some respectable position, and with one or two thousand pounds would do remarkably well here, and be a most valuable acquisition to our society. One piece of advice I would give to emigrants of this class (and, indeed, to all), and it cannot be done better than in the words of Lord Bulwer:—"And if you saw the sharks that swim round a man just landed at—, with one or two thousand pounds in his pocket! Hurry out to the towns as fast as you can, my young emigrant; turn a deaf ear for the present at least, to all jobbers and speculators; make friends with some respectable old resident; spend some time before you invest your capital; take with you a temper to bear everything, and sigh for nothing; put your whole heart into what you are about; never call on Hercules if

your cart sticks in the rut; and your success is but a question of time and perseverance."

Cleared and partially cleared farms, having a suitable number of Maple trees for sugar, and a fuel lot retained, with good houses and premises, can be purchased at from 15 to 25 dols. (£4 to £6 sterling) per acre, according to quality of soil, situation, and condition of buildings; and if more land be desired, adjoining lots can generally be had. Our surveys are parallelograms of 200 acres each; and, with very few exceptions, the farms retain their original limits unaltered.

The Church of England University, and preparatory school in connection with it, at Lennoxville, established some years ago under the sanction of the late Bishop of Quebec, has set its civilising mark on the locality; and the school is in fact the Eton of Canada, where gentlemen's sons receive as good an education in all branches as in any of the home institutions. So that instead of coming into the backwoods, as some may suppose, gentlemen will find themselves amongst many of their own standing, and in a quietly genteel society. We have no shooting in the open country as in England, but the best and grossest are excellent birds. And we have, as yet, no hunting as at home, but the fishing is superlative.

The Eastern Townships, as they are locally called, and to which I would more particularly direct attention, are that portion of the province of Quebec south of the St. Lawrence, between Quebec and Montreal, and extending up to the northern boundary of the United States. The Grand Trunk Railway passes centrally through it, and the market town of Sherbrooke and the University village of Lennoxville, from whence I write; affording speedily and ready access to passengers arriving at Quebec. It is, *par excellence*, the grazing district of the Dominion; and in its diversity of contour and scenery very much resembles the northern and lake districts of England. With comparatively a virgin soil of great fertility, the farming is somewhat primitive, but we are gradually getting into better ways. The usual cereals as well as Maize, are grown, and all root crops seem to have a more than special aptitude to flourish. Hops, too, are grown in considerable quantities. It would be trespassing too mercifully on your space to speak more at large of our agriculture. Suffice it at present to say that if as compared with England our farming is behind the times, we are yet making some progress, and are steadily gaining advance in the general value of stock and produce well worth to encourage us. We have also a most spirited example in our neighbour, Mr. Cochrane, of Compton, who, as many of your readers know, is an extensive and liberal purchaser of thoroughbred stock in the English market. He has recently, by funds and influence, been mainly instrumental in an experiment to establish an agricultural school, with a model farm attached, which is shortly to be opened.

And now, in conclusion, let me say, that if I can make the necessary arrangements, I am proposing to myself the pleasure of visiting England during the coming summer or autumn, when I hope to have it in my power, through your influence and that of some of the leading Farmers' Clubs, to speak more at large and face to face with my countrymen on this and its kindred subject of Canadian farming. And in the meanwhile, should any desire to have further information, let them not hesitate to write to me; and I shall be most happy to answer all their inquiries, and give them the benefit of my experience for their guidance. John H. Charnock, March 30, 1870.

Farmers' Clubs.

BANBURY

On Vagrancy: March 21.—MR. FINLAY DUN, Weston Park, Shipston-on-Stour, read a paper on this subject, from which we make the following extracts:—

Ever since the days of Cain, "fugitives and vagabonds" have roamed over the face of the earth. Whole races have adopted a nomadic Ishmaelite life, preferring tents to towns, a precarious to a fixed mode of life, and a vagrancy to a steady industry. From the days of Queen Elizabeth, our various statutes have in this country been directed against vagrants and beggars. Imprisonment, whipping, and even death, were freely used as deterrents. Sir Matthew Hale mentions one Suffolk assize at which thirteen vagrant begging gipseys were condemned and executed. The civil law expelled all sturdy beggars from the City. The ancient statutes rightly regarded as "offenders against good order and blessings in the Government of any kingdom," such as wake in the night and sleep in the day, and haunt customable taverns and ale houses, and routs about, and no man wot from whence they come, no whither they go." The statute of 5 George IV., c. 83, amended by 1 & 2 Vic. c. 38, is directed against the three classes of idle and disorderly persons, rogues and vagabonds, and incorrigible rogues.

Although these wholesome statutes have been in existence for upwards of thirty years they have been tardily and imperfectly taken advantage of. Mendicancy and vagabondage continued steadily to increase and extend. In 1845 the vagrants were estimated at

11,000; in 1858 they had doubled, their numbers being 22,559; in 1866 they were enumerated at 33,000; whilst in 1868 they probably were not less than 40,000. These figures are of course exclusive of our army of upwards of a million of paupers. During twenty years to 1868, the number of idle vagrants in England and Wales had thus increased fully three-fold.

The Natural History and Habits of the Vagrant are curious. He may be described as a sort of hybrid, between the pauper and the criminal. Cradled in dirt, misery, and brawling, his bodily, mental, and moral qualities are early stunted and perverted to evil. The student of Darwin might find in him the growing reality of the wolf, the blindness of the dog, the cunning of the fox, the trickiness of the monkey, with some of the unpleasant characteristics of the skunk. In winter his chief habitat is the towns, and during an inclement season he often reluctantly resigns his love of independence and becomes a grumbling, disagreeable, demoralising inmate of the union house. But before the cuckoo arrives he is again on the tramp, arranging for another summer campaign. In these midland counties the popular route seems to be from London to Cardiff and of course back again. Although professing much laudable anxiety to secure work, he will seldom take it when it is offered. He only works in very exceptional cases, when something unusually tempting turns up, and never for more than a few days at a time. Vagabondage, not work, is the occupation of his life. Rags and tatters, a whining cry, a shambling limping gait, and an occasionally a hapless following of wretched children, are often assumed to evoke sympathy. Blindness, fits, and other diseases, with loss of arms and even legs are occasionally simulated; ugly sores are artificially produced and magnanimously kept open to attract attention and alms. With some aristocratic members of the fraternity begging letters and petitions are in vogue; of those 3,100 came during 1870 under the discriminating eye of the Mendicity Society of London alone. When searched, money and valuables are occasionally found concealed about the vagrant.

A flagrant case of this kind occurred last year in London; a fellow from Bristol, 48 years of age, representing himself as a labourer out of work, starving, and in much distress, was found begging. He was apprehended, and when searched was discovered to be possessed of fifteen pence in bronze, six pence sixteen shillings in silver, and a Post Office Savings Bank book representing thirteen pounds ten shillings deposited in his own name. The food or clothing in mistaken kindness supplied to the habitual tramp is often sold by him at the nearest town. Money received in alms, or in exchange for victuals or for articles pilfered, is expended in drink. Only when unfortunate in his begging or failing to pick up any convenient saleable commodities does he care to seek the hospitality of the workhouse, and in many counties in the north, only one-sixth, condescend to partake of public hospitality. From their own resources, or from some of their pals they can usually command the sixpence or eightpence which secures the supper, bed and breakfast at the common lodging-house. After a prosperous day's work great feasting and carousing goes on in the beggars' kitchen, and their less fortunate fellows are usually invited to join in the merriment going on. In the night these tramps occasionally claim admission to the union or casual wards, obtain their bed and skilly, but, instead of turning in for the night, they take their departure, and have thus been known to obtain a succession of suppers at these open hostelries. The professional tramp is generally provided with lists of persons in the locality from whom charity is likely to be obtained; occasionally his way guide indicates the names of the persons to whom alms, or money can most readily be procured; sometimes the charitable member of the particular family receives honourable mention; sometimes it is carefully noted where women, children, foreigners, infirm, blind, or deaf and dumb persons, or persons pretending to suffer from these infirmities, are favourably received; desirable begging routes are chalked out, concerning which fuller information is of course afforded at the common lodging-house. The tramp is also thoroughly instructed of the discipline, diet, and labour of any of the workhouses; and are kept thoroughly posted up regarding any magistrates or others who are disposed to curtail their privileges or interfere with their liberty, and many of them also know very accurately the regulations and laws applicable to their vocation. Congregated in low lodging-houses or casual wards these god-forsaken creatures concoct and carry out fully one-half of some authorities say three-fourths of the crime for the repression and conviction of which the country has to pay so heavily. Mr. Dunne, the energetic chief constable of Cumberland and Westmoreland, where for nearly three years the Vestment Act has been stringently enforced, in his evidence of January, 1868, printed by order of the House of Commons, states, "That he had no doubt that 99 out of every 100 tramps were professional criminals, and a large proportion of them were convicted thieves and lived by an organised plan of plunder. Nearly all the serious crimes, such as burglaries, highway robberies, and many of the petty larcenies in these counties had, during the last eleven

the proper management of the tackle, the above statement is in nowise overdrawn."

Mr. Robinson's lectures have been already partly published in our columns. They are very elaborately descriptive and historical, and may be consulted for the details which are given of a wide experience both as owner and hirer of steam tackle.

Examples of Labourers' Cottages, with Plans for Improving the Dwellings of the Poor in Large Towns.

By John Birch, Architect. T. Pettitt & Co., 23, Fifth Street, Soho.

This is a pamphlet of 40 pages and 20 plates, giving a number of cottage elevations for the country and wise plans for labourers in towns. The former have rather a flashy look given to them by roofs excessively steep, unnecessary gables, and fanciful chimney stacks. They have, however, been erected in large numbers, and some of the simpler looking are not unpleasant. It is, however, in the allotment of the spaces within the walls that the practical guidance of the cottage architect is wanted, and of but little exact information is given.

The kind of description appended to the several sketches will be gathered from the following example, describing a design for a pair of agricultural labourer's dwellings, to which was awarded the Society of Arts' medal and premium:—

"This design for a pair of improved dwellings for the accommodation of the labouring classes was approved of by the Council of the Society of Arts from 134 designs submitted in competition, assisted in their decision by the judgment of three professional gentlemen.

"Each dwelling contains a living room, three bedrooms, entrance porch, scullery, pantry, fuel store, pigery, privy, cesspit and ashpit; each scullery is fitted with a washing tub, sink, and a fireclay baking oven; the living room fireplaces have ranges, and are fitted on each side with dwarf cupboards, with bookshelves over them; the bedroom fireplaces have fireclay cottage grates. The system of warming and ventilating hereafter described has been applied to several of these dwellings.

"Each pair of cottages have a well for hard water supply, and the rain water from the roofs is conveyed to tanks for domestic use, having pumps fixed over the sinks in sculleries.

"The dwellings have been for the most part built of brick, and the roofs are covered with tiles, the external walls being constructed hollow (in two thickness of brickwork, with space between) to prevent damp, and are plastered and coloured; the sculleries are fitted with toilet rollers and plate racks, and the pantries have stone shelves and galvanised iron meat racks.

"The cost of erecting these dwellings in different parts of the country, including water supply, drainage, and fittings complete, and ready for occupation, has varied from £26 to £30 per acre according to the locality, distance of carriage, and rates of wages.

No fewer than 18 localities are named in which these cottages have been erected.

Farm Memoranda.

ABERDEEN SEWAGE FARM.—An agreement exists between the Police Commissioners of Aberdeen and Colonel Knight Erskine's representatives (that gentleman having died a few months ago), on the footing of the sewage being sold to the Commissioners at the rate of £5 per acre per annum to the extent of the land cultivated, the maximum being fixed at 5000 tons per annum per acre. The sewage is leased for nineteen years, and the whole of the land capable of this mode of irrigation there is from 50 to 60 acres. It lies immediately inland from the Old Tin Links, and has a pretty uniform slope, being in this respect admirably adapted for irrigation. It had previously been under ordinary crops. The experiment last season was made on 11 a. 3 r. 20 p., and was thus apportioned in regard to crop:—

Date of Sowing.	Crop.	Extent.
" 1870.		a. r. p.
April 21 ..	Grass, with mixture of Bere ..	3 3 8
" May 10 ..	Do. ..	1 10 12
" 19 June 1 ..	Carrots, Beet, Parsnips, and Mangels ..	2 0 0
" ..	Potatoes ..	1 1 0
" ..	Strawberries ..	2 0 0
June 9-13 ..	Cabbages and Kale ..	1 1 3
		0 0 27
	Total ..	11 3 20

It may be mentioned that the land in question is generally of a dry nature, consisting of a sandy and gravelly subsoil resting mostly on a hard pan. A connection was made between the fields and the general sewerage system of the city by means of an oval brick sewer 3 feet 9 inches by 3 feet in dimensions, and about 160 yards in length, terminating in a covered settling tank. Thence the more liquid sewage passes through a pipe 2 feet in diameter, and so to a system of carrier drains about 2 feet deep by 1 foot 3 inches wide, and sloped sides in proportion, and catch-water drains 1 foot in depth by 15 inches in width. The admission of sewage can be regulated at pleasure; the flow over the land, aided by the lie of the ground, works well; and the catch-water drains run off the water to the main water channel, which conducts the exhausted sewage away in a remarkably pure state into a burn, and thence into the sea. Some delay took place in the preparation of the ground, which accounts for

the late period of sowing above noted. A small quantity of manure besides the sewage was used as a precaution; and the sewage was let on at different periods for about 48 hours at a time, and altogether during the season, so far as we learn, about a dozen times. The grasses sown were Italian Rye-grass, Ayrshire Rye-grass, and a mixture of natural grasses; and the mixture of Bere was to the extent of about a bushel per acre. One crop of grass was cut on July 2, being 72 days after it was sown; a second crop was cut on August 6, 35 days from the first cutting; a third on September 10, exactly at the same interval; and sheep were afterwards turned on to eat off the fourth crop. The first cutting of the grass weighed 144 tons per acre; the second was over this; the third was somewhat lighter than the first; and the fourth crop was—partly owing to the lateness of the season—scarcely equal to the third. The Turnips, Carrots, Potatoes, and Mangels were of first-rate quality and very heavy crops; Beet, good Parsnips, fair Cabbages, poor, owing to the ranker of the soil. Kale, splendid, but few plants. The Turnips, Potatoes, and other root crops sold well; and the yield of the crops will be fully £20 per acre, as compared with perhaps £7 an acre from the same land under ordinary cultivation. These results were attained under some disadvantages, the chief of which perhaps was a prejudice existing against the use—especially of grass—of the produce of sewage irrigation.

Add to this the fact that the soil, as the sewage was unfavourable, and that the operation in preparing the ground kept back the sowing. Encouraged by the results, the representatives of the late Colonel Erskine, under the advice of Mr. G. F. Cruickshank, their factor, have lately taken a contract for preparing the soil of about 324 additional acres for an extension of irrigation operations. This northern portion of the land has been exceedingly favourable for the sewage gravitating over it; and, as sowing will commence immediately, while the irrigation drains are almost formed with a connecting link to the settling tank, the experiment for the present season, if experiment it may be called, will be applied to these 50 acres of good land, and will be watched with interest. We may state that owing to the great expense in cleaning and thinning of root crops, the cultivation of these will this season be abandoned, except a small portion of Potatoes and Turnips, and cauliflower. The ground, however, will be sown with Rye-grass and Oats next year, which was found last season to be too strong. It should be added that at Aberdeen, as elsewhere, the process of irrigation is attended with no bad effect to the neighbourhood in a sanitary point of view. It may be that this is due in a great measure to the diluted state of the Aberdeen sewage, owing to the plentiful supply of water. *Scotman.*

WESTER ROSS: April 12.—The weather has been so dry, that the work of the farm has been carried on for several weeks without any interruption, so that now it is in a more advanced state than it usually is at this season of the year. The whole breadth of Oats has been laid down in first-rate condition, and the earlier sowings will soon be above ground. Barley is also being sown, for which the soil is admirably prepared by the long-continued frost. Potato planting is now proceeding with a fair and agreeable breeze, and is well down. Early in March the weather, for a short time, was uncommonly mild, and grass and Wheat started away in right earnest; but since that time there has been a long continuation of east wind, with keen frost at night, which very much arrested vegetation.

During the last few days the weather has again been milder, and several showers having fallen: Wheat and grass have regained a fresher and more promising appearance. Scarcely any early grass has become quite so late in now is, as keep for stock has become quite scarce. Greatly less than the usual number of sheep came to winter in the low country last autumn, and it was supposed that the Turnip crop would scarcely be consumed, but a bare, long-continued, and unusually intense frost set in, which destroyed a larger proportion of our Turnips than was ever before perhaps experienced by us in any one season; and the result was, that generally the Turnips are now finished, and on many farms were done weeks ago, and with artificial feeding stuffs, have been largely used as a substitute. Besides, there has been such a keen demand for cattle, fat or lean, at prices highly remunerating, that there has been no difficulty in reducing the stock to the desired dimensions. Potatoes, notwithstanding, have greatly fallen in price, and are now selling at from 26s. to 36s. per ton. Stock of all kinds maintain their value, and Wheat is still gradually advancing.

The Week's Work.

APRIL 21. *Wheat* hoe as soon as the land is sufficiently dry for the hoe. It is imperative at all times that the hoe work clear, but doubly so in the spring, for if the hoe is properly handled in dry weather it greatly accelerates growth—the process of tillering and formation of the ear. Much may be done this way to cover the land with a uniform crop. Where there is a deficiency of plant the land may stand an extra dose of artificial manure to force it forward, so as to cover the ground before the dry weather sets in.

Horset-hoe Beans, Peas, Parsnips, Carrots, and Potatoes as soon as they will stand it. It is essential that there be a good season, for to keep this implement going in fine, dry weather, is the shortest and surest way of overtaking the season; on the other hand, horse-hoeing in wet weather retards growth, and encourages disease in the crops, with the growth of weeds. Hoeing the land when wet is also injurious to the healthy action of manure, converting it into food for weeds, instead of food for the crops grown.

Vegetable.—Sow the second seeding for this month as previously directed for sowing, and folding in summer. Work with a good season, and get the seed into the land with sap to start vegetation.

Grass and Clover Seeds finish sowing in southern counties, and in northern sow immediately the Barley and Bere is in. Some sow before the last hoeing, but however lightly the hoe is carried much of the seed is buried too deep. It is better to sow after and roll in, if the crop is not too far advanced for rolling. As a rule, the seed should be sown before the crop is too far advanced, rolling being now essential for the successful working of the reaping-machine. The mixtures are very diversified both as to the kinds and quantity of each. Much depends upon quality. For Rye-grass and Clover, from 30 lb. to 60 lb. of the former, and 12 lb. to 20 lb. of the latter, may be quoted as an example. Good perennial Rye-grass from 15 lb. to 32 lb. per bushel, Italian, 15 lb. The Meadow Fescue and Fescue weigh less, but the number of seeds to the bushel are greater. Thus an ounce of perennial Rye-grass contains 13,700 seeds, Italian 27,000, Meadow Fescue 26,000, and Meadow Poas 243,000.

Lucerne sow. The crop is best adapted for the rich dry calcareous soils of southern counties. The land should be deeply fallowed and manured in the autumn, and then sown and harrowed up to this season, and then drilled with from 10 lb. to 15 lb. to the acre. It is sometimes sown with corn crops, but as they are obnoxious to it, it is better to grow it alone on land expressly prepared for it, and afterwards to keep it clean and free from weeds by hand weeding and hoeing.

Chicory is sown on poor sandy soils as a forage crop. From 12 lb. to 13 lb. of seed will sow an acre, and being sown to 10 inches apart. Chicory is also grown on richer soils as a root crop, for roasting, as a part substitute for Coffee. The cultivation is similar to that for Carrots.

Lucerne grows freely on poor sandy, peaty, and fenney soils. Successful culture depends much upon deep thorough tillage, as the plant only luxuriates in a deep friable soil. Chalky soils are unsuited for its growth. Drill in on the flat, 16 inches apart, 2 bush. of seed per acre, and roll immediately.

Hemp requires a rich fertile soil. If grown after a white corn crop the land should be fallowed and manured in the autumn, so that at this season, smashing and harrowing fine, as directed for Flax, fit it for the seed. From 2 to 3 bush. of seed are either drilled in per acre for horse-hoeing or sown broadcast, and the plants thinned out with the hoe, 16 inches apart, each way. The crop is a smothering one when once it covers the ground. It is not sown in spring the land should get a liberal dressing of rape cake and superphosphate. On the Continent special liquid manures are made for Hemp, consisting of rape cake fermented in sewage, and applied at the time of sowing.

Tassel requires a clean, rather clayey, soil in a thorough state of cultivation. Young plants are raised in a nursery as Cabbage plants for transplanting in autumn for next year's crop; or the seed, from 2 to 3 pecks per acre, may be drilled in sufficiently far apart for horse-hoeing, and thinned out to 8 inches apart in the rows. It is also sown broadcast, and hoed out to a foot apart each way between the young plants.

Mangel Wurzel should now be got into the ground as soon as the weather and state of the land will permit. When the land has been manured in the autumn, the work at this season is comparatively light, as the seed will readily be got in with promise. If the land has not been fully manured in the autumn, with farmyard manure; artificial manures should be applied, and in dry weather in a liquid form, to make up the complement required. If the land has to be manured at the time of sowing, then the several operations require to be performed with the greatest expedition and regularity, so as to get the seed into the land with a little loss of natural sap as possible, and thus secure it from early braiding. The quantity of farmyard manure runs from 6 to 10 bush. should be drilled in lightly with a covering of fine mould not more than half an inch in thickness. It is seldom that the rollers of the seed drill are sufficiently heavy, and therefore a second rolling may be advisable. As to the best kind of manure the Mangel plant is a greater consumer of common salt than any of the other root crops—the percentage being about twice that of Swede; the latter consumes more potash and lime, and superphosphate for the two crops (Mangels and Swedes), farmyard manure requires to be doctored differently. Much depends upon the nature of the land, but generally about 2 cwt. of salt to 1 cwt. of superphosphate may be sown over farmyard manure, provided the salt has not previously been applied to the latter, as it often is.

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NOISELESS LAWN MOWING, ROLLING, AND COLLECTING MACHINES, FOR 1871.

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Every Lawn Mower that is sent out by them is warranted to give entire satisfaction, otherwise it can be returned at once, free of cost to the purchaser. Our Machines have been submitted to numerous practical tests in Public Competition, and have in all cases carried off every Prize that has been given.

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- 1st. Simplicity of Construction, every part being free of access and easily managed.
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Agricultural and Horticultural Society, Hamburg, 1863.

Agricultural and Horticultural Society, Liege, 1861.

Agricultural and Horticultural Society, Namur, 1862.

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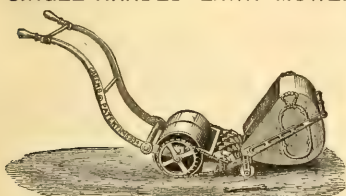
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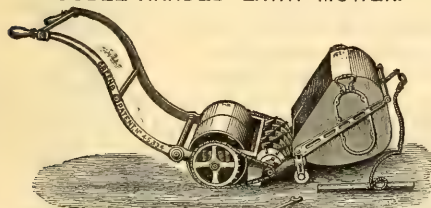
With the increased advantages and facilities we possess for the Manufacture of Lawn Mowers, we are enabled to Sell them at a greatly reduced rate on former years, as will be seen from the following Scale of Prices :—

SINGLE-HANDED LAWN MOWER.



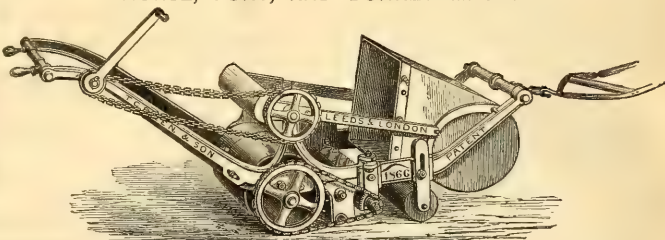
To cut 8 inches	..	..	..	Price £2	10	0
" 10 "	..	..	..	"	3	0
" 12 "	..	..	..	"	4	0
" 14 "	..	..	..	"	5	0

DOUBLE-HANDED LAWN MOWER.



To cut 16 inches	Price £6	0	0	This can be worked by one Man on an even lawn. By Man and Boy.
" 18 "	..	7	0	
" 20 "	..	7	10	
" 22 "	..	8	0	
" 24 "	..	8	10	

HORSE, PONY, AND DONKEY MACHINE.



Prices of Horse, Pony, and Donkey Machines, including Patent Self or Side Delivery Box, Cross Stay complete; suitable for attaching to ordinary Chaise Traces or Gig Harness.

DONKEY AND PONY MACHINES.

To cut 26 inches	..	..	£13	0	0
" 28 "	..	..	15	0	0
" 30 "	..	..	17	0	0
Leather Boots for Donkey	..	..	0	18	0
Ditto for Pony	..	..	1	2	0

HORSE MACHINES.

To cut 30 inches	..	..	£21	0	0
" 36 "	..	..	24	0	0
" 42 "	..	..	27	0	0
" 48 "	..	..	30	0	0
Leather Boots for Horse	..	..	1	6	0

The 26 and 28 inches can easily be worked by a Donkey, the 30 inches by a Pony, and the larger sizes by a Horse; and as the Machines make little noise in working, the most spirited animal can be employed without fear of its running away, or in any way damaging the Machine.

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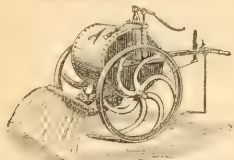
PHYTOSMEGMA.

or, PLANT CLEANSER.

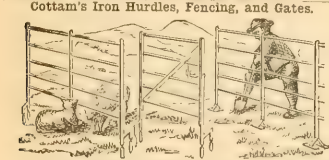
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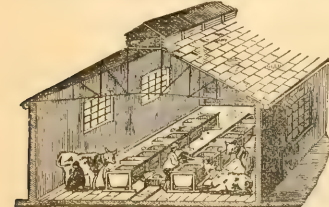


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Their advantages are—Portability, not broken, removable at pleasure; no Woodwork or Partitions to impede Ventilation or breed Vermin; Hay Rack dispensed with as unnecessary; no raised width and depth of Feeding Troughs, Water Cisterns, and Patent Drop Cover to prevent over-couping. Cleanly, durable, and impervious to infection, being all of iron. Price of Fittings per Cow, 55s. Prospectuses free of COTTAM AND CO., Iron Works, 5, Winsley Street (opposite the Lambton), Oxford Street, London, W., where the above are exhibited, together with several important Improvements in the construction of the same, as ordered by Patent.

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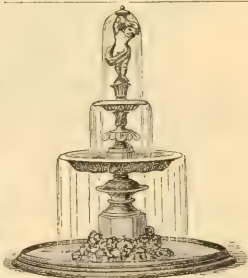
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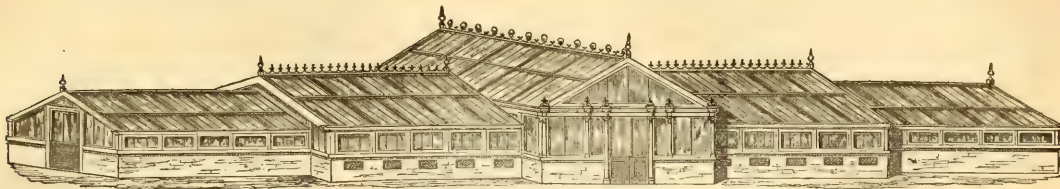
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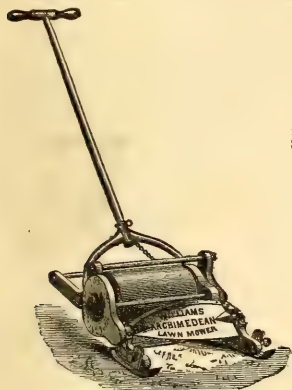
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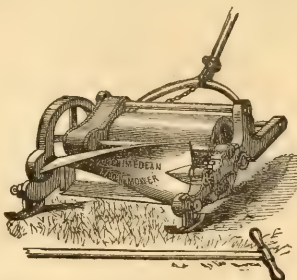
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THE GARDENERS' CHRONICLE AND AGRI-CULTURAL GAZETTE.

No. 17.—[1871.]

SATURDAY APRIL 29.

{ Registered at the General Post Office as a Newspaper. } Price 5d. POST FREE, 5½d.

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THE VOLUME FOR 1871, now ready. Price, in cloth, 3s. 6d. W. RICHARDS, 41, Wellington Street, Strand, W.C.	
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CABBAGE PLANTS.—Strong Robinson's Ox-Cabbage plants, at 3s. 6d. per 1000; also Entell Market and Battersea Cabbage plants, at 5s. per 1000, package included. Reference to unknown Correspondents.
W. VIRGO and SON, The Nurseries, Womersley, near Guildford.

GIANT ASPARAGUS PLANTS, the best that money can procure, at 1s. per plant, per 100. Extra strong SEASIDE, 2s. per dozen. Delicious Vegetable does not require half the expense usually incurred in planting it. See RICHARD SMITH'S SEED LIST for 1871.

Extra strong SEASIDE, 2s. per dozen. RICHARD SMITH, Nurseryman, Worcester.

New and Unadulterated Seeds.

BUTLER, MCCULLOCH AND CO.'S SPRING CATALOGUE is now ready. In addition to the General Lists of Vegetable and Flower seeds, it contains Select Descriptive Lists of all the new, rare, and choice vegetable and Flower seeds of the present season. Sent free and post paid on application.

27, South Row, Covent Garden Market, London, W.C.
Established upwards of a Century.

NEW BEDDING CALCEOLARIA. PRINCESS LOUISE.—It is of dwarf bushy habit, growing from 6 to 8 inches high. The flower stems are short but stout, and carry the trusses of blossom above the foliage; trusses large and very compact; the blooms, which are larger than those of any other yellow bedding Calceolarias, being closely set together. Colour, pure sulphureous-yellow, very effective.

PETER LAWSON AND SON are now booking orders for Plants to be delivered in May, price 2s. per dozen, or 3s. per 100, with the usual discount to the Trade. Price per 1000 upon application. Copies of Testimonials received by the Raisers, Mr. McMillan, Erskine Gardens, may be had on application—Edinburgh and London.

Verbenas, Verbenas—6s. per 100, 50s. per 1000.

WILLIAM BADMAN offers well-rooted Cuttings of **VERENAS**—Purple, White, Scarlet, Rose, Crimson, &c., at 6s. per 100, 50s. per 1000; in single pots, 1s. 6d. per dozen, 12s. per 100. **LOBELIA SPECTIOSA** (true), strong plants from cuttings, 3s. 6d. per 100, 25s. per 1000.

GERANIUMS—*Verisavus*, Lord Derby, Madame Témoin, William Pfrizer, established plants, in single pots, 2s. 6d. per dozen, 5s. per 100; Crystal Palace Gem, finest Golden-leaved Geranium, 2s. per dozen, 15s. per 100.

HELIOBOLE, finest dark varieties, 6s. per 100, from stores.

AGERATUM, Imperial Dwarf, strong, 5s. per 100. Package included. Terms cash. Post-office order on Gravesend. Cemetery Nursery, Gravesend.

E. G. HENDERSON AND SON

offer the following:—

NEW BEDDING VERBENA, BASILISK.

Up to the present period raisers of the Verbena appear to have aimed at novelty in feature, or size of flower, rather than the production of first-class varieties in any given section of colour, or adaptation to the highest purposes of garden decoration. As an exception, E. G. HENDERSON & SON now offer a variety, the colour of which embodies the highest features of excellence in the old varieties, with the most desirable improvements in habit and bloom known at the present period, the variety above named being of the scarlet section, and uniting the most brilliant colour of V. Melindres with the erect branching habit and profuse bloom of V. Purple King. The flower truss is large, well formed, and of great depth; well expanded, of good substance, and opening to the centre. For large beds, secondary groups, belts and ribbon rows, it will be found the most effective kind in its class ever offered, and adapted for the most extensive planting in all favourable aspects of situation, exposure, and soil.

This fine variety is not a casual production from the present race of scarlets, but the genuine offspring from a true cross with the original species, V. Melindres.

For six postage stamps a Coloured Plate will be sent, immediately on being received from the Artist.

Orders received to be executed early in May.

3s. 6d. each; 6 plants, 15s.; 12 plants, 27s.

THALICTRUM ADIANTOIDES.

Amongst the very numerous species of perennial herbaceous plants presenting a wonderful diversity of feature to the varied aspects of a flower garden, as well as in their suitable adaptation in the decoration of classic designs and art-structures, there is perhaps not a single species which rivals the present plant for its beautiful symmetry in leaf structure throughout the summer months. It is a very elegant hardy perennial, rising with a slender, yet firm erect stem, from 12 to 18 inches in height, and in mature growth nearly equal in diameter, of a neat branching habit. From the terminal and lateral growth, the gracefully tripartite leaves diverge to an almost horizontal outline, each multifid leaf being formed of numerous short evenly expanded wedge-shaped leaflets, attached by exceedingly fine thread-like pedicels or foot-stalks, which, as they spread their tiny surfaces to the sun, may not inaptly be compared to a group of fairy-like summer leaf screens. Though perfectly hardy, standing any degree of cold, thriving in all ordinary garden soils, requiring no artificial support, and adapted to the most luxuriant and select flower beds, in delivery of structure it rivals the finest species of exotic Adiantums or Maiden-hair Fern, by the exquisite beauty of its leaf fronds; and by its remarkable adaptation for enduring a warm room, and exposure to the open air in a cut state, it is unequalled by any other plant, even by the best known Ferns, for a back shield or framework to the most select drawing-room, hand, or dress bouquet; for these designs it retains its freshness and verdure beyond any other known species.

5s. each; 6 plants for 25s.

For descriptions of the **BEDDING PANSY** of the season,

QUEEN OF SCOTS,

and the two **WHITE BEDDING AGERATUMS**,

WHITE TOM THUMB and **WHITE IMPERIAL DWARF**.

see *Gardeners' Chronicle*, April 1, for the first, and April 15 for the two last.

THE WELLINGTON NURSERY,

ST. JOHN'S WOOD, LONDON, N.W.

SALTER'S NEW JAPANESE CHRYSANTHEMUMS

NOW READY.

SALTER'S AND OTHER

NEW CHINESE or LARGE-FLOWERED CHRYSANTHEMUMS

NOW READY.

For CATALOGUE, with descriptions and prices, apply to

WILLIAM BULL, F.L.S., ESTABLISHMENT FOR NEW AND RARE PLANTS, KING'S ROAD, CHELSEA, LONDON, S.W.

MAGNIFICENT NEW HARDY PRIMROSE.

Introduced by Mr. Robt. Fortune, from Japan.



MR. WILLIAM BULL

HAS THE PLEASURE TO ANNOUNCE THAT

THE LOVELY NEW JAPANESE PRIMULA "P. JAPONICA,"

IS NOW IN BLOSSOM AT HIS ESTABLISHMENT,

And that he will be happy to show it to any one that will favour him with a visit.

Many as are the beautiful plants that owe their introduction to Mr. Fortune, none of them exceed in beauty or usefulness this hardy Primrose, which has withstood the late severe winter in the open ground, at Mr. W. B.'s Establishment, without any protection whatever.

It has been Mr. Fortune's great desire to introduce this charming Primrose ever since his last visit to Japan, but until recently he has always failed to get plants home alive, or its seeds to vegetate. Now, however, Mr. WILLIAM BULL is glad to say it is a *fact accompli*.

ESTABLISHMENT FOR NEW AND RARE PLANTS, KING'S ROAD, CHELSEA, LONDON, S.W.

NEW PLANTS FOR 1871.

BENJAMIN S. WILLIAMS

Begs to announce that on the 1st of May he will offer to the Public

THE UNDERMENTIONED SPLENDID NOVELTIES.

Adiantum Capillus-Veneris crispulum (Moore).

This is a fine robust form of the species; the fronds are upwards of a foot long; very broad, with large crisp bright green pinnae. It forms a very ornamental plant, and is amongst the most distinct and beautiful of its class; succeeding admirably in the cool fernery.

Price 2s. each.

Fuchsia Empress of Germany.

Habit of plant compact, branching, and very free blooming; tube and sepals bright waxy-carmine; the latter well reflexed; corolla very double, being made up of broad even petals, which are pure white.

Price 7s. 6d. each.

Fuchsia Harry Williams.

A thoroughly distinct variety; it is a compact growing plant, and a profuse bloomer; tube and sepals deep rich waxy-scarlet, the latter well reflexed; corolla very double, formed of even and regular petals, which are intense violet, tinged towards the base with carmine.

Price 7s. 6d. each.

Fuchsia Princess Louise.

An elegant dwarf compact variety; tube and sepals large and well reflexed, rich waxy-carmine; corolla large, single, and pure white, formed of broad even petals of good substance.

Price 3s. 6d. each.

Ixora Prince of Orange.

A very beautiful and valuable addition to the genus. It is of free compact habit, the trusses are large and dense; flowers rich orange-red, tinged with violet towards the centre. This variety is distinct in colour from any of the other kinds, and will become a superb plant for home decoration or public exhibition.

Price 3s. 6d. each.

Ixora Williamsii.

This is a superb free-growing plant, and an abundant bloomer, producing immense trusses of large fine flowers, which in colour are of a distinct and glowing reddish-salmon. The profusion of bloom, added to its distinctness of colour, will cause this plant to take first rank amongst the many beautiful forms of this ornamental family.

Price 3s. 6d. each.

Pelargonium Princess Beatrice.

This very fine Golden Tricolor Geranium is one of the best among the many new kinds now used for bedding purposes; indeed, as a bedder it equals Mrs. Fothergill, and is far more brilliant in its markings. It is a good grower, compact, and free branching, leaves smooth, corolla deep green, with a rich bronze and scarlet zone, and a broad uninterrupted gold margin.

Price 10s. 6d. each.

Pelargonium Lord of Lorne.

A first-class variety, of free yet compact habit, producing large trusses of very double and regular flowers, which stand well above the foliage, and are deep scarlet shaded with crimson. One of the best of the double-flowered kinds.

Price 7s. 6d. each.

Passiflora Innesii.

This superb hybrid Passion-flower is a valuable addition to this exceedingly ornamental genus; the stem is quadrangular, smooth, and narrowly winged. Leaves broadly ovate, about 6 inches long, by 5 inches broad; sepals and petals nearly 2 inches long, white, the latter densely dotted with red. The corolla is composed of many rows of long thick filaments, which banded with red at the base, and spotted and mottled with violet about the centre. In addition to the pleasing colour of its large flowers, this variety has the merit of blooming freely when only at a foot high, and is deliciously fragrant. It succeeds admirably treated as a greenhouse climber.

Price 21s. to 42s. each.

Pteris serrulata corymbifera (Moore).

An extraordinary and very handsome variation of the well-known P. serrulata. It grows some 12 inches high, fronds erect, pinnae all much shortened, forming a dense, crisp, bright green corymbiferous head. This variety is not only the fairest removed from the normal type of the species, but is one of the most handsome Ferns in cultivation, and will be found of great general decorative purpose, especially for the Wardian case or dinner-table.

Price 42s. each.

Selaginella rubella (Moore).

This is a very beautiful species, entirely distinct from any other previously introduced. It is a climber, creeping plant, never becoming erect, but densely covering the ground with its branches and bright green leaves. It is eminently adapted for Wardian cases, or forming edgings to walks in the Stove.

Price 10s. 6d. each.

Toxicopneles Thunbergii.

After repeated but unsuccessful attempts to introduce this superb Stove flowering plant to our gardens, I am at last enabled to offer it to public notice, and in doing so I have no hesitation in saying it is one of the choicest of modern introductions. It belongs to the order Apocynaceae, and in habit and general appearance, very much resembles an Ixora. The leaves are opposite, elliptic, and dark green; the flowers are tubular, with a spreading five-lobed limb, pure white, deliciously fragrant, and produced both in large terminal corymbs and in smaller ones from the axils of the leaves, thus forming a dense raceme of bloom, frequently upwards of a foot in length. It will undoubtedly become as general a favourite as Ixora.

Price 63s. each.

Viola cornuta Enchantress.

The present variety is worthy a place in every garden; it is entirely distinct from any other form, and will become one of the finest plants for spring and summer acidifying. It is dense, compact, and free-branched in habit, growing from 4 to 6 inches high, leaves from 2 to 3 inches long. The flowers are 2½ inches in diameter, petals broad and of good shape, ground colour mauve, with narrow yellow eye, surrounded with circles of violet, radiating from the centre.

Price 2s. 6d. each, 24s. per dozen, 70s. per 50 plants, 45s. per 100.

VICTORIA and PARADISE NURSERIES, UPPER HOLLOWAY, LONDON, N.

Choice Tricolor and other Geraniums.
THOMAS PESTRIDGE can now supply for cash—
 For dozen—
 Achievement (Turner's) .. 24 0
 Lucy Grieve .. 12 6
 Sophia Cusack .. 12 6
 Mrs. Turner .. 12 6
 Glen Eyre Beauty .. 12 6
 Charming Bride .. 12 6
 Plants over 3s. per dozen package free. A LIST of other varieties on application.
 The Greenway, Uxbridge.

DR. DENNY'S ZONAL GERANIUMS.—These splendid GERANIUMS will be sent out in May next, at 3s. for the first seven varieties. For descriptions, see WM. PAUL'S SPRING CATALOGUE, free by post.

MR. POSTANS' new white-flowered, white-edged GERANIUMS, SNOW WREATH and VIRGIN QUEEN, price 1s. 6d. each; **WALTHAM BRIDE and AVALANCHE,** 5s. each; the two latter cheaper by the dozen. Also **Red May**, **WILLIAM PAUL**, Paul's Nurseries, Waltham Cross, N.

GEORGE SMITH has much pleasure in offering the following ZONAL GERANIUMS, viz.:
NOSEAGAY GERANIUMS.—MR. GLADSTONE (SMITH)—Extra large truss, colour rich scarlet, shaded with purple, the edges of petals shaded with carnation; the pipe much larger than a crown pipe, and of good substance. G. S. warrants this to be the best Nosegay ever offered. Awarded a First-class Certificate by the Royal Horticultural Society, Liverpool, 1869. Also **Red May**, by the Royal Horticultural Society, open to all England, as the finest Nosegay Geranium yet offered. 7s. 6d. per dozen. **WALTHAM BRIDE** and **AVALANCHE**, 5s. each; the two latter cheaper by the dozen. Also **Red May**, **WILLIAM PAUL**, Paul's Nurseries, Waltham Cross, N.

KINGCRAFT (WINDSON)—Dark carnation-scarlet, with large compact truss, very early and hereafter in profusion; of fine habit, and one of the finest Zonals in cultivation. 5s. each. Where 6 are ordered 7 will be sent, and where 12 are ordered 15 will be forwarded.

THE ABOVE NOVELTIES, in good plants, to be sent out the first week in May.
 TOLLINGTON NURSERY, Hornsey Road, Islington, London, N.

JAMES CARTER, DUNNETT, and BEALE, have the pleasure of offering the following NOVELTIES to the Trade:
PEARL GERANIUM GOLDEN TRICOLOR, ETTIE BEALE—First-class Certificate, Royal Horticultural Society, Kensington. First-class Certificate, Royal Botanical Society, London. A most brilliant coloured variety, with flat, finely shaped, almost circular leaves, beautifully marked with a brilliant carnation zone, interspersed with dark chocolate blotches, and regular narrow golden margin. Each 21s.

PEARL GERANIUM LATERIES (Joy-leaved) DR. SCHONBERG—A very elegant free-flowering kind, with large clusters of rich mauve-purple flowers. Each 5s.

PEARL GERANIUM HYBRID BELLING, LOTHARIO—Of the sweet-scented leaf section, with numerous trusses of rich violet-crimson flowers, with conspicuous black spots on each petal; a bedding plant of the highest quality. Each 5s.

ANTHURUS REGALE, 30s. per dozen; 15s. 10s. per 100.
 " **SCHERZERIANA**, 22s. per dozen; 11s. 5s. per 100.
AGERATUM IMPERIAL DWARF, 12s. 10s. per 100.
 " **TOM THUMB**, 12s. 10s. per 100.
LAESAEUS, 12s. 10s. per 100.

PEKISTROPE **ANTHURUS AUREA VARIEGATA**, 18s. per dozen; 9s. 6d. per 100.
IBERIS LATIFOLIA VARIEGATA, 30s. per dozen.
IBERIS GIBBATA, 18s. 10s. per dozen.
STACHYS CILIATA, 18s. per dozen.
TRICHOM MANGON, 18s. per dozen.

217 and 218, High Holborn, W.C.; and Crystal Palace Nursery, Forest Hill, S.E.

Bedding Geraniums.
ALFRED FRYER offers the following at per dozen for cash—

GOLDEN TRICOLORS.
 Lady Cullen .. 3 6
 Mrs. Pollock .. 3 6
 Sophie Desmareque .. 3 6
 Louise Smith .. 3 6
 " **SILVER TRICOLORS.**
 Italia Viva .. 3 6
 Italian Beauty .. 3 6
 Mrs. John Clutton .. 3 6
 " **SILVER-EDGED IVY-LEAVED.**
 ELEGANT .. 3 6
 A. H. Willis .. 3 6
 " **GOLD and BRONZE.**
 Beauty of Calderdale .. 3 6
 Beauty of Ribblesdale .. 3 6
 Black Knight .. 3 6
 Cleopatra .. 3 6
 Countess of Kellie .. 3 6
 Kenneth Hero .. 3 6
 Mrs. John Todd .. 3 6
 Duke of Edinburgh .. 3 6

DOUBLE FLOWERED ZONALS.
 Andrew Henderson .. 3 6
 Captaine l'Herminette .. 3 6
 E. G. Henderson .. 3 6

Hampers and packing 1s. for a single dozen, 6d. extra for each subsequent dozen. Remittances requested from unknown correspondents. A LIST of other varieties post free.

ALFRED FRYER, The Nurseries, Chatteris, Cambridgeshire.

CLEMATIS GEM.—A new and beautiful hybrid, raised by G. BAKER, Esq., and introduced to the Horticultural Society's meeting at South Kensington, August 17, 1870, by whom it was awarded a First-class Certificate. It is a most profuse bloomer, and continues in bloom until destroyed by frost; colour, rich blue; Stanishish, size of lauginausa. Plants will be sent out the second week in May.

G. BAKER and SON, American Nursery, Bagnath, Surrey.

ROBT. T. VEITCH, the Nurseries, Exeter, respectfully announces that he has now ready for distribution plants of the above fine **WHITE AZALEA**, which obtained a Special Certificate from the Royal Horticultural Society in the Spring of 1870. It was also again greatly admired at their Exhibition held in March last. Can be confidently recommended as a free bloomer, surpassing all other Azaleas in early forcing. Price 1s. 6d. each. Four for three in the Trade. Can also offer the Trade several dozen **LUCILLA GRATISSIMA** and **PINCINIA**, at 2s. per dozen.
 Exeter, April 19.

SEEDS OF EXTRA CHOICE QUALITY.
CALCEOLARIA (SCOTT'S), carefully hybridised from plants 9 to 10 inches in height. Flowers perfect in shape; colour in great variety, including the beautiful mottled and spotted.

CINERARIA (SCOTT'S), extra choice strain .. 1s. 6d.
PANSY, saved from choice show and fancy varieties .. 1s. 6d.
PRIMULA FIMBRIATA, extra choice strain .. 1s. 6d.
PRIMULA FIMBRIATA FILICIFOLIA, the beautiful Fern-leaved .. 1s. 6d.

Both for the number of plants, the beauty of foliage and bloom, I have never had such a sale since I have been a grower. *—Tide Testimonial, see Catalogue.*

WALFLOWER, double, 12 superb varieties, mixed .. 1s. 6d.
 For all other sorts, see also **PALEO**, 1s. 6d. free on application.

SCOTT'S WASH DESTROYER, 1s. 6d. and 2s. 6d. per bottle. J. SCOTT, The Seed Store, York, Somerset.

New Bedding Tropaeolums.
THOMAS THORNTON, Heatheride Nurseries, Jagshol, Surrey, has the pleasure to offer the following new and distinct forms of **BEDDING TROPEOLUMS**, all of which can be highly recommended.

LUSTROUS—A new and distinct form, with all above the dark foliage; very compact habit, and a fine and continuous bloom.

COMPACTUM COCCINEUM MAJOR—Rich orange-scarlet flowers, very long, and of unusually large size; compact habit, very free, and always in bloom.

YELLOW DWARF—A new and continuous bloomer, something like T. compactum luteum, improved in character, but deeper in colour, and having rich crimson spots.

ETNA—A very fine variety, which produces extremely showy vivid crimson flowers, and also a large and fine specimen.

VESUVIUS—Bearing a profusion of rich bright orange-crimson flowers, that are shown up well above the dark foliage of the plants.

Plants, 3s. 6d. each; or the set of five, 15s.
 A very liberal allowance to the Trade, especially for quantities. For further description of these, see *Gardeners' Chronicle* for October 19, 1870, and "Gardeners Year Book for 1871."

Choice Flower Seeds.

JAMES VEITCH and SONS,
ROYAL EXOTIC NURSERY,
KING'S ROAD, CHELSEA, S.W.

PRIMULA SINENSIS FIMBRIATA ALBA .. Per packet—4s. 6d.
 " **" RUBRA** .. 4s. 6d.
 " **" CHOICE MIXED** .. 4s. 6d.

The above Primulas are saved from the best fringed and most perfectly formed flowers, and cannot be surpassed in quality.

Our Primulas were awarded a Special Certificate R.H.S., February 15, 1871, for superior quality.

CALCEOLARIA—James's choice strain .. 1s. 6d.
 " **" From the Dalkeith collection** .. 1s. 6d. and 2s. 6d.
CINERARIA—Saved from a first-class collection .. 1s. 6d. and 2s. 6d.
CYCLAMEN PERSICUM—Price extra .. 1s. 6d. and 2s. 6d.
 Awarded a Special Certificate R.H.S., Feb. 15, 1871.

POLYANTHUS—Very choice, saved from finest gold-laced flowers only .. 1s. 6d. and 2s. 6d.
ANTIRRHINUM—From the finest varieties .. 1s. 6d. and 2s. 6d.
 " **" Cox's collection of 18 varieties, separate** .. 1s. 6d. and 2s. 6d.

ECHEVERIA METALLICA, fine new seed .. 1s. 6d.
BALSAM—Camellia-flowered, choice mixed .. 1s. 6d. and 2s. 6d.
CAROLINE—Choice mixed, double .. 1s. 6d. and 2s. 6d.
PICOTE—First quality, choice mixed .. 1s. 6d. and 2s. 6d.
 " **" Collections of 12 varieties, separate** .. 1s. 6d. and 2s. 6d.

PINK—Choice mixed, from finest laced varieties .. 1s. 6d. and 2s. 6d.
GLOXINIA, drooping .. 1s. 6d. and 2s. 6d.
 " **" From our own splendid** .. 1s. 6d. and 2s. 6d.
HYDRANGEA—Choice mixed, from collection .. 1s. 6d. and 2s. 6d.

HYDRANGEA—From choicest named flowers .. 1s. 6d. and 2s. 6d.
 " **" 12 varieties, separate** .. 1s. 6d. and 2s. 6d.
HUMEA ELEGANS PURPUREA, new and fine .. 1s. 6d. and 2s. 6d.

MYOSOTIS DISSEITIFLORA, fine for spring gardening .. 1s. 6d. and 2s. 6d.
PANSY—Choice mixed, from English show varieties .. 1s. 6d. and 2s. 6d.
 " **" Belgian or Fancy** .. 1s. 6d. and 2s. 6d.

STOCKS—East Lothian, per collection of three colours (scarlet, purple, and white) .. 1s. 6d. and 2s. 6d.
STOCKS—Brompton, collection of 12 varieties .. 1s. 6d. and 2s. 6d.

SWEET WILLIAM—Bragg's Improved, finest mixed .. 1s. 6d. and 2s. 6d.
WALLFLOWER—Double German, finest mixed .. 1s. 6d. and 2s. 6d.
 " **" 12 varieties, separate** .. 1s. 6d. and 2s. 6d.

New and Choice Flower Seeds, Post Free.
B. S. WILLIAMS & SONS, NURSERYMAN and SEED MERCHANT, Victoria and Paradise Nurseries, Upper Williams, London, N. Per packet—4s. 6d.

Williams' superb strain of **PRIMULA**, Red, White, or Mixed .. 1s. 6d. and 2s. 6d.
 Plants from this seed have always been awarded First Prizes wherever exhibited.

Neill's extra choice CALCEOLARIA, 1s. 6d. and 2s. 6d., and 3s. 6d. and 4s. 6d.
Weatherill's extra choice CINERARIA, 1s. 6d. and 2s. 6d., and 3s. 6d. and 4s. 6d.
 Williams' superb strain of **BALSAM**, 1s. 6d. and 2s. 6d., and 3s. 6d. and 4s. 6d.
Wiggins' prize strain of CYCLAMEN .. 1s. 6d. and 2s. 6d., and 3s. 6d. and 4s. 6d.
ACACIA RICEANA, the most beautiful of all the Acacias .. 1s. 6d. and 2s. 6d.

AGAVE DENSIFLORA, fine for subtropical work .. 1s. 6d. and 2s. 6d.
ANTHRUS BICOLOR RIVER, new .. 1s. 6d. and 2s. 6d.
CORONIS, PRINCE OF WALES, very ornamental .. 1s. 6d. and 2s. 6d.

CAULOECA CLEMENTIS, superior to C. candidissima, new .. 1s. 6d. and 2s. 6d.
CAREOPSIS AKISTONA, new .. 1s. 6d. and 2s. 6d.
ECHEVERIA METALLICA .. 1s. 6d. and 2s. 6d.
GLAXINIA, Drooping varieties .. 1s. 6d. and 2s. 6d.

GRINDELIA HIRSUFLORA, new .. 1s. 6d. and 2s. 6d.
GOETITIA WHITEVEIL, the largest of all the Goetities, new .. 1s. 6d. and 2s. 6d.
HELENIUM GRANDIFLORUM, new .. 1s. 6d. and 2s. 6d.

HOLLYHOCK, from Chatter's finest varieties .. 1s. 6d. and 2s. 6d.
HUMEA ELEGANS PURPUREA, new .. 1s. 6d. and 2s. 6d.
HYDRANGEA, new seed .. 1s. 6d. and 2s. 6d.

LEPTOSIPHON ROSEUS, very pretty, new .. 1s. 6d. and 2s. 6d.
Parson's new WHITE MIGNONETTE .. 1s. 6d. and 2s. 6d.
PAULUS NEUBERGER, new, strongly recommended .. 1s. 6d. and 2s. 6d.

MYOSOTIS SYLVESTRIS, true .. 1s. 6d. and 2s. 6d.
POLYANTHUS, Wiggins' prize strain .. 1s. 6d. and 2s. 6d.
PERFUMED GOLDEN FEATHER .. 1s. 6d. and 2s. 6d.

East Lothian STOCKS, per collection of three colours .. 1s. 6d. and 2s. 6d.
SOLANUM HYBRIDUM COMPACTUM, new, awarded a First-class Certificate by the Royal Horticultural Society, March 10, 1870 .. 1s. 6d. and 2s. 6d.

STYLIS, WILLIAM, Humm-hum-seed .. 1s. 6d. and 2s. 6d.
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STYLIS, WILLIAM

THOMAS CRIPPS & SON,

NURSERYMEN, TUNBRIDGE WELLS, KENT,

Have great pleasure in announcing, that on and after the 1st of May they intend distributing the first three varieties of their magnificent strain of PERPETUAL BLOOMING

HARDY HYBRID CLEMATISES.

Introduced to public notice as far back as August, 1866, the highest encomiums have been since then bestowed on them by eminent horticulturists who have seen them growing in our Nursery. The varieties we now offer, being quite distinct from all others, must eventually rank amongst the most attractive of this very beautiful and deservedly popular race of Hardy Climbers. They commence blooming towards the end of May, and continue in flower until the buds are destroyed by frost. Each kind is very free blooming, and has been awarded a First-class Certificate by the Floral Committee at South Kensington, the only place (excepting our local exhibition) at which they have hitherto been exhibited.

C. LADY CAROLINE NEVILL.

Fine well-formed *lanuginosa*-like flowers, from 6 to 7 inches in diameter; colour delicate bluish white, with a broad purplish-lilac longitudinal band in the centre of each petal; foliage and growth of *C. lanuginosa*.

C. STAR OF INDIA.

Flowers 4 to 5 inches in diameter; colour rich violet-purple, with a rosy-purple band in the centre of each petal; foliage and growth of *C. Jackmanni*. This is undoubtedly the most effective of the dark-flowered hybrids.

C. TUNBRIDGENSIS.

Flowers 4 to 6 inches in diameter, and of the most perfect form; colour dark blue, shaded with purple, mid-rib dark purple. This is also of the *Jackmanni* class; it is a very abundant bloomer, and will make a most useful bedding plant.

From numerous flattering Testimonials, we select the following:—

"The blooms of your new Clematises were received in the most perfect condition, notwithstanding the long journey by railway, detention at the station, and the very intensely hot weather. They certainly appear to possess a brilliancy of colour unequalled by any other varieties, great substance, with faultless shape; several of the intense bluish purples are quite new in colour, the same may be said of the whites, and we think a finer collection of blooms were never seen. We are quite certain that, when known, they will be sought by all lovers of this most useful class of plants."—Messrs. JOHN WATERER & SONS, *American Nursery, Bagshot, September, 1870.*

"Thanks for cut blooms of your Clematises; they are certainly distinct and good, and from appearances they are a distinct strain from ours. I should imagine from the petals that they partake mostly of the blood of *C. lanuginosa*, but as you sent no foliage with flowers, I am not certain upon that point."—Messrs. GEORGE JACKMAN & SON, *American Nursery, Woking, September 29, 1869.*

"I derived much pleasure from a hasty visit to this well-known Nursery. The seedling Clematises particularly attracted my attention; for form and beauty they cannot be equalled.... The exquisite form of the flowers is unrivalled."—X., *Journal of Horticulture, August 6, 1868.*

"But where are the varieties of *C. lanuginosa* which were shown in the spring of 1866, by Mr. T. Cripps, of Tunbridge Wells? I have not heard of any one having seen them since, nor do they appear to have been exhibited; it was predicted of them that they would beat Jackman's strain. I remember there were two beautiful varieties shown, viz., Lady Caroline Nevill, delicate lavender, with a dark stripe (fancy a flower of *C. lanuginosa* with a dark stripe up each segment—how very attractive it must be),

and *C. Tunbridgensis*, reddish-purple, with a blue stripe up each segment—a novel and beautiful flower."—Mr. R. DEAN, in the "*Gardener*," September, 1867, p. 359.

"Mr. T. Cripps, of Tunbridge Wells, has most effectually broken the silence I referred to on page 359, for at the meeting of the Floral Committee of the Royal Horticultural Society, on October 1, he literally electrified the horticulturists present with the superb collection of the beautiful new forms of the Clematis he produced; and it certainly can be said, with the fullest truth, that the year 1867 has produced rich and varied forms of the Clematis, to such a degree of perfection and extent of variation, as to almost necessitate the closing of the chapter of their history for a brief space. I take it to be highly probable that Messrs. Jackman and Cripps have been working, as it were, in parallel lines of improvement, but the *modus operandi* has differed, in regard to the particular impress left on the new seedling varieties by the species or varieties used in the creation of a new progeny. That *C. lanuginosa* has been used by both raisers is beyond doubt; but while Jackman's appear to have got more of the *C. viticella* habit infused into their plants, Mr. Cripps would appear to have more of *C. lanuginosa*, yet both sets are allied to flowers of *C. lanuginosa* build.... As a further probable proof of their partaking mostly of the character of *C. lanuginosa*, it may be stated that there were only two really dark flowers, and these were hybridised seedlings of *C. viticella*. The darkest of these twin was Star of India, the prevailing hue of colour violet, with a reddish band up each segment of the flowers, not unlike Jackman's Rubella in appearance, but with a greater depth of colour. This was a splendid flower, and received a First-class Certificate."—Mr. R. DEAN, in the "*Gardener*," November, 1867.

One Guinea each.

NEW PURE WHITE BEDDING LOBELIA, "PURITY."

We have acquired the stock of this very desirable novelty from Mr. Chambers, of Beddington, by whom we are informed that it is the result of successive sowings of seed saved from the lightest blooms of a cross between *L. speciosa* and *L. Paxtoni*. Three plants which flowered during the past summer were of the purest snow-white; from these *Purity* has been selected, as containing every necessary quality, viz., dense dwarf habit, large finely-formed flowers, hardness of constitution, and profuseness of bloom.

The *Gardeners' Chronicle*, of January 28, 1871, says:—"In *Lobelia erinus* species *Purity*, there is much reason to believe a decided advance has been made towards a useful white bedding Lobelia. Hitherto such white Lobelias as Snowflake, Miss Murphy, and Queen of Whites, have fallen very short of what was desired; while the

so-called white forms of *L. speciosa* have always had more or less of a blue tint in the flowers. In Mr. Chambers' variety, *Purity*, there was observed all through the summer an entire absence of the blue tint, and when it was shown in London it was in bad condition. I have no hesitation in recommending it."

Plants, 3s. 6d. each.

CATALPA SYRINGÆFOLIA AUREA.

We have peculiar satisfaction in introducing this as the most valuable hardy ornamental-foliaged tree that has been sent out for several years. The *Catalpa syringæfolia* being too well known to need description, we will merely state that the variety we are now about to distribute has the same robust growth and habit as its parent, but with foliage of rich glossy yellow—not a pale sickly straw colour, but a deep golden yellow, suffused with green near the principal veins (as in the *Pyrethrum Golden Feather*). Planted in the full sun, its beauty becomes far more satisfactorily developed than in a shady situation, and the leaves will neither curl nor burn, as is the case with many yellow-leaved and variegated plants. It originated on the Continent, and, although raised from seed three years ago, it has remained very true, which we trust will prove an ample guarantee of its constancy, and also of its value as an indispensable addition to our already extensive list of Ornamental Trees.

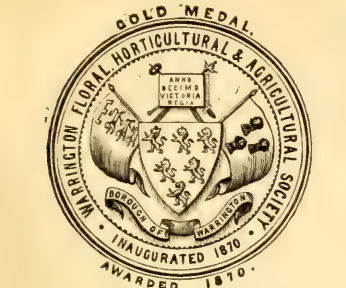
"A fine bold golden-leaved tree.... Should it permanently retain this valuable characteristic, it will make a grand pictorial tree in landscape scenery."—*Gardeners' Chronicle*, August 20, 1870.

"To the highly interesting and valuable group of hardy pictorial trees, *Catalpa syringæfolia aurea*, exhibited by Messrs. Cripps & Son, and awarded a First-class Certificate, will be an excellent addition, the large bold leaves having quite a deep golden hue."—*Florist and Pomologist*, September, 1870.

Plants in Pots, One Guinea each.

Coloured Drawings of the *Catalpa*, or either of the Clematises, may be had for 12 stamps.

For Trade terms see our WHOLESALE CATALOGUE 1870-71.



W. E. DIXON
BEGS TO CALL ATTENTION TO HIS
SPLENDID COLLECTION OF STOVE
AND
FINE FOLIAGE PLANTS,
ORCHIDS, TREE FERNS, HEATHS, AZALEAS,
CAMELLIAS, AND NEW HOLLAND PLANTS.
In Specimens, Half and Quarter Specimens, &c.,
unequalled in the Trade for health or variety.

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RHYNCHOSPHERUM JASMINOIDES, var.	1 6
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BOUVARDIA LONGIFOLIA	0 0
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GENETIVILLIS TULIPIFERA	10 6
PHENOCOMA PROLIFERA BARNESII	10 6
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" AMILIA	10 6
" EXIMIA	10 6
" GEMIFERA ELEGANS	10 6
" FICULOIDES	10 6
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BEDDING GEBANUMS.	Doz.—s. d.
Fine Plants and fine kinds	3s. to 6 0
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VERBENAS, fine kinds	3 0
GOLDEN FEATHER PYRETHRUM	3 0
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STOVE PLANTS.	Each.—s. d.
ALOCASIA FERNSEI	1 6
ANTHURUM SCHEERERIANUM.—Plants of this magni- cent perpetual flowering stove plant, 71. 6d., 10s. 6d., 12s., and 24. Fine plants, 4s. 6d. to 9 guineas.	1 6
Of the above, W. E. D. holds a fine stock of flowering plants, especially one grand specimen, which created such a sensation amongst the lovers of Horticulture in South Kensington last week.	1 6
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PASSIFLORA TRIFASCIATA, fine	1 6
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FERNS.	Each.—s. d.
PTERIS SCABERULA	1 6
TODIA PELUCIDA	5 0
TRICHOMANES RADICANS	5s. to 10 0
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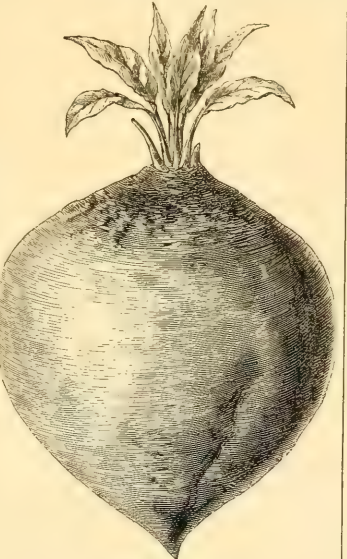
The above have, in open competition against all comers,
won over 300 First at the principal Exhibitions, includ-
ing the Warrington Gold Medal, &c.
W. E. D. would invite an inspection of his General
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ANTHURUM SCHEERERIANUM, and IXORAS,
all sizes; and also a remarkably fine selection of really
strong and well hardened BEDDING PLANTS suitable
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Full particulars furnished on application.
W. E. DIXON, BEVERLEY, YORKSHIRE.

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"THE ROYAL SEEDSMEN"
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GENUINE SEEDS.
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CARTER'S PRIZE MANGEL
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YELLOW GLOBE MANGEL	Per lb.—s. d.
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Much Cheaper by the Bushel or Cart.
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An immense cropper, with fine top, 10d. per lb.
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FOR ALL SOILS. CARRIAGE FREE,
As used at Aldershot, Chertnam, Woolwich, Hilsae,
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FOR PERMANENT PASTURES.
FOR ORDINARY SOILS, best quality, 27s. to 30s.
per acre; second quality, 20s. to 24s. per acre.
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per acre; second quality, 20s. to 26s. per acre.
Reduced Rates for quantities of more than ten acres.
For full descriptions see CARTER'S ILLUSTRATED FARMER'S
CALENDAR, sent Gratis and Post Free.
JAMES CARTER AND CO.,
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A Great Reduction in Price.
CHEAP BARGAINS for the BEDDING SEASON.
LEWIS WOODTHORPE begs respectfully to in-
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instances much more. Revised Descriptive CATALOGUE free by
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Novelties for 1871.
DAHLIAS.—KEYNES' first-class variety, consisting
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DAHLIA, MARCHIONESS OF BATH (WHEELER'S).
J. KEYNES has purchased this beautiful flower. White-tipped
purple. First-class Certificate. Price 6d. per plant.
Caste Street Nursery, Salisbury.

Russell's Pyramid Primula.
GEORGE CLARKE has this season secured a
quantity of the very fine strain of excellent condition, which he
recommends, feeling assured that no other possesses such a robust
character, with really splendid flowers. Mixed, Red and White,
3s. 6d. per pk. Instructions for raising and growing sent if required.
Nurseries: Streatham Place, Brighton Hill, London, S.W.; and
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TROPÆOLUM, MINNIE WARREN.—A beautiful
variegated plant, of the highest excellence for the decoration of
the flower garden. The leaves are green, blotched and broadly edged
with pale cream. Fabii dwarf-sprigged variety of the highest
merit, by receiving three First-class Certificates in the past season.
To be sent out in May next at 10s. 6d. each, or 10s. 6d. per doz. for 4s.
Orders booked and executed in strict rotation. A Coloured Plate may
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JOHN CATTELL, Nurseryman, Westeham, Kent.

Vegetable, Agricultural, and Flower Seeds,
MISCELLANEOUS PLANTS, SUITABLE FOR BEDDING AND
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ROBERT PARKER begs to announce that his
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in cultivation of the above-named is now published, and will be
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Each Catalogue sent by post, 1s. 6d. in postage stamps.
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Forest Trees, Ornamental Trees, and Shrubs.
PETER LAWSON AND SON have to intimate that
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The stock of Seedling and Transplanted LARCHES, SCOTS
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WOOD AND INGRAM offer fine plants, established
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SEMPERVIVUM CALIFORNICUM, 2s. 6d. per doz.; 1s. per 100.
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LILIUM AURATUM, fine growing plants, to flower this season.
12s. to 18s. per dozen.
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CANTIONS, Self and Glove, various, per dozen pairs, per dozen
pairs, 10s.
WOOD & INGRAM'S NEW SPRING CATALOGUE OF
PLANTS is now ready, and will be sent post free on application.
The Nurseries, Huntingdon.

MANCHESTER BOTANICAL AND
HORTICULTURAL SOCIETY
GRAND ANNUAL HORTICULTURAL EXHIBITION, 1871.
MAY 26 TO JUNE 2. Military Bands each day.
THE EXHIBITION WILL OPEN ON FRIDAY, MAY 26, at 2 P.M.
Admission, 10s. 6d. each; May 27, 2d. each; Whit-Monday and
remaining days, 1s. each.
Gardens will be admitted by Tickets as follows:—On Friday,
May 26, 2d. each; Saturday and remaining days, 1s. each. Ap-
plication for these Tickets must be made on or before May 25.
NOTICE TO EXHIBITORS.—ENTRIES CLOSE ON MAY 16.
Botanic Garden, Manchester. BRUCE FINDLAY.

Noteworthy Horticulturists and Botanists.
NOTICE.—A SERIES OF PORTRAITS of
1. NOTEWORTHY HORTICULTURISTS and BOTANISTS
is being published in the GARDENERS' CHRONICLE and
AGRICULTURAL GAZETTE. The following have already
appeared, and copies may be had on application to the Publisher, viz.:—
Stowe, C. B. & K. Wilson, SAUNDERS.
M. J. BERKELEY, F.L.S., M. DECAISNE, and G. F. WILSON, F.R.S.
A Portrait of Professor REICHERT, of Hamburg, will shortly
appear.
Published by W. RICHARDS, 41, Wellington Street, Covent Garden.

The Gardeners' Chronicle
SATURDAY, APRIL 29, 1871.
MEETINGS FOR THE ENSUING WEEK.
MONDAY, May 1.—Royal Horticultural (Fruit and Floral
Committees), at S. Kensington. 1 P.M.
WEDNESDAY, 3.—Ditto (Scientific Committee). 1 P.M.
Ditto (General Meeting). 3 P.M.
THURSDAY, 4.—Linnean. 8 P.M.

THE INTERNATIONAL EXHIBITION to be
opened on Monday next will be in many re-
spects different from those which have preceded it.
In 1851 the grandeur and novelty of the scheme,
the elegance of the building (PAXTON'S triumph),
and the marvellous interest of its contents, all
contributed to raise a feeling of exultant satisfac-
tion and buoyant hope, in some respects sadly
belied by what has followed. In 1862 another
gigantic exhibition was held, but the novelty had
worn off, the bazaar or warehouse element was
painfully obtrusive, and the building itself was ugly
in spite of its admitted suitability for its purpose.
The death of the PRINCE CONSORT, the presid-
ing genius of the first, as of the second Exhibi-

— Among the garden names which are apt to occasion confusion there is one which is noticeable just now, when the plant to which it applies is in request. This is SPIRÆA JAPONICA, known to botanists as

Astilbe or *Hotela japonica* or *barbata*. We observed only a week or two since, in a contemporary, an article upon *Spirea*, in which this plant was noticed under the name first given above. The error doubtless arose from the fact that, on the introduction of the plant, it was figured in the Botanical Register for 1837, t. 2011, as *Spirea barbata*, a name given to it by Dr. WALLICH, who discovered it in Nepal. As had been previously shown by DECAISNE and MORREN, it is not only no *Spirea*, but not even rosaceous, belonging to the neighbouring order, Saxifragæ. These authors founded upon it a new genus, *Hotela*, commemorating a Japanese botanist, Ho-Tei, with the specific name *japonica*, which they showed to be allied to Don's genus *Astilbe*, from which it differed in the presence of petals, as well as in other less obvious particulars. HOOKER and BENTHAM however, in the "Genera Plantarum," have united these genera, so that our plant should be named *ASTILBE BARBATA*, the latter being the older specific name as well as the more characteristic, in allusion to the cluster of long, stiff hairs, which may be observed at the base of each petiole. The general appearance of the plant, which recalls *Spirea Aruncus*, as well as its having been figured as a

ranged from 65°.2 at Leicester to 49° at Newcastle, showing a range of more than 16°, and in Scotland from 58°.6 at Glasgow to 49° at Dundee, giving a range of 9°.6. The mean for England, as deduced from the observations taken at the several stations, was 60°.5, and for Scotland was 53°. The extreme MINIMUM TEMPERATURES in England gave but little range, 42° at Portsmouth and 36° at Hull being the extremes; the mean for all stations was 39°.8, or 6°.6 above the mean of the several stations in Scotland, where 36° at Greenock was the highest and 31° at Edinburgh the lowest minimum. MEAN TEMPERATURES. The highest mean temperature recorded at any station in England was 50°.3 at Portsmouth, the next in order being 50° at Blackheath; the lowest were 41° at Newcastle, and 44°.4 at Hull. In Scotland the highest was but little above the lowest in England, and the lowest was nearly 4° below the mean temperature at Hull. The mean for England was 47°.5, and for Scotland was 39°.6; thus the southern country was 8° warmer than the northern. RAINFALL.—Although England can claim some large falls during the week, as 2.26 inches (at Birmingham) and 2.06 inches (at Portsmouth), yet in Scotland these are surpassed by a

produced tubers of the same kind with those from which itself was developed. If a change occurs, says Prof. REGEL, it is to be attributed to reversion, and not to any process of graft-hybridisation. Prof. REGEL quotes some experiments of M. BOUCHÉ, of Berlin, on Potato grafting, which were equally unsatisfactory.

THE FLORAL AVENUE IN REGENT'S PARK.

THE accompanying illustration (fig. 106) is a representation of the chief walk or promenade in Regent's Park, leading from the gardens of the Zoological Society to Marylebone Road. It forms, as will be seen, an avenue of great beauty, and is the work of Mr. Markham Nesfield. Originally it consisted of a double row of Chestnuts, which grew too closely together to be suitable for the situation. Few of the improvements in the parks have been more appreciated than this floral walk and promenade, leading, as it does, to and from one of the most fashionable as well as instructive gardens not only in London, but in the world, viz., the Zoological Gardens. By-the-by, when passing through these gardens the other day, the thought struck me that

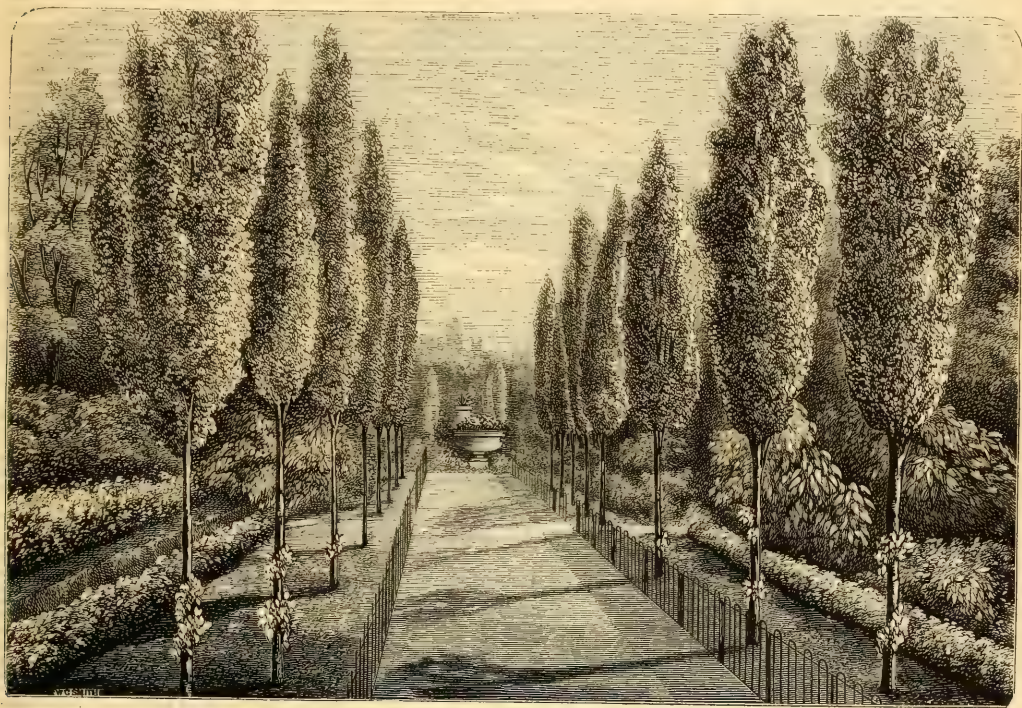


FIG. 106.—THE FLORAL AVENUE IN REGENT'S PARK.

Spirea, no doubt explains the use of the name by which it is popularly, but erroneously, known.

—A PHOTOGRAPH of Mr. GLENNY has lately been issued, and may be had of Mr. DAVIDSON, Waltham Green, Fulham. Mr. GLENNY has been a voluminous writer, but is probably best known by his treatise on the properties of flowers and plants, as estimated from the artificial or conventional or florists' point of view.

—We have before us a prospectus of "Mycological Illustrations, being Figures of New and Rare Hymenomycetous Fungi," to be edited by W. W. SAUNDERS, F.R.S., assisted by A. W. BENNETT, M.A.; the drawings by W. W. SAUNDERS and W. G. SMITH. The object of the publication is to give representations of many new and rare species not hitherto figured in this country, and to supply drawings of such species as have heretofore been imperfectly represented. The work is to be issued in quarterly parts, each part to contain about 24 plates. Mr. VAN VOORST is the publisher.

—The principal METEOROLOGICAL FEATURES which occurred during the week ending April 22 were the high mean temperatures registered in England compared with those registered in Scotland, and the large amounts of rain which fell in both countries. The extreme MAXIMUM TEMPERATURES in England

fall of 3.95 inches, which occurred at Dundee. The means for the two countries are, for England 1.53 inches, and for Scotland 1.36 inches. The observer at Norwich reports a slight thunderstorm at 1 P.M. on the 16th, and at Bradford the following note occurs on the 19th: "Thunderstorm at 4 P.M.; vivid lightning accompanied by loud thunder and heavy rain." The observers at Manchester and Hull also made note of thunderstorms on the 22d at the former station, and on the 16th and 17th at the latter. (See Mr. GLAISHER'S Tables in our present issue.)

—The BALSAM BOG of the Falkland Islands is one of the most singular and interesting plants of the Umbelliferae. *Azorella Selago*, Hf., has a similar habit, covering the ground in Kerguelan's Land, near the sea, with brown masses many feet in extent, and often so soft that the traveller plunges into or through them up to the middle. Like the *Bolax glebaria*, the living part of the plant forms a crust over a vast mound of debris, the decayed or decaying remains of former years growth, through which the living roots descend into the ground. It is the most abundant plant in Kerguelan's Land. In Fuégi it is much more scarce, occurring only in small tufts on the mountains.

—Prof. REGEL, in a recent number of the "Gartenflora," records the result of his experiments on POTATO GRAFTING. In no single instance did he succeed in producing a change, the scion invariably

it would not be difficult to render them more complete even than they are in an educational point of view—the small enclosures in which the animals are confined should be planted with some of the most handsome varieties of hardy trees and shrubs, which should, like the animals themselves, be carefully and correctly named. Moreover, these plantations might be arranged in family groups, one of which might occupy each compartment, at least as far as the most conspicuous members of the family are concerned, instead of the common materials now employed for the embellishment of the garden. The public would not only thus have examples of fine trees and shrubs, but a taste would in this way be induced for planting in the gardenesque style, with botany and zoology combined.

Reverting to the floral walk, it will be seen to be distinct in character from the views which I have hitherto produced as illustrations of the picturesque. In this case we have to deal with straight lines, the strip of land being long and narrow, not admitting of the circular description of treatment called gardenesque. This, it will therefore be apparent, is an exception to the rule, and one of which I am glad to find an example as a precedent. In cases in which the ground is unfavourable for plant growth, the same might be improved by sinking the road and adding the soil thus removed to raise the adjoining banks, which should slope towards the roadway, thus improving the depth and bringing the flowers and

shrubs more into the light and view of the road than could otherwise be the case. The soil thus improved will have the effect of giving additional vigour to the vegetation, which would form a screen to block out unsightly objects at once, and in a short time would limit the views to the garden itself, the beauties of which would then be seen at a glance. The vase and flowers in the distance form a good termination to the perspective, and the planting beyond, screening the church in this view, gives it an architectural finish. A residence in place of the church would of course also have a similar effect.

From a public road this avenue would have an excellent appearance, and privacy might be secured if desired by adding at the entrance a massive flower vase, like that seen in the distance, the drive at the entrance being round a semicircular clump of shrubs, forming a match to the screen in front of the church—a background against which the vase would have a striking effect; and if need be, a similar vase might be placed in front of the shrubs opposite the entrance gateway.

The chief features of this view, as regards character, are the lines of Poplars (*P. fastigiata*), which when young, are very suitable for that kind of decoration; but being trees of rapid growth they are soon likely to outgrow their bounds. For this kind of planting I should, therefore, recommend fastigiated forms of Oak, Robinia, Thorn, Pyrus, Acer Lobelii, Hollies, and Evergreen Oaks, which are similar in character, but comparatively slow growers. As regards the Acer two fine examples of this tree may be pointed out, one at Messrs. Paul & Son's nursery, at Cheshunt, the other in the gardens of the Royal Horticultural Society at Chiswick. Of the Robinia, evergreen Oaks, Pyrus, and Thorns, excellent examples may be seen in Kensington Gardens. All these trees will bear smoke well, and are therefore adapted for town situations. Cypressus, Arbutus, Irish Yews, and other fastigiated forms of Conifers are not town trees, at least within 15 miles of Charing Cross. The Pyrus, Holly, and Thorn succeed well in smoky atmospheres, as do also the Aucuba and other Chinese and Japanese shrubs. Two years ago when in Liverpool collecting information respecting Sefton Park, for which I furnished plans, I visited the Botanic Gardens there, and Mr. Tyerman, the curator, pointed out to me that scarcely anything would live there but except the different kinds of Pyrus, Thorns, and Hollies, which he added were quite at home with us. Conifers would be as objectionable there as near London, in short none of that useful class of evergreen trees and shrubs can be employed anywhere in smoky towns, in which they pine away and ultimately die, the elements amid which they naturally thrive being those of the very purest description. Smooth-surfaced, broad-leaved deciduous trees are those which should be selected for town planting.

As regards the question whether drives, rides, or walks in public or private parks and gardens should be straight or curved—a matter to which I have paid considerable attention, more especially with respect to the London parks, comparing Kensington Gardens, the promenade in Regent's Park, and the roads and drives in Hyde Park with the circular lines to be found in the other metropolitan parks—I have arrived at the conclusion that straight lines will only produce the best effect but are also most convenient. Straight promenades of the description alluded to, when crowded with gaily dressed people from end to end, make up perfect pictures in themselves, the vast multitudes that throng them, knowing that no unforeseen obstructions oppose them, pass and repass each other with a graceful ease and patience which would not be exhibited were they not able to recognise to the fullest extent what was before them. If this be true in reference to pedestrians in crowded promenades, how much more inconvenient would curved lines be in regard to large numbers of persons taking exercise on horseback or in carriages? At Hyde Park Corner I have sometimes counted no fewer than from 100 to 150 carriages passing and repassing along the drive there in one minute. For such a traffic as this curved lines would be wholly unsuited, whereas straight streets, with a road in the middle, and some 40 feet in width, it is accomplished, although I must admit that the width of the road should be at least twice what it is for the crowds that use it in the summer season between 4 and 5 o'clock in the afternoon. Straight lines, too, confine the traffic to the margins of the parks better than any other, leaving the green centre open and free for recreation ground and ornamental planting, while no many circular lines have a tendency to cut up and unnecessarily fritter away the space.

In Hyde Park, especially near Park Lane, is another mode of gardenesque treatment, somewhat similar to that laid down in the illustration, which, viewed as garden scenery confined to narrow strips of land, is as equally finished a work in itself as is the picturesque park scenery to which I lately alluded in reference to Kensington Palace. Treatment such as that here represented will often enable the architect adopting the Italian style of building to lay down suitable drives, and to ornament grounds, with but little space at his command, all the skill required being to make the breadth in proportion to the length, so that

each part may be perspective so conspicuous that the mind can take in all the picture at one view. This arrangement, too, has the advantage of being capable of being broken up into parts or not, as may suit the objects to be introduced, whether they be sculpture, fountains, &c. It is moreover a style which as a whole can be carried out, either uncouthly and plain, or extensively ornamented. Suitably managed such an avenue as this might in the country be of great use in connecting distant ornamental grounds with the mansion, the church with the latter, the home farm, the kitchen garden and forcing grounds, or as a private road or walk to the neighbouring village, aviary or poultry yard, pheasantry, &c. In fact, few plans for connecting highly ornamental grounds with a breeding establishment in regard to horses or cattle, or dairy, could be better than this, while as an ornamental public walk to the Zoological Gardens it is, as it now stands, all that could possibly be desired. *J. Newton.*

SALVIA GESNER-EFLORA.

FOR the decoration of the conservatory or greenhouse during March, April, and the early part of May, this is one of the most showy and easily cultivated spring-flowering plants extant, and is worthy of more extended cultivation, if only for the sake of its inimitable colour—a brilliant scarlet—a colour possessed by comparatively few of our spring-flowering indoor plants, added to which is its easy cultivation and non-liability to contract disease or foster insects. Excepting, however, when subjected to repeated droughts at the roots during the summer and autumn especially. It is then liable to the attacks of that arch-enemy, red spider, which, if not speedily checked, causes the foliage to assume an unhealthy and rusty appearance. Hence, being a somewhat gross feeder, a generous soil and a due amount of moisture at the root is requisite to preserve its lively green foliage in health, which, apart from its other attributes of the plant, affords, during the dull months of winter, a pleasing effect in association with other denizens of the conservatory. Hence it is somewhat surprising that, even in the majority of our largest establishments, it does not receive that share of patronage to which it is entitled.

I may remark that at the present time I have several large specimens now in resplendent beauty, exciting general admiration, both in the standard, globular, pyramidal, and bush-like style of growth, ranging from 2 to five years old, the former plants especially presenting a novel effect of single stems from 2 feet to 4 feet high, with "heads" from 3 feet to 5 feet in diameter, literally smothered with an infinitude of racemes of the brightest scarlet inflorescence.

For the benefit of the uninitiated, I may detail my mode of cultivation, which is simply, soon after the flowering season is past, to spur in the plants to within 18 inches of the ground, for five or six weeks, and then to plant them out in the garden, in a border in the kitchen garden, having first cut away the major portion of their roots, thus rendering it unnecessary to use larger pots, when "potted up" in the autumn, than those they had previously grown in. At the same time a suitable stake is inserted by the side of each plant, to secure from the adverse effects of high winds and violent storms of rain during its probation out-of-doors. As the new shoots advance in growth, the weekly watering should be continued, and the plants should be thinned out, thereby ensuring a more robust growth to those left on; and for the same reason it is not necessary to stop back the new shoots to induce a more bushy habit, as there are always produced more than sufficient shoots from the preceding year's growth to form a compact "head." Due regard is also observed in the way of ample supplies of water during hot and dry weather, so as to prevent the establishment of red spider; but should it get in an apparatus, it must be speedily checked by a free application of the syringe or garden engine.

Prior to "potting them up" towards the end of September—say about a fortnight—a spade is run round their balls, about a foot distant from the stem of the plant, so as to cut off any straggling roots and render them less susceptible to injury by removal into the blooming pots; after which, the latter process they are placed in a shady situation for a few days, until they become somewhat re-established, when they are removed either into a dormant vinery or Peach-house, preparatory to their instalment in the greenhouse about Christmas, when the Chrysanthemum season is over. I may add that young plants struck from the current year's growth are also planted out, and occasionally grown on in pots instead; the latter mode, however, entails greater trouble to the grower, and produces a healthy growth, but which may be greatly modified by plunging the pots in a bed of ashes or otherwise. *W. Gardiner.*

A ROSE GROWER'S EXPERIENCE.

I FEEL called on to contribute my experience as a Rose grower, in reference to the points raised in the able paper in the *Gardeners' Chronicle* of April 15, on the comparative hardness or tenderness of various Roses in the same classes. My apology, if any be needed, for a first appearance in print in connection

with Roses is, that large rosarians are invited to say whether they, each in his own practice, have made any special notes on the subject of roses; and my claims to be considered a large rosarian rest on my growing, with patient and tender care, about 2500 Roses of all classes, in a well situated garden, sloping gently to the south, the soil very good, and the supply of soft water most abundant within the walls. When I add, that my roses live like the Lord Mayor, as advised by Rev. W. F. Radclyffe, in one of his papers from Rushton some ten years ago, that I never protect a single plant in the least degree, that I give a fair trial to each variety, on the Brier, the Manetti, and own roots, and, above all, that I have, during the winter just passed, applied a special course of treatment to all my Roses, most pertinent to the main point in the paper alluded to, I trust my few observations may prove useful to those who love Roses, and possess facilities for growing them in large or small quantities.

Early last November, the weather being favourable, and no other job pressing, I set my gardener and his assistant to take up all my Roses (except those on the walls, chiefly Teas), and trench all the ground fully 30 inches deep, heeling in the plants at once when taken up, carefully replanting within a day or two, pruning the roots, and rejecting all, to the extent of nearly 200, which seemed unhealthy, or had been superseded by better varieties. This task accomplished, I applied a heavy dressing of well-rotted cowdung over the whole, and left them to take care of themselves during the very severe weather which ensued. Early in March I got the manure pointed in; I had all pruned between the 10th and 25th of the month. My entire stock are now breaking splendidly, and my losses are, two plants—one of Madame la Baronne de Rothschild, and one of Madame Margottin (Tea), the first on a Brier about 3 feet high, and the other a rather weak plant on its own roots.

The past winter has been the most severe but one, I think, since I became a Rose grower (about 20 years), and my losses, never large, have, in this bad season, been far under the average, this pleasant state of affairs being doubtless mainly due to the treatment I had adopted.

Of course it is only right to say that many of the sickly subjects, which I had rejected and given away to one or two fair friends, would probably have swelled the number of deaths had I replanted them, but, on the other hand, I have not a case of loss of any of the plants of tender constitution would have yielded to the severe frost had they not been taken up and replanted while the soil was in a fine friable state, and heavily mulched afterwards.

On the subject of tenderness, as regards the Roses named, *Reine du Midi* is fairly hardy with me, so also is *Mons de Montigny*. The name of this variety is often given wrong. I remember having been corrected by a friend in Paris, who said, "that Rose, that Rose, that Rose is Mons (the Mountain) de Montigny, and not Monsieur de Montigny, as generally called." *Acidale*, *Malmaison*, and *Celine Forestier*, generally escape pretty well, while *Triomphe de Rennes*, a splendid Rose, though fairly hardy, is peculiar, and with me never does well on a south wall, but it seems quite at home with a sheltered western aspect. *Gloire de Dijon* is always hardy and good. My best show blooms of this Rose I generally obtain from standards on the Brier. In March 1869 I tried largely on fine old plants of *Dijon* in various aspects about four years ago, and those on south and west walls have grown and bloomed splendidly, standing sun and water to any extent. On one small plant, facing south, about 8 feet high and 5 feet across, I counted 63 large blooms or buds at one time about the end of last May. On the Brier this Rose is quite hardy with me, and from standards of about 3 feet I obtain my best blooms. At the end of last August I had 14 glorious blooms on one Brier, and the drooping on the point of a long shoot, the colour very rich, and the solidity such that I was able to exhibit one bloom each, in two stands, which obtained first prizes at our autumn show. These had been expanded for five or six days, and were so fine when shown as to attract the warmly expressed admiration of one of England's fairest Roses, her Excellency the Countess Spencer, on her exhibition of inspection of the exhibition, which I have the honour to mention is always hardy, and the climbing variety of the same does splendidly on a south wall, and also on a low sheltered northern wall, where it blooms large and fine, but about a month late; this I consider a gain. An old favourite of mine, *Lelia*, or *Louise Perony*, I find very tender; also another splendid Rose, *Paul's Queen Victoria*, and *Joan of Arc*, the latter so like her Majesty in all respects—colour, growth, and habit, &c., that I find great difficulty in saying which is which. When to those I add *Baron Adolphe de Rothschild*, *Madame Boutin*, and *Baron Neikeron*, I think I have named all the Roses likely to be met with in good general collections, which are exceptionally tender, and I make it a rule to grow two or three plants each of all such in nice warm nooks and corners, in order to save them from extinction.

Of the novelties of the past two or three years, I find the following most likely to prove acquisitions:—*Marquise de Castellane*, deep rose, very large and full, a fine grower; *Louis Van Houtte*, a splendid dark velvety Rose, which I should like to see more robust than it is with me; *Souvenir de Poiteau*, a salmon

shade of pink, very fine; Thyra Hammerick, soft creamy blush, large and full, holds well for two or three days, a fine show flower; Duke of Edinburgh, rich, bright, and velvety red, quite first-rate. I have noted many others of 1869 and 1870, which I hope to prove thoroughly within the next few months; but I rather like "slow coaches," as our friend Rev. Mr. Radcliffe has been recently styled (in my opinion at least, unfairly and ungratefully), and I would rather be sure before I give him characters to improved novelties. One of the grand Roses of last year, Princess Christian, gave me two or three blooms from a young plant not long of the hands of the raiser, which disappointed me very much, and I began to sigh for my half-sovereign, but I am not without hope that it may yet prove all we have been led to expect, as good solid flowers are not to be hoped for from young plants forced on to supply an enormous demand.

I find my love of Roses has led me away into a few rambling descriptions, which I had not intended to touch on when I sat down to write. I shall try back to the paper which has set my pen in motion, and assist, as far as my observations, made closely for many years, can go, in an attempt to determine, whether the most fatal mischief comes to our Roses from above or below, and with great diffidence I venture to differ from the opinion given in the able paper at p. 477. After a hard winter I have found many of my Roses much injured, chiefly on the upper wood. At the proper time I have used the knife freely, and cut away all that seemed bad; a little later I have looked again, and found that I should have to cut more boldly; I have done so, often to within an inch or two of the point of union, on worked Roses, or of the ground on own-rooted plants, and in most cases with success; and I think this could not well happen if, as has been suggested, the injury had been inflicted on the roots of the plants in the first instance. In the same paper the statement is made, that, in a state of Nature, the roots of the Dog Rose are seldom frozen through; if not, it is not from want of exposure, in our country at least. In my rambles, within a few miles of my own residence, I have often in the winter time observed splendid Briers growing on the tops of exposed banks, with portions of the roots showing over the soil, frozen hard and shining like the skin of the Hazel, and not sustaining the least injury. The point in their favour I take to be the generally extreme dryness of the old banks. While on the subject of Briers, I beg to enter my protest against a dictum many times repeated of late years, that the Brier is doomed, as a stock. I trust this is not to be. I have for many years obtained 20 choice Briers, in the month of November of each year, fine sappy, green, well-rooted fellows (those with the white blossoms are far more enduring than the red). The first operation is to cut down all to a height of about 3 feet, then trim the roots, and plant in the border in good rich soil. In due season I had them myself with my choicest and tenderest Roses (my back rebels against bending over the Manetti, which my gardener manages right well); and I do believe that a more beautiful sight is not to be obtained in all the realms of Flora, than a large range of well contrasted, handsome, shapely Roses on the Brier, flanked on each side, as I always have them, with fine dwarf plants on own roots or Manetti. I obtain many of my finest blooms from Roses on the Brier. *James F. Lombard, Dublin, April 18.*

BOTANY FOR BEGINNERS.—IV.

THE Hyacinth is so similar to the Tulip in the essential characters of its roots, bulb, stem and leaf, that much that was written of the one will apply equally to the other. It may be well, however, to notice that whereas the Tulip stem bears a single flower at its extremity, and two or three leaves at its sides, the Hyacinth stem does not itself bear leaves, but supports a cluster of flowers, each separate flower having its own

to maturity. The Dutch bulb growers, however, with whom quantity as well as quality is a very important concern, manage to turn to account all the second generation of bulbs and largely to increase their numbers. Their method of effecting this was described in these columns by Mr. Fortune some years since. Notches are cut in the base of the bulb (fig. 110), or a portion is scooped out (fig. 109), and, as a consequence of these injuries, a number of heretofore latent buds start into life and growth; new ones are formed where ordinarily none would be seen, and in this manner one parent bulb is made to produce a large crop of little bulbs, which in due time grow into saleable commodities, having the characteristics of the parent bulb. Buds or bulbs formed in this unwonted manner, or in situations where ordinarily there are none to be seen, are called *adventitious*. The property of forming these adventitious buds is a valuable one for the gardener in more plants than the Hyacinth.

The flower of the Hyacinth is, setting form and

(fig. 107, D; fig. 108, A). The stamens have essentially the same structure as those of the Tulip, but instead of being *free*, they are only partially separated from the tube of the perianth (fig. 107, E). The pistil of the Hyacinth is almost precisely similar to that of the Tulip, and consists of three *inseparable* carpels, but while in the Tulip the style is absent and the stigmas large, in the Hyacinth the style is well developed and thread-like, and the stigmas small.

The Hyacinth affords us a good illustration of certain principles of floral construction most necessary to be understood. We allude to the independence or freedom of the several parts of the flower in some cases,

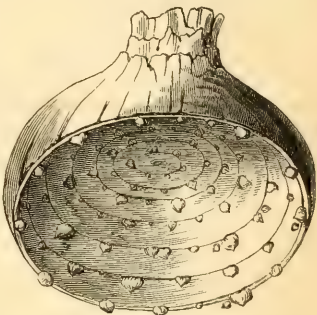


FIG. 109.—BASE OF HYACINTH BULB, scooped out to induce the formation of new bulbs.

as contrasted with their apparent combination in other instances. The six pieces of the perianth in the Hyacinth are combined below, or more correctly speaking, they are not separate. In other words, the points of the pieces of the perianth are first formed, each separate from its neighbour. Growth near the points, however, soon ceases, and is resumed at the opposite end of the young flower, in such a manner that a tube, or cylinder, is formed, which is gradually pushed up as the draw-tube of a telescope might be if forced out from within, and not pulled out as it generally is. The six segments thus never become united together: they merely cease to be separated, and the tube of the flower thus consists of the lower *inseparable* pieces of the perianth. But more than this, the stamens are free above, but *inseparable* from the tube of the perianth below. They, too, begin life as independent stamens, but the isolation ceases after a time, and in adult life they appear as if joined to the tube of the perianth. So in the pistil the three carpels are nearly *inseparable*, their extreme tips, the stigmas, are *free*; but the remaining portions never separate, at least till the seed-vessel is ripe.

Botanists speak of this apparent union either as *cohesion* or *adhesion*. By cohesion they mean the apparent union of parts of the same description one to the other; by *adhesion* they designate the apparent union of parts of different kinds; thus in the Hyacinth the six segments of the perianth are called *coherent*, while the six stamens apparently united to the perianth are spoken of as *adherent* to it. Now, as we have shown, there is really neither cohesion or adhesion in this case, but simply an imperfect degree of separation, arising from an arrested or checked development.

The terms cohesion and adhesion imply that parts originally separate become subsequently united together. But this is not in the generality of cases a true expression of the state of affairs. Such a union does certainly take place sometimes, but very rarely. The process to



FIG. 108.—PLANT OF HYACINTH, showing roots, bulb, leaves, stem, and inflorescence. A, top view of flower; B, diagram showing origin and relative position of the stamens and pistil; C, cross section through the ovary, showing its three cavities enclosing the ovules.

colour on one side, very similar to that of the Tulip. The beginner must please not to consider this remark as very Hibernian. He will not have made much progress in Botany before he finds that colour, with certain well marked exceptions, is botanically of comparatively little moment, and that form and size, unless associated with some other characteristic, are also, comparatively speaking, of minor consequence. We do not wish the beginner to despise either colour, form, or size, but we would caution him not to attach so much importance to them in botanical matters as he would do in other things, and particularly not to rely upon them unless in association with other qualities. Like the Tulip, the Hyacinth has a perianth of six pieces, but while in the Tulip the segments are all separate or *free*, in the Hyacinth they are partially or incompletely separated one from the other. In fact we have in the Hyacinth a bell-shaped flower, the *tube* of which consists of six segments not separate; the *limb* of the flower constituting the margin of the bell being made up of the same six segments, but here separate one from the other

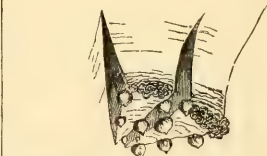


FIG. 110.—PORTION OF THE BASE OF A HYACINTH BULB, notched so as to induce the development of "adventitious" bulbs.

which the terms in question are usually applied, is one not of union but of imperfect separation. In future, then, we shall not employ these terms, cohesion and adhesion, as they convey erroneous ideas, but we have thought it necessary to explain them as they are in general use.

An apology is perhaps due for introducing a word as yet unknown to dictionaries—*inseparable*. The excuse is that it expresses the true condition of affairs, and that the nearly-allied word "*inseparable*" is already in common usage. With these explanations it is hoped the beginner will have no difficulty in understanding the sense in which the new word is used.

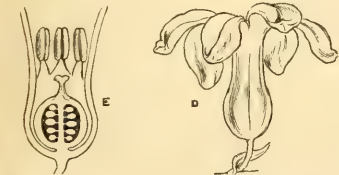


FIG. 107.—D, FLOWER OF A HYACINTH, showing the stalk springing from the axil of a bract, and attaching to the main stem, as shown at fig. 107, D. E, section lengthwise through the centre of a flower, showing the position of the stamens, the ovules attached to the central placenta, the style, and the stigmas.

little stalk springing from the axil of a bract and attaching to the main stem, as shown at fig. 107, D.

In speaking of the Tulip, we pointed out the provision for next year's growth in the little bulb produced in the axil of one or more of the scales. A similar provision exists in the case of the Hyacinth, and of many other bulbs. Generally speaking, only a very small number of this second generation of bulbs are developed; many, indeed, are formed, but few grow

Home Correspondence.

Raising Vines from Eyes.—The saying, that "There is nothing new under the sun," will I believe be found at fault respecting a new mode of raising I have discovered of raising Vines from eyes. From the great difficulty of advancing anything new on Vine culture (known by the late discussions in the *Gardeners' Chronicle*) all growers will therefore duly appreciate any discovery likely to produce first-class Grapes. Vines have been recommended by some growers to be raised like Peas from their eyes placed on pieces of turf, and when planted on the ground on a bearing year, to be covered, "beautiful for eyes," like Madame Rachael's face-enamelled ladies. Other Grape growers stick to the old plan of raising their Vine-eyes in small pots, and shifting them into larger pots when they are well rooted. This is my plan, but I use a wonderful stimulant to make the eyes grow rapidly when inserted into the pots, as well as to the young Vines when planted out in the borders. I thought at one time of giving my "panacea" some outlandish name, like *adventum* for a year or two in the gardening periodicals, like "ozokerit," but the importance of the discovery made me give it at once in the *Gardeners' Chronicle*. The grand secret is, therefore, "German yeast." A little of it in its hard state is placed on the top of the drainage in the pots, and when the Vine eyes are placed in the soil, the yeast makes the young shoots rise, and grow with great rapidity. When the young Vines are planted out in the border they must, likewise, be dry weather, be watered with the yeast in a weak, soluble state, and if some guano is mixed with it, it will be all the better for the Vines. Young Vines raised by this method will be the very ones to show the "extension system" to advantage, and Mr. Cannell's "hundred pounds good advice" will not be thrown away. Thus a great boon to Grape growers is given without fee or reward by their humble servant, *A Grape Grower*.

Fruit Tree Blossoms and the Wet Weather.—Since the frost has gone our Pear, Plum, and Cherry trees have been in full bloom during the wet weather of the last fortnight, and, from examination, I am doubtful if the little blinks of sunshine will be sufficient to dry the pollen into a dust to complete its work of fructification or otherwise. The shortness of outdoor frost has been felt quite as much as our late inside fruit was two years ago, when nearly all the fruit caused. The last frost has thinned our Currant and Gooseberry bushes a little, but almost nothing to speak of. The weather and the bushes being dry has saved our crop up to the present. Owing to the fine dry and bright weather we had some time ago you will observe, from the branch which I send you, what a heavy set of Apricots we have got. *J. Miller, Workshop Manor, [Prodigious, Eps.]*

Prizes at the Exhibitions.—As the grower, under the direction of Mr. W. Paul, of the pot Roses which obtained the highest prize at the Royal Botanical Society's recent show, I may be allowed to say a few words in answer to the letter in your last issue from Messrs. Paul & Son. First, it appears to me that, if Messrs. Paul & Son are "sufferers" through my judgment receiving a higher prize than theirs, the judges are not to blame as the two groups of roses were not brought into competition. Unless Messrs. Paul & Son are prepared to maintain that the prize awarded to Mr. W. Paul was too high, their argument appears to be baseless, and I have evidence to offer on that point. Messrs. Paul & Son admit that these Roses were "admirably flowered," and their grower told me that they were the best Roses Mr. W. Paul had ever shown. Mr. Lane also said, in my hearing, that they were the largest and best coloured pot Roses he had ever seen. Messrs. Veitch's grower, speaking in commendation of their size, said they were "Cabbages, not Roses." If this is the opinion of three eminent Rose growers, would other Rose growers have given a lower award? What, then, becomes of the charge of putting "square men in round holes?" That it may not be supposed I am writing in support of the judges, or from any other motive than that of settling what I think right, I may say that I do not know who the judges were. *W. Egan, Paul's Nurseries, William Cross, M.*

Heating with a Single Pipe.—The mode of heating by a single pipe, as noticed at p. 519, is nothing new, but must have been known in the trade many years ago. I can recollect, that on visiting the gardens at Eps, now the seat of Crantock Duff, Esq., Mr. P. Banfi, about 20 years ago, my attention was attracted by a huge looking pipe, of about 9 inches diameter, passing through a range of Melon pits. This, Mr. Tindal, the gardener, told me was for heating without a return. As I had never before seen or heard of anything of the kind, I asked if the pipe contained two divisions, or how could the cold water return? and he assured me that the one pipe without divisions acted both as flow and return by the warm keeping the upper and the cold returning by the lower portion of the pipe. Although correct, which I then had my doubts of, I could not see that there was any advantage to be gained, as one yard of the large pipe (if necessary to be so large) would cost more than double the price of 4-inch

pipe. The pits seemed very substantial and complete, but I do not know by whom they were fitted up; as, however, Mr. Tindal is still enjoying the situation, I feel sure he will be happy to give any particulars respecting them. *Robert Farquhar, Gr., Fyne Castle.*

Setting of Grapes and Peaches.—With due respect to our extreme physiologists, I never did entertain a great idea of the high and dry and arid atmosphere recommended by some for fruit or plant cultivation. Even our great Orchid growers are recommending a cooler treatment for that now fashionable class of plants; and extremes in our fruit cultivation, either with heat, cold, or moisture, will be found detrimental to good success. In my own practice I never grow fruit, or trees, or shrubs, or flowers, or plants, with the exception of the Canon Hall Muscat and the Kempsey Alicante, I have never found it so sufficient for a general crop. I am of opinion that Canon Hall Muscat sets best in a low temperature, as I have grown it nearly out-of-doors opposite the front ventilators, where the current of air flowed in and out, the ventilators being open day and night. In the draught the berries set as freely as Black Hamburgh, while upon the other hand, the fruit of the latter is very bad. But the question at issue would the syringe complete the setting of the fine Grape? if so, it ought to be reintroduced. I have no doubt but that some of your correspondents will remember the fine example of the Canon Hall Grape which was shown at the Royal Botanic, Regent's Park, some 18 years ago, from some place near Chester; but how such a good set was effected I cannot tell. Although still green, none could deny that they were thoroughly bushes, and I have seen them, freely syringed all my. Peach trees twice a day, only leaving off for a few days when the trees are in full bloom, keeping the atmosphere of the house moist by sprinkling the pathways, borders, &c., if the weather is bright and sunny; night temperature from 48° to 52°; admitting air with sun-heat at 60°; if the weather is very dull little sprinkling is done while the trees are in bloom. All early houses are gone over carefully with a can, and the late houses are left to set themselves with what assistance they get from the bees, &c. I send you a few shoots as an example of my setting; the shoot with the largest fruit is from a neighbour, who adopts the same principle as myself with all his early houses, and the set upon his trees is quite equal to what is shown upon the branch. The shoots with the smaller fruit thereon are from my succession houses—the early ones being stoned and thinned, and I would have sent you a shoot of them likewise. But the setting of them was similar to what I have sent, and the fruit is now beginning to show itself well up amongst the leaves. I think it would be needless to alter my system so long as I am rewarded with success. *A Dry Setter.* [The shoots sent are regularly furnished from end to end. Eds.]

Dinner-table Decoration.—Small baskets made of glass are very pretty objects for containing cut flowers for dinner-table decoration or for rooms. These baskets are now made of different kinds of coloured glass, some with handles, and some without, and of different shapes and sizes, according to the purpose for which they are wanted. The fewer the cut flowers placed in them the better, so that they are artistically arranged along with the fronds of Ferns or green leaves of other plants. These baskets are now made in very various shapes, and I should be about to find itinerant hawkers in this locality. In recommending them for dinner-table decoration, I expect I shall have "W. T." down upon me for condemnation or approval, and I await his criticism with fear and trembling. According to "W. T." (p. 483), the great mass of gardeners are quite unfit to decorate a dinner-table, from their trying to crowd too many of their best productions of fruit and flowers, to the discomfort of the guests. There is some truth in this, and gardeners, entrusted with this duty, should try and educate themselves artistically, on purpose to hold their own with the professional decorators. As the initials of my name unfortunately clash with "W. T.'s" I shall, as a veteran in your columns, sign myself *The Original W. T.*

Severe Frost for the Season.—In this locality in South Lincolnshire the frost on the mornings of the 7th to the 11th was very severe for the season, the thermometer registering on the 7th, 12°; on the 8th, 13°; on the 9th, 9°; on the 10th, 5°; on the 11th, 10° of frost when we had a change with rain. With us the Gooseberries are nearly all destroyed, more particularly on the upright growing bushes. The bushes with drooping form are not quite so much injured, a few being left which may turn out a crop. Gold rats, red and white, are very much injured. The principal fruit on the stalks being destroyed, a few small berries on the end of the bunches remaining. Black Currants are slightly touched, but not to a great extent. Apricots, where not properly protected, are nearly all destroyed. I say properly protected, for ordinary shading, such as double netting and other light material, has been of no use during this severe frost. Here we have 11-inch coping-boards on the walls with Frigi Domo covers, which are fixed on rollers, and can be let down in a few seconds when required for protection, and in fine weather they are neatly rolled up under the coping boards on the

same principle as window-blinds; by this means we never lose a crop by frost, and now we have an abundant crop, well set. I do not, however, consider Apricots safe till the middle of May, when the covers are taken down. My covers have been in use for the last 15 years, and will last many years longer. Peaches and Nectarines are also destroyed where not protected, but we expect a fair crop where covered with Frigi Domo. Green Gage and other Plums on south walls, also Cherries, are injured where not protected, but I trust not to a great extent. Apples, Pears, Plums, and Cherries on espaliers are standards appear for the present to have escaped, but time will show. *David Lundan, Blisshelm, Scotland.*

Photinia arbutifolia.—From the specimens growing here I should say that this plant deserves to be more extensively planted, as what Mr. W. Paul would call a "pictorial tree." It has now put forth its shining dress—its waxy, green leaves, and the autumn of the old leaves will be red, and reddish purple. It not only has two seasons of coloured leaves, but it also flowers, when the white flowers also make it very conspicuous among other trees. From the manner in which it has stood the cold winters these last ten years—we registered here 25° of frost—and from the country came from (California), I should think it would do well anywhere in the kingdom. I see it was introduced in the "Gardeners' Chronicle" in the year 1840, and is now formed, so that it is likely, from its size, that the above tree was one of the first planted in this country. *H. M., Enys.*

Araucaria imbricata.—The large Araucaria imbricata growing at Craigro near Montrose, is, I should say, judging from the description of "A Forfarshire Gardener," p. 48, a male plant. I have here 13 Araucarias, all of which are very robust and handsome, and of them five have been and are bearing male cones. If "A Forfarshire Gardener" will watch the tree at Craigro, and will occasionally give one of the cones a tap with his walking stick, he will see a perfect shower of pollen dispersed from it, similar to what may be seen on striking a Yew or a Chinese Juniper when the male blossoms are "ripe"—if I may be allowed the term. The female of our plants, up to 13 have done the same, to be males, while only one female has as yet shown herself, is an interesting fact, and seems to me to bear some analogy to the cases of some butterflies and moths so interestingly told in the "Descent of Man," the males of which are fully developed, and escape out of their chrysalis state some time before the females, so that no sooner do the latter appear than they find themselves surrounded by a whole bevy of admirers from which to choose their future husband. It will be interesting to any one who may have the opportunity to watch the future development of this noble tree in this country, and see if this analogy is still further traceable. Mr. Darwin tells us that the males of those butterflies and moths which arrive at maturity before the females are smaller than the females; and in Loudon's "Arboretum Britannicum," p. 2432, it is stated, writing of the Araucaria imbricata—This is a very remarkable tree, the female of which, according to the description, is of a high, while the male is seldom more than 40 to 50 feet high. And so widely was this statement accepted by the admirers of the Araucaria that I have met with many who, looking at a number of specimens, have considered that all the short-jointed, compact, well-furnished plants, which convey to the looker an idea of early maturity, were males, whereas the long-jointed, straggling, gawky-looking ones were females. But Mr. Barnes, some time gardener at Bilton, and who used to, and I hope will again, occasionally contribute to the *Gardeners' Chronicle*—from whom no one in England has had better opportunity of observing Araucaria imbricata distinctly—denies this. He says, there is no way of telling a male from a female otherwise than by seeing their respective cones. This, though I thought differently once, I now quite believe, but at the same time I believe Pavon is right also; and, if so, we have another analogy to the case of butterflies, moths, and moths, and Araucarias. May we not, without any violent improbability, speculate from this upon the presumption of there being something in common between vegetable and animal life? My idea may at first appear "far-fetched," but so probably to a novice would be the idea of there being anything in common between an Ascidian and a man. "I was a fish and I shall be a crow," is according to the hero of a book written by one of our countrymen, English, the view of that class whose great merit in the eyes of another of the same writer's heroes consists in never reading, and in understanding no language but their own, would probably take of this speculation. *C. F. P., The Grange, Kingston, near Taunton.*

—Observing an inquiry respecting the cones or catkins which have made their appearance on a plant in Scotland, I beg to state that from the description there given, I have no doubt the plant is male; the cones are stated to be in a bunch of three and about an inch long, and the cones of the Araucaria imbricata, when they first appear at the end of the branches, are round and short, and they soon get to 2 or 3 inches in diameter, or, if on a strong, healthy plant, in a few weeks to 5 or 6 inches. I have gathered from the

female *Araucaria* cones above 7 lb. in weight, and, indeed, exhibited some in London over that weight, with male catkins from 2 to 8 inches in length, and 2 inches in diameter. There were when I left Bieton 15 males, and three or four females there, that we knew of. They first coned and produced catkins and perfect seed there, and the first plants from English-grown seed were raised there. A notice of these facts was given years ago. *James Barnes, late of Bieton.*

Syringing Fruit Trees when in Bloom.—Since the 11th, rain has fallen here more or less every day, and Mr. Simpson's recommendation to syringe Peach trees when in bloom will be proved on a grand scale this spring on other fruit trees. Pears, Plums, and Cherries have been in full blossom for the last week, and if the clerk of the weather goes on syringing a few days longer, the fruit will be all thoroughly wet. All these varieties of fruit trees are loaded with insects this spring, as well as Apple trees; and if frosts and insects keep off in May, plentiful crops may be expected. There have been occasional glimpses of sunshine on several days, which will have helped to dry the pollen for fertilising the blossoms. The effect of the frost on the mornings of the 7th and 8th is now seen in the discoloured sides of the bunches of Black and Red Currants, and the few *Gossypium* saved are only to be found on the lower branches. *William Tillyer.*

Hardiness of *Chamærops* *Fortunei*.—I had the pleasure a few days since of once more inspecting the two fine specimens of this Palm at Heckfield (South Hants), of which we have heard so much lately. It will doubtless interest all who take pleasure in sub-tropical gardening to hear that both specimens, although left entirely exposed to the full rigours of the past winter without a shred of covering, are not only uninjured, but looking as fresh and vigorous as could well be desired. Both plants are from 8 to 9 feet in height, and about the same in diameter. Some of the leaves measure 3 feet across; the stems at the base are about 12 inches in thickness, and they are now entering upon the fifth year of their acclimatisation. During the winter period they have not known other shelter than the formation of the ground and the surrounding trees afford. *A. D.*

Frost on Roses.—The effects of the frost on the different varieties of Roses in this neighbourhood, Keymer, (Sussex), are somewhat anomalous and uncertain with respect to the varieties killed or injured. But still the loss is by no means so great as was anticipated, for many of those which appear to be quite dead have shot out at the point of union with the stock. I must mention that my remarks are limited to standard plants. The soil is a heavy retentive loam, which just suits the common Dog Rose, but is rather unfavourable for the tenderer varieties worked upon it. A vast number of plants were killed back to the stock, though only two varieties of the hybrid perpetual class, under my observation, were killed, namely, *Ville de Lyon* and *Pavillon de Prégny*. Amongst those severely injured are:—*Hortense Blanchette*, *Impératrice Eugénie*, *Mademoiselle Bonnaire*, *Madame Eliza Vilmoren*, *Alfred Colomb*, *Charles Verdier*, *Monsieur Chaix d'Est*, *Genatave Vaisse*, *Souvenir de M. Boll*, *M. de la Roche*, *Charles Verdier*, *Demis Helye*, *Comte Lita*, *Horace Vernet*, *Napoleon III.*, *Courage des Alpes*, *Prince Humbert*, *Reine Blanche*, and *Madame Creyton*. The unprotected Teas, with the exception of *Gloire de Dijon*, were killed; but I have seen no *Devoniensis*, which have been exposed during the winter. Some plants of *Maréchal Niel*, *Homère*, *Madame Falcot*, and *Climbing Devoniensis*, were left to their fate, and perished. *Noisettes Céline Forestier* and *Cloth of Gold* are the dead, and *Triomphe de Rennes* very much injured, also *Lamarque*. *Eourbons* seem to be pretty hardy, for even *Souvenir de la Malmaison* withstood the winter. *H.*

Australian Plants.—Will some of your correspondents in the South West of England kindly furnish me, through your columns, with lists of the Australian and New Zealand plants which have withstood the effects of this and previous winters? And any details respecting the number of years they have been planted, and the size attained, &c., would be acceptable, and perhaps interest others besides myself. *H.*

Horticultural Exhibitions Ancient and Modern.—Whether we accept of Mr. Ayres' conclusions or not it is impossible not to admire his zealous championing of the good old times horticultural. He thinks modern exhibitions but pignions compared with their giant sires. The moderns can grow "greens" or common flowering plants to elephantine dimensions, but in floral rarities they are nowhere. The other side is ably defended by the modern champion exhibitor, Mr. Baines. This gentleman is in every way able to hold his own, alike in your columns and the press, show tents. If I venture a few remarks upon the subject it is not because I think Mr. Baines needs assistance, nor yet that I may differ with Mr. Ayres. As to the latter, I expect that gentleman will dispose of me in his usual trenchant style, thus: that not being a great exhibitor I, of course, know nothing about it. However, that is a man may observe, and for that matter, I agree with the Editor, judge justly, and without being an actual grower for exhibition. I have

seen a good many shows, from Chiswick days till now, and cannot admit the degeneracy of modern exhibitions to anything like the extent that Mr. Ayres contends for. There is a considerable change of material, that is what Mr. Ayres must approve, for he is constantly advocating freshness of material or arrangement, while sighing so vehemently over the old times and old plants. Had they continued till now, the great flower shows must have been more monotonous and stale than they are represented to be. That they have not continued is, not for lack of skill, but because fashion has changed its mind, and is now improved. The love of a mere glare of flowers for a few days—and that was what that some of those plants afforded—has given place to more desirable, if not beautiful, subjects. Besides, the love of form has largely absorbed the taste that was then wholly absorbed in colour. I stay not to discuss which is the more educated or refined; suffice it to note the fact of the great change of taste. Our exhibitions have reflected that change, and necessarily so; and I think much to wonder whether Mr. Ayres' energy and talent will be able to hark back to the horticultural world to its old love. Many would doubt if he would gain caught by doing so. But, leaving these knotty points to the large exhibitors, so ably headed by Mr. Baines, I proceed to question the assumed facts, that modern horticultural exhibitions are milk-and-water representatives of those of some 40 or 50 years ago, and that they are less popular. On the contrary, I believe they are more popular, more attractive than ever. I base this faith in the superiority of the present over the past on such obvious facts as the value of the prizes, the money subscribed by the public to originate, sustain, and see them, and the numbers that are held throughout the country. I have recently received a good many prize schedules—such as those of the Manchester, Leeds, Liverpool, and other societies—and the amount of special prizes is really astonishing. But why need these examples when Mr. Ayres' own experience of the special prize list at Nottingham proves the point so effectively? Nearly all this outcry about the unpopularity of flowers seems to me to be wholly a mistake. Mr. Ayres and others look back to Chiswick with longing eyes, and deplore the irksome tameness of modern exhibitions; they seem to forget that Chiswick in those days had it all to itself. Now every town and village has its own village of no note, but its flower show. The public interest and support has increased a hundredfold; but it is diffused into a thousand rivulets all over the country, instead of being gathered into one unique flood at Chiswick, as in the old time. I advanced these views in your pages some years ago, while discussing the relations of the Royal Horticultural Society to practical gardeners.

I have hinted that the time might come when the parent society might leave the exhibition field to be occupied by her studious children. The provincial migrations of the Society, which I also advocated at the same time, may save off that time indefinitely, and the fortnightly or monthly meetings, with one or two great metropolitan spurts, may continue. But were it possible to restore the old monopoly of grand exhibitions of the Society, it might be a great misfortune to the science and practice of horticulture. Undoubtedly, the horticultural shows are most attractive to visitors and beneficial to horticulture in general. [The description you allude to is copied from that of Dr. Engelmann, in *Transactions of the Academy of Sciences of Philadelphia*. Eds.] This multiplicity of societies is at once a proof of the success and an honour to the old Society. Never, upon the whole, was there so much and such general ability among horticulturists, as seen in thousands of private gardens, and also as measured by the products exhibited at hundreds of centres throughout the country. [Hear, hear!] Mr. Ayres has simply been suited with too much of a good thing, and being very much occupied in various ways, he is naturally anxious to pile all this wealth of beauty upon a great altar at Chiswick or Nottingham, so that he may adore it all at once, and be done with it for another twelvemonth; and because he cannot do so he cries out that he is tired of the whole affair, and that the shows are not worth seeing. I cannot agree with him. *D. T. Fish.*

Roses and Mildew.—Will any of your rosarian correspondents be good enough to tell me what is the most effective treatment of mildew? In this particular spot it amounts at present to a perfect plague. It has attacked the forced Roses and those growing out-of-doors—the vigorous and the puny—with strict impartiality. The season has been favourable beyond example. *E. L. G.*

The Potato Tournament.—I am much indebted to Mr. Easley for his highly flattering remarks respecting the collection of Potatoes which I exhibited at Oxford last year. I fully agree with him that should there be a show of the noble tuber this year it should take time nearly all the month of August, as by the time that the second and third can be exhibited the first are quite ready, as well as, in fact, all the best sorts are quite ready for garden culture. If shown later these will lose much of their beautiful, bright appearance. I also agree with Mr. May's suggestion for the division of prizes and number of tubers; and if the show should be held at South Kensington or elsewhere, would it not be better to put them all into the hands of some one person to stage them, &c., as many of the

country exhibitors would be unable to attend to set them up? *G. Craddock, The Gardens, Compton Verney, Warwick.*

Grafting Aucubas.—I graft these plants in the first or second week of May, using the young shoots for the grafts. These I find will grow, and in some cases will form flower-buds, but these, as far as my experience goes, are so weakly as to be of little use the first year. If grafts be taken off before the flower-buds open or growth commence, they may be grafted in the middle of March and through April. But my reason for deferring it so late is to have as many shoots as possible of varieties which I wish to graft. Perhaps it would be well to defer it even later in some parts of the country. The young wood should be allowed time and harden a little before cutting it off for grafting. As far as I have seen, the grafts have all begun to grow and open their buds the same time as the bushes on which they have been grafted,—proving to my mind that it is the way to ensure self-fertilization on our Aucuba bushes. *Henry Mills.*

Mrs. Pollock Pelargonium.—Many of my plants of this variety have this year reverted to the parental type—the Emperor of the French. Is this an indication of sympathy with the fallen monarch, or is it an abhorrence of being thought too red? Perhaps a more natural explanation would be the fact that we rest on limestone gravel, and the water is strongly impregnated with lime. There is a constant tendency here in all variegated plants to turn green. *John Douglas, Kilkrea Castle.*

Pinus albicaulis.—I have repeatedly inquired of local nurseries for this, in vain. In the *Gardeners' Chronicle* of October, 1865, you described it as having "milk-white bark," and I think you added that it came from "the Cascade Mountains of Oregon." It seems to offer an inviting contrast for planting. Can you, or any of your correspondents, inform me of its habit, hardiness, &c., and when it is to be got? *Lathbury.* [The description you allude to is copied from that of Dr. Engelmann, in *Transactions of the Academy of Sciences of Philadelphia*. Eds.]

Ladybirds.—It may interest some of your readers to know that these insects have survived the winter in this county—Cornwall. We have I dare say hundreds in the garden. They have wintered in the Box ending, and under the leaves of herbs, or anything affording shelter. I saw one or two on the Peach trees to-day, so that they are beginning to fly about. *H. M.*

Cannell's Registered Boiler.—As you have allowed Mr. Cannell in your columns to give publicity to his theory of what constitutes a hot-water boiler, and to condemn all others wholesale, I trust you will allow the subject to be well ventilated, in the hope that it may draw out from those most interested many suggestions and experiences. Most of your readers were no doubt pleased to read the very practical remarks of Mr. Z. Stevens (of Trencham) at p. 481, as to the qualities necessary in a horticultural boiler, more so as they appeared at the same time as Mr. Cannell's part reply (p. 484) to my queries referring to the registered hot-water circulator (p. 419). Upon looking at the illustration (figs. 96 and 97), I was at first led to know whether this was another registered boiler, as it appeared differently constructed to the one shown at p. 379, the former having a double, and the latter a single arch in each "fine section." (To be registered, I presume, one form or shape must be adhered to.) Your readers will, I think, readily admit that Mr. Cannell has not replied to my queries at p. 419, nor has he read them correctly: for instance, my remarks about the two boilers. I did not say anything about "one boiler doing about double the work of the other." I said the boilers were precisely the same, the quantity of pipe the same, the reported result totally different. Now, what is the cause of this imaginary phenomenon? In the one case, the person in charge of the apparatus attended to it, and in the other he did not. However, to return to the registered boiler. The illustration, p. 379, clearly shows all the eight return pipes entering the boiler, or, at least, the boiler, and the flows at the front end, or older end. I may be wrong (and ready to admit if proved) in deciphering the words, "cold-water flow" and "hot-water flow." It occurs to me, and must also to most of your readers, that it is a great mistake to advocate the use of anything that has not been thoroughly tested, and tried by actual experience and close observation, and many men, gentlemen more particularly, have not time or opportunity for inquiry, and are contented with the reputed respectability of the person making the report, or selling the commodity. In this particular instance "some hundreds of gardeners express a belief that the boiler possesses immense capabilities." Have these "hundreds" thought over the matter for five minutes? I doubt it very much. Mr. Cannell suggests that its merits are purely imaginary. I am afraid he is correct. The boiler, figs. 96 and 97, p. 484, the one shown at p. 379, is 18 inches long, 18 inches wide, extreme measure, the fire bars 18 inches long. Now taking the water space in each section to be 3 inches with three-eighths metal, 9 inches for the ash hole, 15 inches height for fire space, with 5 inches each to the fire flues, and 9 inches for the 4-inch fluepipe on the top of the boiler (I hope I am not overestimating

the measurements, for such is not my desire) we have a total height of 7 feet. Just imagine this for a boiler with a fire space of 16 inches, 10 1/2 by 15 inches, holding water about 1 bushel, or 10 lbs. I always thought the dead-plate was to keep the fire dead at the front of the boiler, so that the furnace-door might not become red-hot and crack. I have it, is true, seen the dead-plate at the back when pulling down some apparatus that would not work, consequent upon the whole affair being erected by some local genius, who had almost set the boiler upside down (I remember one instance when this was actually the case). Referring to "fire dormant" at the back, I never could get that portion of the fuel to burn properly that did not have a draught under it, either at back or front of boiler. We now come to Mr. Cannell's remark, p. 379, "as the glasshouses are extended so can heating power be added" (on the top I presume). In that case the boiler must be taken out and reset deeper in the stove-hole, otherwise the whole of the pipes in the houses must be raised (a very awkward job). Of course this would not be the case if the stove-hole was originally of a depth to provide for the future additions of "flue sections" to boiler, but we all know that the depth of stove-hole is a serious matter with us. I never set a saddle boiler on brick-edge, but have the fire under the bottom edge, in fact suspend the boiler over the fire. If we wish to heat a pot or kettle containing water quickly, we place it above the fire, not [the fire] at the side of it. I shall most heartily hail with pleasure some movement in dampers; as I said before, the great difficulty is to work the damper properly, *i. e.*, so as keep pace with the changes of the temperature. My practice has always been to get the fire up thoroughly, red hot right through, before leaving for the night, and then to nearly close the damper, leaving just enough opening for a draught, so allowing the fire to burn down, not up, as the morning advanced. As to position of damper, if partly closed, say 18 inches from the boiler, and the whole of the flue, from the boiler to the damper, is charged equally with heated air. In conclusion, allow me to say that I trust some one with more ability, with longer experience, and more persevering, may develop this momentous matter. I am not a F.R.H.S., but I have always had a great desire for anything appertaining to horticulture or floriculture, and in my small way as an amateur florist will not hold the candle to many professionals; and, if I had the time to spare, would compete with some of the most expert growers, such as in boiler-making and fixing. R. S. Dunbar, Wimbledon.

Hibiscus Cooperi.—Although a good many plants have been written about lately, in your pages by various correspondents, as being suitable for button-holes, adorning ladies' hair, &c., I have not seen any notice taken of this. We have a good-sized specimen of it in the stove where I write, with a fine lot of the most beautiful double flowers, which are marked with pink, white, and light and dark green of various shades. From this plant we have been cutting mostly every night for the last four months at least. It is a beautiful thing for making "button-holes," and besides it does capitally for making up with cut flowers in a bouquet. I send along with this a sample, to confirm what I write. I may say that last autumn I thought of throwing away the plant, because, standing in the greenhouse, which was too cold for it, the foliage looked dingy. But I took another chance, and put it in the stove, where it soon came away in an abundance of the most beautiful young shoots. It has been one of the most useful plants we have had for some time back, and it promises to be of good service for a long time to come. *Observer.* [Our correspondent's "button-hole" was worthy of observation. Eds.]

Concerning the Early Growth of some Indigenous Trees.—Under the belief that I had already advanced concerning the earliness of growth of some trees afford a lesson to practical gardeners, I may state that at this old place a Sycamore tree assumed its full summer garb some weeks since, before other trees of the same kind, and only a few yards distant, had begun to swell their buds perceptibly. The early foliage was very fine, and laden to the thick hanging from the top. This early tree has the major part of its roots beneath a cow-yard, from which the huge layer of manure has not been removed during the past inclement winter. There can be no doubt but that the fine warm weather which we experienced early this season has influenced this and many other trees, though those possessed of this precocity would have assumed the leaf first even under less felicitous circumstances. Is there any doubt but that in all such instances the roots possess exceptionally favourable influences? And does not this illustrate anew the fact, that for early growth we must defend the roots of any kinds of plant from the inclemency of our winters? If we would force our Vines early, we protect our Vine borders. Not only should we do so against absolute injury, but we should endeavour to ward off that coldness which is so penetrative, and which not only destroys the annual fibrils, but induces the state of torpor, which becomes necessary in vegetation in the pure winter state, and if not so, and did not the natural influences reach even to the roots, we should stand aghast often at

the effects upon trees, &c., of a mild moist month in mid-winter. *William Earley, Valentines.*

Bougainvillea speciosa at Swyncombe Gardens, Henley-on-Thames.—More glorious than ever is the rare beauty of the magnificent Bougainvillea at Swyncombe this year, now in the full flush of a superb development. The splendid radiance of the lustrous mauve bracts—so plentiful that even the green leaves appear tinted with this colour—is perceptibly and even strikingly heightened as compared with previous years. There is an unusually rich depth of colour thrown over the flowering sprays, and so profuse are they that the plant has the appearance of an awning of the loveliest mauve, filling the interior of an end of the house. This rich depth of hue Mr. Daniels supposes to be traceable to the influence of the dry hot summer of last year, which thoroughly ripened the wood, more so than is usual with the plant. So rapidly does it grow, that it has pushed its young growth a distance of 5 feet further along the house since last blossoming season; and threatens to displace the fine specimen of *B. glabra*, planted at the other end of the house, and which yearly creeps along towards the dominions of its imperial relative *B. speciosa*. Widen its course, it cannot; it already extends on either side of the house as far as it can go. If the long, low span-roofed house and its precious contents of rapturous beauty could be transported from Oxfordshire to South Kensington, and be the floral lion of the Horticultural Garden, it would be the floral lion of the season, and attract thousands of visitors while it remained in bloom. It must be admitted that the charming demesne of Swyncombe, set down as it is in the midst of a great natural amphitheatre, has a notoriety peculiarly its own; for this marvellous Bougainvillea can nowhere else in the United Kingdom be seen of such large proportions, and in such a grand state of development.

When the long-anticipated and much desired Order of Merit in the robes of the Victoria Cross, and its most worthy knights are decked with the insignia it confers, one of the not least illustrious of the recipients will be Mr. Daniels, for what he has so well and ably done with the Bougainvilleas. R. D.

Cissus discolor.—I fully agree with Mr. Earley as to the great beauty and comparatively easy culture of this elegant Vine, and beg to ask if it is deciduous in its native habitat. In April, 1870, a young plant bearing a beautiful, unopened bud, and a young leaf, being in a small pot, and well rooted, I gave it a liberal shift—potting it in good turfy loam, Belgian mould and sand. It was placed at one end of an East India house, and treated to frequent doses of liquid manure. I stopped its leaders several times, which caused it to branch freely, and being trained along the roof at right angles with the rafters, and allowed to hang in graceful festoons, it had a pretty effect. In the bud, and at the first opening of the leaves, which are home, producing large and most beautifully tinted foliage. The plant in question kept on growing during the past severe winter, although the thermometer frequently registered 56°, and once or twice 54° as a minimum night temperature, and growing branches at its extremities were cut for dinner-table decorations in February of the present year. The plant lost a few leaves at the base near the pot, but this I attribute to its having been allowed to become dry at the root. Now, in the month of April, the thermometer has been at an annual temperature of the air in Java is about 83°, and the average rainfall is over 100 inches, or at least 8 feet 4 inches. I am inclined to think that this *Cissus*, in its warm and moist habitat, keeps on growing all the year round, and I should be most happy to hear the evidence of any traveller that might throw light on the subject, for I am convinced that a few facts clearly stated by an experienced observer are far preferable to a mass of unsupported statements by a layman. Those who have carefully read Colonel Benson's letter on Orchid culture, which appeared in the *Gardeners' Chronicle* of last year, will understand the full force of these remarks. The *Cissus* makes a splendid exhibition plant, and may be either trained on a globe trellis as it grows, or allowed to climb along strings, being careful to keep the leaders apart. I prefer the latter method, as the plant can be transferred to any sized trellis a few weeks before it is required for exhibition. Its last remark applies also to *Dipladenias* and *Stephanotis*. F. W. B.

House Sewage as a Manure.—There are few things, perhaps, of such importance to gardeners as house sewage. It should be used by every one possessing a garden, although many are slow to admit its value. There are some who are quite averse to the practice of applying any sort of manure in a liquid state, and it is on this account that I wish to bring the subject under the notice of your agricultural practical readers, in the hope that some of them will state clearly and definitely the result of their experience; for nothing, I think, tends more to impress the minds of the gardening community than plain authentic statements from those whose experience leads them to divulge the same for the benefit of those around them. Liquid manure has one great advantage, it can be applied at any period of the plant's growth, whereas solid manure must be sown or laid down before the crop is planted or sown; then as the crop advances and requires more support, the dung becomes

exhausted and insufficient. But the facility with which liquid manure can be applied at any stage of growth, and to any degree of strength, affords an easy mode of supplying the lack of solid manure, or of meeting those cases where stable manure is scarce, as often happens, or where it may be that the garden is not short of its necessary allowance, even where plenty is to be procured, owing to the expense incurred in getting it. Of course I allude to those establishments where there is no stable manure made. In such a case I consider house sewage of the utmost importance to the gardener. Every house, therefore, with a garden should be provided with means to secure this fertiliser, which is so beneficial to most of our kitchen garden crops. All must admit that the soil is not so much to be esteemed by the consumer, and that both these qualities are dependent on rapid growth; therefore, by resorting to this valuable manure, the necessary result will be attained. A certain amount of care is, however, required in applying it; for to over-saturate the ground with it, is even worse for the roots than saturation with pure water. It is also very liable to burn the soil in two or three applications, in which case the hoe must be frequently had recourse to, for nothing is worse for vegetation than an encrusted surface. It should by no means be applied to seed-beds. Liquid manure is used with excellent effect for Asparagus, Celery, Lettuce, and all the Brassica family; for fruit trees in pots, Peach and Vine borders—in short, anything which requires stimulating. There are cases on record where the Grape Vine has done wonders, owing to its roots reaching an adjacent sewer. How admirably adapted are the words of our poet Cowper, where he says—

"The soil must be renewed, which, often washed,
Loses its treasures of salubrious salts,
And discharges the roots."

So much in its favour as far as my experience goes; perhaps others, who can give more particular proof as to its utility, will do so. Nevertheless, I hold out that every house with a garden should be provided with the convenience to secure one of the gardener's best friends, for the exceptional summer of 1870 proved it to be a friend in need, and a friend indeed to me. There are many ways for the appropriation and collection of house sewage, but the simplest of all and the most efficient is to dig a well in some obscure part of the garden, or where it is most convenient for its collection; divide it into two compartments by having a wall down the centre, connect the two divisions by inserting a syphon about half way down; convey the sewage into one side from as near the top of the tank as possible to secure a good fall, by which means the solid portions will settle to the bottom of the receiving side, and the clear liquid will pass through the syphon into the other side, from whence it can be pumped up, or used, with as much facility as if it were pure water, but with widely different results. Care should be taken to keep the top secure with a stone slab or close-fitting lid to prevent any offensive smell from rising. It will be requisite to occasionally remove the solid accumulation from the bottom of the receiving side, and this is best done in the winter time, when it will prove to be a most fertilising ingredient to trench into the land. *E. Morgan, The Butts, Harrow-on-the-Hill.* [At Oxford, last year, Dr. Voelcker stated that his experience led to a preference for applying manures through the medium of composts rather than directly to the crops in the liquid state. Eds.]

Poinsettias.—I have just observed Mr. Taplin's remarks at p. 452, in reference to my letter on a first-rate lot of Poinsettias which I had seen at Drayton Manor. It is no wish of mine to dispute the matter with him now, yet I can say that the statement which came of the size of the plants, and the quality of the average as there was any need for. There were certainly many bracts [heads] that would measure a great deal more than 8 inches across, especially in taking the longest leaves of the bract, of which there are some more fully developed in most. I can give Mr. Taplin credit for being able to do a great deal in his own way, for I was a short time one of his men when he was at Chatsworth, but the Poinsettias he had when I was there were not of any particular merit. *Robert Mackellar.*

Foreign Correspondence.

TETUAN: April 12.—We arrived at Tangier on April 7, and on the 8th left for Cape Spartel, some 12 miles to the West, accompanied by a soldier. We took one baggage mule with food and paper for plants, &c., walking ourselves, first up flat grassy valleys with no trees, and then over hills 1000 feet high or so, covered with wild flowers of yellow, blue, &c., and four kinds of Heath, white Broom, *Laureustinus*, *Leontideis* (*Pistacia Lentiscus*), *Phillyrea*, *Hawthorn*, *Arbutus Unedo*, and Oak scrub of several species, and so down to the sea. The coast is steep and rocky, terminating in a bold promontory, on which the lighthouse stands about 130 feet above the sea. The house itself is very peculiar, a square of four blank walls externally, entered by a Moorish arch, inside a large hall, and a room to the sky, with arcades all round, and a fountain in the middle. The Pharos, a square tower with the lantern, rises some 50 feet from the seaward face of the

building, and is a very picturesque object. Eight rooms open into the arcade, two of which were given up to us, all neat and clean, with tiled floor and white washed walls. The lighthouse is an international one, built by the Morocco Government, and kept up by England, France, Spain, and Italy, whose Consuls at Tangier take their turns of inspection. The next day we walked along the beach for three or four miles to some stone quarries that have been in use from the time of the Romans to cut querns from, and the face of the cliff is covered with circular holes marking the spots where the querns were and still are cut. The rocks face the sea—a wild stormy coast, with long sand flats and rocky capes. On our way we found the curious *Drosophyllum*, figured last year in the Botanical Magazine.

Tangier itself is a small walled place, with two gates (shut at 6—7 P.M.), a maze of most filthy streets, swarming with Moors, Arabs, and Jews, and supported by its inside wall by Gibraltar. The markets are pretty. The climate is excellent, especially for chest diseases; the summer is not too hot, they have fires throughout winter, but never in the bedrooms. It is much moister than we anticipated, and the vegetation more backward, but they have had an exceptionally cold winter, snow having fallen at Gibraltar.

This country is evidently a magnificent one; vast tracts are under cultivation, and of a noble sort, however. Wheat, Barley, legumes, and Flax are the staple crops, and vegetables in the gardens. But much of the food at certain seasons consists of a wild vegetable, *Cynara humilis*, a low Thistle that covers the ground in all rich soils; the leaves are gathered for fodder of camels and horses; and next month, when the stems have come up, the markets will be full of it for human food. It is allied to the Cardoon (which I saw cultivated) and the Artichoke, and is called by the Arabs "Chimé."

The plough is of the rudest form, just such as is seen in Egyptian sculptures; the only mill is the quern; the bread, made in flat round loaves, is rather brown, but excellent, barring a little sand. Oranges are the staple fruit; and Almonds, ground-nuts, and Walnuts, from Spain, and Dates from the south-east provinces, are abundant in the markets. The garden culture (*Salads*, &c.) is carried on by Jews, that of the fields by Arabs.

On the route from the north and south, with a soldier and interpreter, for Tetuan, distant 42 miles S.E., intending to break the journey at 30 miles, at a caravanserai or "fondak," where Arabs pass the night. The route was first along the sea-shore, and then inland for miles over low flat valleys and gentle cultivated slopes. The general features of the flora of the low grounds and moderate hills, in this part of North Africa, coincide with those of South-west Spain. The ground is occupied with *Palmetto* (*Chamædorea humilis*) to an extent that I never saw any other *Palm* equal. It occurs in dense tufts, never forming a stem, encroaching on cultivation, and reappearing in clumps in the midst of (quasi) ploughed fields. The flanks of the lower hills, as I have before stated, are clothed with yellow shrubby Leguminosæ (*Genistæ*, *Calycomnes*, &c.), giving the effect of the Broom-covered "knives" of the south; the uplands with various species of *Cistaceæ*, many with thick, leathery leaves. *Calluna*, *Erica scoparia*, multiflora, arborea, australis, and umbellata. Amongst them there are a *Cratægus*, *Arbutus Undulatus*, *Laurustinus*, *Phillyrea* (two species), dwarf scrubby Oaks (*Quercus Suber*, pseudo-coccifera, lusitanica and Tozza?), and *Pistacia Lentiscus* in vast quantities.

Of other trees we see *Poplars*, *Fraxinus Ornus*, or, as all our botanists call it, *Fraxinus*, and *Almond*, all probably planted, and rather rare and scattered, and *Olives* more numerous than all the rest. The forest is everywhere destroyed by successive burnings of the Arabs. The herbaceous vegetation is varied and most beautiful, especially the plants suited to rockwork, which grow, some in good rich loam, others in rocky places. At this moment some five or six species of *Erodium* outnumber all the rest, except perhaps a small annual *Campanula*, Daisy, a variety of *Bellis*, annual and biennial, and *Anagallis arvensis*. Iris juncea is extremely common, as is a deep orange *Calendula* of an extraordinarily rich hue, that sometimes covers an acre or two of hill slopes. Orchids are not so numerous as might be expected. We have found *Ophrys apifera*, *araneifera*, *lutea*, and *Speculum* (the two last probably hybridise together); *Peristylus diphyllus*; *Orchis Morio*, *Simia*, and *undulatifolia*; *Neottia intacta*; *Serapias Lingaria*, and *serotina*, growing together. Bulbous plants are excessively numerous, but except *Ornithogalum*, *Urotopetalum*, and *Phalangium*, few are in flower. *Asphodelus ramosus* is the only other very large and prevalent herbaceous thing I can recall; it form enormous tufts with panicles 3 to 4 feet high, and is almost as common as the *Palmetto*.

The hedge and suburban vegetation is rich and varied. A *Fumaria*, which I never saw before, the petals of which are as large as the leaves, *Convolvulus Spium* (the large-flowered variety), *Tamus*, *Bryonia*, two species of *Smilax*, a *Rubus*, *Rosa sempervirens*, and two *Aristolochias*, are everywhere, with gigantic Nettles and many undeveloped Umbellifers. The prevalent Compositæ are the aforesaid *Bellis*, *Calendula*, and *Pyrethra*, but multitudes are coming up, especially a *Cynara*, which Mr. Ball takes for *C. humilis*, which is used as food both by men and

cattle; it occurs everywhere in enormous quantities. I must not forget amongst the features of the vegetation here, *Agave* and *Opuntia*, both of great size; and an *Oxalis* and *Tropæolum*, which run wild near the towns.

The villages are few and far between, and hardly distinguishable; the houses are mere mud hovels, and scattered without order. Whole tracts are covered with masses of Broom, so that the hills precisely resemble the slopes of Scotland or Jersey. We crossed many small streams, but no large ones; much of the land is under cultivation, and we saw flocks of sheep, and herds of good cattle and horses. Great storks or cranes sailed over the plains, grand birds; and larks abounded, with here and there a beautiful bee-eater. Crossing some high land, about 300 feet or so above the sea, we caught sight of a snow-crested mountain, south of Tetuan, called the Beni-Hassan, a place of Arab pilgrimage, quite inaccessible to Europeans, and the only good way to the rocky, mossy, and scrubby Tetuan, the Beni-Hosmar. At about 20 miles the road, or rather horse-track (for there is no road that a wheelbarrow could go on throughout Morocco), crosses a ridge that separates the waters flowing north and west from those flowing to the Tetuan river; and the scenery becomes very picturesque, the track winding by rocky watercourses, amidst gnarled old *Olives* and *Lentice* growing with low scrubby leaves, and the quaintest trunks, 1 to 2 feet in diameter, burnt half through by the Arab fires when bivouacking—a very grim scene. We ascended about 1200 feet to the fondak, a square whitewashed building on a mountain spur, with a court inside, and a flat roof, swarming with filthy Arabs, camels, mules, and horses; there were six or eight rooms—holes like coal-cellars—without windows, and insupportably filthy. There was no other means of escape, save to pass the trap-door in the roof, and determined to pass the night there as best we could.

On Tuesday we were off at daylight; it was blowing so furious a gale that we could not cook any breakfast. The path continued ascending a low broad valley to the top of the pass, about 1200 feet, whence we descended, still in broad open valleys, and so on through immense tracts of cultivation, to the broad valley of the Tetuan river, where we reached the top of the city, occupying a long low terrace projecting eastward from the hills on the west into a rich cultivated valley, through which the river wound. To the east of the river the peaks of Beni-Hosmar rose to about 4000 feet elevation, very grand and rugged; to the north, the valley broadened out to the Mediterranean. The city contains about 50,000 inhabitants, Arabs and Jews; it is walled and dominated by a castle at the top, but this has been knocked to pieces by the Spaniards, and great part of the city also is in ruins.

The weather is delicious, the vegetation beautiful. The old crumbling walls, with broken Moorish arches, the watercourses lined with gigantic Reeds that wave overhead like miniature Bamboos, the thickets of Hemlock and other Umbellifers, Nettles, Thistles, and other weeds growing at least 6 feet high, and clothed with *Convolvulus* and Brambles, climbing white Roses, and *Tamus*, and the *Opuntia* and *Agave*, the *Oleander* (not in flower) by the rivers, the wild gardens of Orange, Pomegranate, Myrtle, Fig, and Almond, with Pumpkins, Melons, climbing Haricots and Scarlet Runners, and the brilliant green fields of corn and other crops, make up most lovely landscapes, not forgetting the whitewashed Moorish houses that gleam in the sun from out of this luxuriant vegetation.

Yesterday we got a guard from the Caïd (Governor) of the district, and an officer of the Beni-Hosmar, and had a splendid day, botanising up to about 3500 feet. Only one botanist (Mr. Webb) has previously visited the mountain, some 40 years ago. It is a splendid rugged mass of limestone peaks, separated by very steep narrow-floored valleys, the flanks of which are crested with rifted white precipices. The whole is clothed with stunted shrubs up to 3000 feet, consisting in the lower parts of the trees I have mentioned already, and in the higher of a small *Cornus*, exactly like ours to look at, but only 2 to 4 feet high. We found some very rare, and some probably new plants, on the upper part of the mountain, among them the *Hemirambe* gathered by Webb, but which no one has since seen; also *Iberis gibraltaria*, and many other fine plants. At a height of 3400 feet we found no signs of a subalpine flora, though we obtained many things that did grow at a lower level. We could not go to the top, which was cut off by steep gully from the part we reached. The view was superb across the Mediterranean to the Spanish coast, south the snowy crest of Beni-Hassan, and west the hilly country we had crossed in coming from Tangier. Tetuan was cut off by the rocky ridges around; but the view of the city, the great green cultivated plain and winding river, seen as we descended, was exceedingly fine.

Instead of returning to Tangier direct, we made up our minds to visit Ceuta, some 25 miles distance, and thence cross in the Spanish courier-boat to Algeiras, where we spent yesterday, and botanised the hills at the back of the town, and this morning we crossed to Gibraltar, and hope to get a chance boat back to Tangier this afternoon. The day at Algeiras was very instructive, enabling us to compare Spain and the opposite coast at the same season. The general

character of the vegetation was the same, but the civilisation of this, the least civilised country in Europe, is so far ahead of the barbarism of the Moors, that there might be hundreds of miles between them. Of native vegetation, Mr. Ball lighted upon *Rhododendron* and *Erica ciliaris*, neither of which are yet found in Morocco, as also a beautiful *Helianthemum*, which he thinks is unnamed. The plants, too, are rather more forward on this side the Straits. F. D. Hooker.

Societies.

LINNEAN: April 6.—G. Bentham, Esq., President, in the chair. The following papers were read:—

1. *Notes on the Styles of Australian Proteaceæ*, by G. Bentham, Esq. In the *Proteaceæ*, as in the *Compositæ* and some other orders, it has been observed, the author remarked, that the anthers in most cases open perianth, very various. The observations he had made had indeed, been chiefly founded upon dried specimens, and might require to be supplemented, and probably in some instances corrected, by carefully watching the process of ripening, and the mutual action of the anthers and stigmas, and the plants in flower, or perhaps the use of a form of a close cylinder round the papillose portion of the style, which has probably some stimulating influence on them, for immediately before the opening of the flower we find the anthers open inside, and the pollen grains crowded on the stigma, which undivided, the stigmatic surface is soft, or above or below the anther cylinder, is as yet immature, dry, and evidently capable of absorbing pollen. When the flower is quite ready to expand, the force which overcomes the cohesion of the valvate perianth-segments and anthers generally, is the same, and the stigmas are less of elasticity, so as to promote the scattering of the previously loosened pollen, after which the liberated style matures its stigma, and becomes ready to receive any pollen that may reach it from neighbouring flowers. The cohesion of the perianth-segments is generally stronger than that of the anthers, or perhaps the stigma is more, and more particularly so either at the top or at the base of the limb, at the point of insertion of the stamens immediately under the base of the anthers. The ripe anthers, with the immature stigma buried in a mass of pollen, are thus kept in close confinement and inactivity, in some instances for a lengthened period. When the style by its growth at last succeeds in liberating itself, it is chiefly in two ways. In many of the straight, regular-flowered species it will force its way straight through the end, separating the tips of the segments, and the stigma will move up or down, or of elasticity to the base of the stamens, or lower down. In many curved-flowered species the resistance opposed by the cohesion of the limb is greater, the style by its growth becomes more and more bent like a bow, breaks out from the base, and then the stigma will move up or down, and from the limb, either by splitting it from the base upwards, or by slightly opening it at the base only. It would appear that the extra force required by the style for this final effort is sometimes influenced by meteorological or other circumstances, and may not always occur, for we often see in Banksia cones, which have been long in flower, and have even ripened their seeds, the majority of the withered flowers with the anthers and end of the style still closely imprisoned in the closed limb; but then in those cases the majority of the ovaries have not ripened into fruits. The perfect fruits, Mr. Bentham believes, always correspond to liberated styles, but this point requires further observation on the living plant. The style of *Petrophila longifolia* was then described as being a good style, and the stigma was kept in the straight flower, and the stigmatic arrangements in *Personna*, *Banksia*, *Grevillea*, *Hakea*, *Adenanthos*, *Agastachys*, *Conospermum*, *Synaphea*, &c., were noticed in succession. The bifurcation or bifurcation of the style end in *Adenanthos* and *Agastachys* was also noticed, and the grounds on which some botanists have established a theory that the gynæcium of *Proteaceæ* is bicarpellary, as they also suppose it to be in *Laurineæ*; but the frequent obliquity of the stigma, the arrangement of the ovules when several in one double row, or in a single row, or in a row of the ovary and other minor circumstances, have convinced the author that both are essentially monocarpellary. The division of the end of the style of each carpel occurs in many pleiocarpellary genera, as in *Cleome*, *Cordia*, &c.

Other genera, the *Paronychiaceæ*, *Amarantaceæ*, and many others, are examples of a really 2—3 carpellary gynæcium with a single ovule.

11. *On the Generic Nomenclature of Lepidoptera*, by G. R. Crotch, M.A., Assistant Librarian at the University of Cambridge, communicated by Newton, Esq.

April 20. G. Bentham, Esq., President, in the chair. A. F. Haselden, Esq., W. H. Jackson, Esq., and A. Müller, Esq., were elected Fellows. The following communications were read:—

1. *Notes on a Paper by Mr. Andrew Murray, "On the Geographical Relations of the Chief Coleopterous Fauna,"* by Roland Trimen, Esq. The author commenced by observing that the drift of Mr. Murray's main argument is to account for the greater part of the difficulties presented by the known existing distribution of animals and plants over the globe, by the simple explanation of "continuity of soil at

some former period," but while all will admit that very great changes have taken place in the relative extent and position of land and sea, during various periods of the past, and though the he concurred with many naturalists when he ventured to express the opinion that too frequent recourse had been had of late to that broad and general admission as a mode of solving the difficulties in question, and that a rather wholesale creation of artificial continents had been resorted to, he was not disposed of such problems by "calling up" connecting lands "from the vasty deep," in which it is assumed they have been submerged, has, he admitted, something attractive about it, and possesses the manifest advantage of affording the fanciful geographer an inexhaustible field whereon to dispute himself.

"The world is all before him, where to choose."

The author then proceeded to set forth certain of his own observations bearing on some parts of the subject treated in Mr. Murray's paper.

II. *Extract of a letter from Mr. Murray, on the Relation between the Fauna and Flora of South Africa, and the Mediterranean element of the European region.*

EDINBURGH BOTANICAL: February 9.—Prof. Balfour in the chair. The following communications were read:—
I. On *Anholoths Pittcairniae* and its Fruit (*Cardiocræon*), with other Fossil Plants, from Falkirk; by C. W. Peach, A.L.S.

On the Cultivation of *Cinchona at Rungebe, Darjeeling*, by C. B. Clarke, M.A., in charge of Cinchona plantations in Bengal, communicated by Professor Balfour. Mr. Clarke gives full details regarding the Government Cinchona plantations in Bengal, now extensive, at Darjeeling, at Rungebe, at an elevation of 3300 feet, the mean temperature is 64°; at Rishap, at 2550 feet, it is 57°, according to observations taken in 1867. During 1869, the rainfall was 157.70 inches at Rungebe, at an altitude of 5000 feet, and 91.6 inches at Rishap at the same time. One year's Rungebe is very like another, both in temperature and in general distribution and quantity of rain. The proper climate for *Cinchona succubra* and *C. Calisaya*, appears to be a warm, equable, and excessively moist one. Though the rainfall at Rishap is so much below that of Rungebe, the humidity is almost as great, and is well adapted for Cinchona cultivation. The Rungebe plantations are visited about once a year by hailstorms, which, however, do but little damage, and they are almost free from violent winds, which is a very essential advantage, as the Cinchona trees are brittle, and have heavy branches. Mr. Clarke notices particularly *Cinchona officinalis*, *C. succubra*, and *C. Calisaya*. The most successful plantations of *C. officinalis* in India are Mr. M'Ivor's, on Dodabetta, in the Nilgieries, where many of the plants are now grown into trees 20 feet high. The trees here look very like those of the other plants of *C. succubra* or *C. Calisaya*, and will never yield bark equal in quantity to that of the two last named species. At the same time the high quality of the bark, and the comparative facility with which it can be worked up into crystalline granules, will make it a plant almost worthy of attention. The Nilgier plantations of *C. succubra* of six, seven, eight, and nine years' growth are successful examples of cultivation. Mr. Clarke refers to Mr. M'Ivor's method of mousing up the plants with a view of improving the yield of quinine, and states his own experience of this. He says that this is the most magnificent species which ranks first of all bark in the London market, the bark being now worth 9s. per lb. The only locality yet discovered where it can be grown to any economic advantage in these plantations is at Rishap. The case of the entire bark of the tree, regarding the preparation of the different species of Cinchona, preparation of the bark, &c. The quantity of quinine issued from the Government medical stores for the official year 1869-70 (for Bengal, North-Western Provinces, Punjab, and Central Provinces) was 2679 lb.

Letter from Professor Christian to Professor Balfour, regarding the introduction of Cinchona, in India. Professor Christian says:—"A long time ago, somewhere between 1838 and 1842, I sent a memorial to the Board of Directors for India, strongly urging them to introduce the Cinchona plants into that country, on the grounds that the Cinchona forests were getting rapidly depopulated in America, while the demand for the Cinchona alkaloids was as steadily increasing, and because India presented great tracts of waste lands apparently well suited for the transplantation of the trees. I also pointed out that, if the transplantation were done, it would be remunerative. For, although it would be a very arduous undertaking, were the bark to be collected only by cutting down large trees, which do not attain sufficient growth in less than 20 or 25 years—being the only American method of obtaining the bark, the trees would be shown the bark could be profitably taken from trees very much younger, and without either destroying or even injuring them. Now, I had ascertained by chemical analysis that, contrary to the analysis of some French chemists, sulphate of cinchonine was to be obtained from the bark, and that the bark taken from twigs 2 or 3 years old in as large proportion as from the large 'flat' bark, from the trunks and great branches. Consequently, as it appeared, from the fact that the trees grew in their native forests by suckers from the old roots, that the result would be, that down, that young twigs might be safely cut from them at an early period, it followed that the collection of Cinchona bark might be conducted in the same way as that of Cinchona bark at Colombo, where only twigs of one or two years' growth are used. For the purpose, and without any loss of time. You may have seen that the quinine has proved true, so true that it has been found suitable in India, even to treat the Cinchona plants like osier beds in England, by cutting them down altogether when young, thus using only twigs for the bark, and trusting to suckers for the replacement of the growth of the plants, and that the result has been the introduction of fine bark from India, in such bulk as to have lately been sold by auction in the London market, only nine years after the first Cinchona plants were transplanted to India. My memorial was sent to the India Board,

through Dr. Royle, and was backed by him. Indeed, it was written at his suggestion, in consequence of a conversation I had with him on the subject. I have doubts as to whether Dr. Royle had moved in the matter. But these events are so old that I must by no means rely on my memory for such a fact. One thing, however, is certain, no step was ever taken by the East India Directors in consequence of the representations of either one or the other of us. Dr. Royle frequently lamented to me this inaction. Not long ago, on reading the introductory remarks of Mr. Markham, in his excellent account of the introduction and progress of the Cinchona culture in India, it occurred to me to endeavour to recover the date and precise contents of my memorial, by interesting Dr. Waring, and, through him, Dr. Forbes Watson, in a search for it, as I had no copy, and cannot find any reference to it. But I am sorry to say that no trace of it could be discovered."

IV. *Miscellaneous Communications*.—Dr. Alexander Christian sent notes regarding the growth of a plant of *Fourcroya gigantea* in the garden at Agart. He states in a letter to the Editor in Edinburgh:—"January 4, 1870.—The main stem of the plant before my door shot up to 27 feet, but round its base appeared a number of young plants growing direct from the base, just where it met the ground, and one of these sent up a shoot about 3 inches high, and sat thick, which flowered sparsely compared with the main stem. The big stem, I thought, had finished its work, and it was cut down about a month ago, and stuck up against a tree to dry if it liked; but not a bit of it, for young branches, with young plants at their base, continued to form as happily as when the stem was part of the original bush, and the surface of the stem is quite moist on pressure with the nail. Truly it is a wonderful plant! Another mode of propagation, visible in the species with the lowest leaves, is by young runners, which grow from runners at a little distance from the parent stem; but, of course, this is only a variety of what I have mentioned above. The question of species I don't care much about, but I am sure your plant in a former letter is identical with the somewhat common one here, and that the plant I have, which is off St. Helena stock, is of another kind. I wonder if I could send some young plants home! They have strangeness, and still out of the ground, green and unchanged, but without taking root as yet, though two months planted. A few are fattening out, but most are unchanged, and of size 3 inch in diameter, and 2 to 3 inches long. February 1, 1870.—My Agave (*Fourcroya*) is still flourishing, and developing new young plants, though long separated from the main plant and now merely set up against a tree (to dry, as I thought at first). The young plants in pots are much as they were, and that the plants are coming down—hardly larger and without roots. You can pull them up at once with ease, but I fancy they will make a start in warmer weather. February 14, 1870.—The Agave stem is still green, and furnishing young plants though cut down for more than two months, and the plants against a tree. The young plants I put in the ground remain in *stata quo*, but I expect they will shoot up in the coming warmer weather. March 14, 1870.—I find my young plants are much as they were—alive, green, but rootless, and with tiny leaves that don't advance. I suppose they shoot up at some unexpected time during the hot season. The stem that was cut down several months ago is still green, and producing new little bulbs. May 4, 1870.—I don't suppose it is any novelty, but it may give you some amusement to look after fifty young plants, which should be each along with this. All my 500 or 600 young plants are growing vigorously, being about 6 inches high, in a temperature of 90° to 100° by day, and 80° by night, so you will have to give these warmth. Try some in pots with a warm sun on them, in and out of the house, and perhaps in a hot-house, and you will heat but not much moisture; others might be in a moist place. What cold they will stand I don't know, but little plants like these have been nearly six months in the ground in the cold season, with the temperature at night, for some time, of 40° on the surface, and the old plants go through the winter in seasons all the year, and grow to a height of 3 feet, they are very ornamental if set out each in a large pot or painted half-cask, and it may be found that they can be planted out if protected by a cover in winter."

observations and figures of Prof. Westwood and Mr. Berkeley on our columns are omitted.

Obituary.

We regret to announce the death of Mr. WILLIAM WILSON, the well-known musicologist, which took place at Warrington on the 34th of this month. Mr. Wilson was born in 1799, and was educated for the law, but resigned his studies in 1826, and from that time has been engaged almost entirely in botanical pursuits. His fame chiefly rests upon the "Bryologia Britannica," the standard work upon British Mosses, which was issued in 1855, and of which a new edition was in contemplation at the time of his death. He was in intimate correspondence with Drs. Schimper and Lindberg and other continental bryologists, among whom his extensive knowledge procured him a high position. In the earlier portion of his life he devoted considerable attention to British flowering plants, and we are indebted to him for the first discovery and record of *Cotoneaster vulgaris*. This, as well as some other plants, he described for the Supplement to "English Botany." He is frequently referred to in the "British Flora," and has contributed many interesting papers to the "Phytologist" and other periodicals. He subsequently devoted himself exclusively to the study of Mosses, and his "Bryologia" will always remain a monument of his attainments in that branch of botanical study.

—Died, on the 25th inst., at the Pendleton Nurseries, Mr. CHARLES NOYES, aged 71 years.

THE WEATHER.

STATE OF THE WEATHER AT BLACKHEATH, LONDON, FOR THE WEEK ENDING WEDNESDAY, APRIL 26, 1871.

1871. MONTH AND DAY.	Reading of Barometer reduced to 32° Fahr.	Dry- Thermom. ° Fahr.	Wet- Thermom. ° Fahr.	Dew Point. ° Fahr.	Degrees of Humidity	Weight of Vapour in a cubic Foot of Air.	At a G.M.S.	
							Ther- m.	Gr.
April.								
20. Thurs.	29.19	48.2	45.0	44.0	92	3.4		3.4
21. Friday	29.19	48.7	45.3	43.7	90	3.4		3.4
22. Saturd.	29.19	48.7	45.3	43.7	90	3.4		3.4
23. Sunday	29.19	48.7	45.3	43.7	90	3.4		3.4
24. Monday	29.19	48.7	45.3	43.7	90	3.4		3.4
25. Tuesd.	29.19	48.7	45.3	43.7	90	3.4		3.4
26. Wednesd.	29.19	48.7	45.3	43.7	90	3.4		3.4

1871. MONTH AND DAY.	Highest.	Lowest.	Range in ° Fahr.	Mean.	Direction.	Horizontal Movement.	Inches.	WIND. RAIN.	
								W.	R.
April.									
20. Thurs.	58.0	45.5	12.5	51.8	W.	0.10	0.10		
21. Friday	58.0	45.5	12.5	51.8	W.	0.02	0.02		
22. Saturd.	58.0	45.5	12.5	51.8	W.	0.02	0.02		
23. Sunday	58.0	45.5	12.5	51.8	W.	0.02	0.02		
24. Monday	58.0	45.5	12.5	51.8	W.	0.02	0.02		
25. Tuesd.	58.0	45.5	12.5	51.8	W.	0.02	0.02		
26. Wednesd.	58.0	45.5	12.5	51.8	W.	0.02	0.02		

April 20.—Generally overcast throughout the day. Rain fell frequently.

— 21.—Generally cloudy till night, then nearly clear. A little rain fell in the afternoon.

— 22.—Overcast in the morning, variable afterwards. Rain fell continuously throughout the day.

— 23.—Very variable, but generally fine day. Several showers of rain fell.

— 24.—Generally overcast, and occasionally very gloomy. A little rain fell at 4 a.m.

— 25.—A fine day throughout. A little rain fell occasionally in the day and at night.

TEMPERATURE OF THE AIR AND FALL OF RAIN AT DIFFERENT STATIONS.

NAMES OF STATIONS.	Highest.	Lowest.	Range of Week.	Mean of all High- est.	Mean of all Low- est.	Mean of all Range.	Mean.	FALL OF RAIN.
Portsmouth	58.0	45.5	12.5	51.8	44.7	15.3	50.3	2.96
Blackheath	58.0	45.5	12.5	51.8	44.7	15.3	50.3	2.96
Bristol	58.0	45.5	12.5	51.8	44.7	15.3	50.3	2.96
Birmingham	58.0	45.5	12.5	51.8	44.7	15.3	50.3	2.96
Wolverhampton	58.0	45.5	12.5	51.8	44.7	15.3	50.3	2.96
Leicester	58.0	45.5	12.5	51.8	44.7	15.3	50.3	2.96
Nottingham	58.0	45.5	12.5	51.8	44.7	15.3	50.3	2.96
Norwich	58.0	45.5	12.5	51.8	44.7	15.3	50.3	2.96
Sheffield	58.0	45.5	12.5	51.8	44.7	15.3	50.3	2.96
Manchester	58.0	45.5	12.5	51.8	44.7	15.3	50.3	2.96
Liverpool	58.0	45.5	12.5	51.8	44.7	15.3	50.3	2.96
Salisbury	58.0	45.5	12.5	51.8	44.7	15.3	50.3	2.96
Greenock	58.0	45.5	12.5	51.8	44.7	15.3	50.3	2.96
Leeds	58.0	45.5	12.5	51.8	44.7	15.3	50.3	2.96
London	58.0	45.5	12.5	51.8	44.7	15.3	50.3	2.96
Newcastle	58.0	45.5	12.5	51.8	44.7	15.3	50.3	2.96
Edinburgh	58.0	45.5	12.5	51.8	44.7	15.3	50.3	2.96
Glasgow	58.0	45.5	12.5	51.8	44.7	15.3	50.3	2.96
Dundee	58.0	45.5	12.5	51.8	44.7	15.3	50.3	2.96
Aberdeen	58.0	45.5	12.5	51.8	44.7	15.3	50.3	2.96
Fairley	58.0	45.5	12.5	51.8	44.7	15.3	50.3	2.96
Greenock	58.0	45.5	12.5	51.8	44.7	15.3	50.3	2.96
Leith	58.0	45.5	12.5	51.8	44.7	15.3	50.3	2.96
Perth	58.0	45.5	12.5	51.8	44.7	15.3	50.3	2.96
Dublin	58.0	45.5	12.5	51.8	44.7	15.3	50.3	2.96

JAMES GLAISHER.

Notices of Books.

Waifs and Strays of Natural History. By Mrs. Alfred Gatty. Bell & Daldy. Small 8vo, pp. 165.

The nature of this little book is sufficiently well indicated by its title. It consists of a series of pleasantly written gossiping essays on natural history, and is specially intended for the amusement and instruction of children. Most of the articles we recognise as having previously seen service in the author's admirable periodical for children, known as "Aunt Judy's Magazine," nevertheless they are quite worth reissuing in the elegant typography of the present volume. Parents on the look out for some book to place in their children's hands can hardly do wrong in procuring this little volume for the purpose, and especially if the proposed recipient have any taste for natural history.

The Report of the Fruit Growers' Association of Ontario for the year 1870 is before us. It contains, in addition to a series of reports on fruits, an essay on the noxious insects of the province of Ontario, or, at least, on those attacking the Apple, the Grape, and the Plum. In another season it is proposed to treat of the insects affecting other fruits. The descriptions of the insects are accompanied by woodcuts. The new Vine disease is said to have confined its attacks to the Frost Grape. By an oversight all reference to the

Garden Operations,

(FOR THE ENSUING WEEK.)

PLANT HOUSES.

IN *Orchid-houses* proper a steady increase in the temperature must be made so as to advance them gently up to the full summer maximum, which should be attained at no very distant date. In this matter we should take time by the forelock, having regard to our own changeable climate, in connection with the treatment they require during the four seasons, so distinctive in their features, which they have to pass through under an artificial state of culture in this country. I advise the work to be started at such a time as will allow their growth to be completed, and so about the advent of our longest day, especially such as produce pseudobulbs, which require the utmost amount of sun-light and warmth which our very uncertain autumn furnishes to ripen them efficiently. Though I refer more immediately to such as produce pseudobulbs, these remarks apply equally to other kinds. Even the gorgeous *Saccolabium*, *Vandas*, &c., are influenced very materially by the same surroundings. An early growth, begun in the spring, insures that proper limitations are imposed with healthful strength, assures a longer and more felicitous period in which to form a larger and better increase of surface, which is able to impose its own natural check sufficiently early in the autumn to insure their perfect maturation before they go to rest. To the more exotic kinds, or such as are inhabitants of the hot jungles of Hindostan and other parts of the torrid zone, I would now suggest that a mean temperature of 62° by night, with 68° by day, be always maintained, with a rise of 10° or 12° by sun-heat alone. In connection with the above, more than ordinary attention to watering must be given, because of the fact that, though they should never be permitted to become so dry as to actually feel the want of root moisture, an excess must be strictly guarded against for a few more weeks to come, when no ground of caution in this matter is requisite. I write more particularly regarding *Phalenopsis* and other more delicate sorts, which have been lately potted; though, taken in the abstract, this treatment applies to all. Give to each pot requiring water a good soaking throughout with tepid water, soft if procurable—and be careful not to pour it over young leaves or pseudobulbs in a soft weak state, since it may cause them to be so much injured by less than time theorem. With a fine syringe apply clean tepid water over the plants alike once or twice a day according to the state of the weather, always bearing the fact in view that it is of importance they should dry thoroughly at least once during the day. To add to the durability of such as are in bloom, provision may profitably be made to remove them into a cooler house, where less humidity exists. In the case of plants so treated, draughts must be most particularly guarded against, and must too arid or too low a temperature be permitted. Blocks, baskets, &c., containing any kinds hung up within the houses must be kept constantly and uniformly moist, by being frequently dipped into a tank or tub of tepid water. In regard to stoves and greenhouses, as the plants are in the main growing strongly at this date, some attention should be given to the matter of affording abundance of room to each specimen, and to turn each round so as to equally expose it to the sun and enjoy the light. Greenhouses as well as stoves should now have the floors and other cool absorbent surfaces saturated with water, to induce a nice, soft, growing atmosphere to pervade them. Sow other batches of *Amaranthus*, *Cockscombs*, and *Balsams*, if a succession is needed, pointing on such as are already up. Many will now have their *Indian Ascleas* coming into bloom; it is of great importance that a liberal supply of water be afforded them at such a juncture.

FORCING HOUSES.

Pines now ripening must receive every attention in regard to root moisture, and the alternating phases of external weather, for whilst they are quiet under its more favourable aspects, which are casual and highly transitory, yet considerable caution is absolutely necessary. If, in other words, a fine sunny drying day or two occur, drying the soil moderately in the pots of such as are in an advanced stage of ripening, it will not be well to give them water too hurriedly, in the case the next two or three days should be dull, cold, and unpropitious. Rather permit them to lie in some degree through being too dry, than by having an excess of root moisture, to get into a condition which is detrimental to their flavour. To-morrow being the last day of April, it behoves growers to produce a more excitable atmosphere, in conjunction with the natural impulses of the season, in Pine-pits or Pine-houses of every description. Excepting in instances where large modern spans of glass are used, and the houses are very light, it will be advisable not to make preparations to disperse in *to* with any kind of shading that has been in use during very bright sunshine. Syringe all successional with tolerable freedom three or four times a week. Give air earlier in the morning, reducing it somewhat later, so as to gradually bring the plants through the state of transition, between the early spring and summer months, as gently as possible. Take advantage of the next bright warm day to

increase the mean temperature by 2°, being careful during the first bright day or two to admit sufficient air to move the atmosphere within the structure, so as to neutralise the dangerous effects of the now powerful sun's rays. *Vineries* will in the main be now in full work in some stage or other, and with the advent of May the full summer temperature, with all its necessary accessories, should be assured. Great care must be taken to allow all such *Vines* as are so far advanced as to have Grapes colouring, all the air possible, for without this the true merit—a good flavour—cannot be assured. To do this the more liberally, the thermometer should be watched early on fine mild mornings, in order, if possible, to perceive quickly any upward tendency which may be occasioned through the sun or other influences. Then, instantaneously, a moderate and studied amount of air should be given,—not such an amount, however, bear in mind, as will cause the temperature within the vine to fall by even one degree, but such as will neutralise any but a moderate rise. By these means a rarified air will be assured, following the long closed feeding hours of night, aiding the leaves to elaborate more freely the crude sap taken up, and which, by these aids, they are enabled to turn into the more rarified, subtle juices of a progressively ripening fruit. By thus studiously giving air at the earliest possible time in the morning, it will be possible to close up earlier in the afternoon, to the greater benefit of the fruit and the economising of heat—the temperature of the house being kept up through the night with a more limited resort to the aid of artificial heat. Give manure water with moderate freedom to pot fruits advanced in growth. There are none but will accept this boon with a zest, providing the manual offerings are of a somewhat moderate kind, and it is in my mind that the higher fertilising properties are possessed plentifully by the lighter fluid after the grosser sediment has, by settling down, been separated therefrom, especially will this aid *Pot Vines*, *Figs*, and all kinds of stone fruits.

HARDY FRUIT GARDEN.

Proceed quickly with the thinning-out of *Apricots*, the crop upon which, I am informed, has set very abundantly this season very generally throughout the neighbourhood of Essex. Here, as elsewhere, it is to remove five or six finely developed fruit to each one that is allowed to remain. In thinning them always choose the finest fruit, and that in positions where it can grow without let or hindrance by compression against the walls or branches. Continue to thin out the young growth upon *Peach* and *Nectarine* trees as they require it. In regard to this matter I would, to save repetition, refer the reader to the excellent practical remarks made by Mr. Miller, of Workshop Manor, at p. 517.

HARDY FLOWER GARDEN.

Hardy Annuals may still be sown where from any causes it was not desirable to sow earlier. It will also be found an advantageous time to sow biennials, such as *Sweet Williams*, &c., and perennials of the *Hollyhock*, *Polyanthus*, and *Auricula* types. Harden off *Zinnias*, *Stocks*, *Asters*, &c., by removing them into a cool structure, where immunity from frost is enjoyed. Prepare finally the design for your flower beds, based upon the experiences gained and made note of last season, and the kind and quantities of the plants you have been able to keep through the winter. I have urged in previous Calendars the importance of keeping all light kinds of soil as firm as possible, by not digging such as were properly dug up in the autumn, and which have subsequently lain in fallow during the winter.

KITCHEN GARDEN.

Following the recent very bounteous and beautiful rains, the hoe must be kept constantly at work when a dry period ensues, until every bit of ground has been well hoed. The weeds already formed are very plentiful, and will make a rapid advance until this has been done, and I have found that there is still a disposition in some places to use the old Dutch hoe, which I have such an aversion to that I would not allow it upon the premises. It is such a superficial penetrator, giving not a tithe of the aid which the more ordinary kind of hoe now in use does; besides, to hoe deeply not only proves a sure destroyer of weeds, but forms a powerful aid to the plants in their growth. Mow up the *Clifforters*, and other grasses needing it. Transplant any kinds of *Kale* or *Broad leaved* enough for such a purpose. Sow a good breadth of *Scarlet Runners*, *Dwarf French Beans*, *Beet*, *Lettuce*, &c., for main crops, successional supplies, &c. Remove quickly all old stumps of every kind of "greens," *Broccoli*, *Brussels Sprouts*, &c., which have ceased to be of further use, and trench the ground over immediately, in preparation for other crops, and to guarantee a neat and tidy appearance throughout.

W. E.

Notices to Correspondents.

ABERGELE: J. F. H. Apply to Messrs. Webber & Co., Messrs. Johnson, or Mr. L. Solomon.
APPLE: J. W. The fruit was so much bruised in coming through the post that it is impossible to identify it.
AZALEA CULTURE: E. C. See p. 321 in our last issue.
BOOKS: *Ignoramus*. Thomson's "Handy Book of the Flower Garden," and Loudon's "Amateur Gardener's Calendar," will both be useful to you.—An Amateur.

"Thomson's Practical Treatise on the Grape Vine" (Blackwood). There is no recent treatise on the Cucumber, and probably most of those which have been considered as authoritative are now out of print.

CAMELLIAS: V. B. The disease in your *Camellias* resembles very closely the spot in Grapes, and possibly arises from something wrong about the roots. The young leaves, independently of the spot, do not all seem very healthy. The parenchyma in parts very weak. We should recommend you to examine the roots, which, however, ought not to be a bad condition from old statement, except they have been allowed to get dry, and have then been overdone with water. If the roots are healthy you must consider whether your plants have been exposed to sudden chill. It may be possible to ascertain the cause of the spot, but we can mainly form a conjecture, which may be erroneous, from the specimens before us. M. J. B.

CLIMBERS FOR FERN-HOUSE: E. K. H. For the roof introduce the climbing Fern, *Lycopodium japonicum*, often called L. microphyllum, and *Lapageria rosea*, if you have patience to wait for the latter to make a start. We should also be inclined to try *Berberis repens* corallina. To clothe the wall there is nothing so good as the small-leaved Ivy-like *Ficus stipulata*, commonly called *Ficus repens*. Perhaps any of our readers who have successfully cultivated them in a combined conservatory and fernery with a north aspect, and slightly heated, will be good enough to mention them. The beautiful *Callitriche polyphylla* would probably succeed in place of it, but we got to make a start, and *Ruscus androgynus* is a fine climber even in the open air.

CUCUMBERS: C. E. The roots of your Cucumber are covered with tuberculous excrescences which are now much decayed, and which we believe are produced by a minute *Vibrio*. The interior of some of the tubers is occupied by a white gelatinous mass consisting of oblong unseptate spores, which belong to some species of *Fusicipium*, which is in all probability an after-growth. Doubtless the *Vibrios* have in the end destroyed the Cucumber plants. You should remove the soil, or the same mischief may be repeated. The *Agropyrum* trees were much injured last and the previous year by the species of *Oidium*, of which you have sent a specimen. It is very near to that which has been so fatal to *Vines*. You should apply sulphur. *Whitehorn* is often affected with the same fungus. M. J. B.
FUNGUS: W. F. *Agaricus nudus*, Bull. M. J. B.
GOLDEN TRICOLOR PELARGONIUM: W. G. Mrs. Pollock.

INDOROUS PAINT: *Lattenburg*, and others, ask if this is now on sale, and if so, where. We are not aware that it is on sale in this country. The notice that the Company now forming is 10A, King's Arms Yard, Moorgate Street, E.C.

MILLED: W. G. The specimen sent has been so utterly crushed by the post stamping that, after wasting a good deal of time upon it, we have been obliged to give it up as a bad job. If our correspondent will send a few specimens in spirits we shall willingly resume our examination. All we can say at present is that it is not British. A. M.

NAMES OF PLANTS: A. K. H. *Spirea japonica*, see p. 546.—C. P. *Erica hercynica*, *Arabis alpina*, and one of the *Aubrietias*, probably, from its colour, A. *Campbellii*.—G. Y. *Polystichum capense*.—N. H. *Azalea amena*. We cannot attempt to name the *Rhododendron*.

PLANTING: A. M. CHICHESTER. The plants back as long as possible, and strike the cuttings in the autumn.

VINE DISEASES: D. D. The tuber from the stem of a Vine is one of those curious growths somewhat analogous to the galls which occur on the Beech tree, and perhaps like them, indicating an adventitious bud. The smaller one is of the same nature, but in an advanced state of decay. They will not themselves injure the Vines, any more than analogous growth do Beeches or Elms or other trees on which they occur. The precise cause of the disease is at present very obscure. M. J. B.—W. S. C. A very common affection of Vine leaves, consisting of an over-development of the cellular tissue of the leaves. It is not injurious. The cause is uncertain. M. J. B.—A. B. The appearance on Vine leaves is extremely common, and, we believe, not injurious. It is merely a little over-development of the tissue of the leaf from some imperfectly understood cause. M. J. B.

ERRATA: In the report of the meeting of the Royal Caledonian Horticultural Society, there is a slip in the list for 18 Haynatts should have been credited to Messrs. T. Methven & Sons, instead of to Messrs. Dickson & Co.—In our report of the last meeting of the Fruit Committee, at p. 530, it is stated that Messrs. Rivers & Sons were the exhibitors of the collection of fruit sent by Sir Germain Pears, which should have been credited to Mr. C. Ross, gr. to E. Eyre, Esq., Welford Park, Newbury.

CATALOGUES RECEIVED: Vilmorin-Andrieux & Co., General Catalogue of Seeds and Plants.—John Scott, Flower Garden Annual Directory, and Catalogue of Bedding Plants.—Haynes & Sons, Catalogue of Garden Syringes, Hydronettes, &c.

COMMUNICATIONS RECEIVED:—G. C. (next week).—J. W. O. & Co.—T. D.—P. M. B. (next week).—D. G.—E. M.—J. Q.—V. S. Cardigan (next week).—J. H. Leicester.—J. B.—W. B.—M. J. N. A. B.—A. B.—A. G.—A. B.—A. G.—A. D. B.—J. A.—A. F.—T. C. & Sons.

Markets.

POTATOS.—Southwark, April 24. During the past week the *Irish*, *Swedish*, and *Belgian* have been much lighter, but still a large supply by rail. The trade has been better for all fresh lots of good quality, but stale or warehouse Potatoes are still a drag on the market. The following are this day's quotations:—York-

of animals and machines was already far advanced, and when the production of corn in this country began to diminish. We may be said to be entering now upon a third epoch. The Royal Agricultural Society has just announced that the supplies of guano are exhausted; it did not proclaim in the same report that its greatest field of usefulness is closed, but such is the fact. The annual show may still be an useful gathering, but it has lost its original and chief object; exhibitors and their customers have been introduced to each other, the prizes have been given to the best kinds and sorts, the stamp of merit has been affixed to the most approved models, and in these respects good work has been well done, and breeders and makers and their customers will take care that it is never undone. Competitions now are very frequently not trials and comparisons of the qualities of animals and machines, but of the skill of the exhibitors as exhibitors.

As regards its shows, the work of the Society is, to a great extent, over. The Marquis of Tweeddale and the Highland Agricultural Society are alive to this,—they have expressed these views, and are taking the lead in the entry upon new fields of labour. We do not doubt either the ability or good intentions of the English society. We are merely pointing out the fact, that the present is the commencement of a new era in agricultural history. What will the Royal Agricultural Society do to maintain its prestige and influence? and what will farmers do without guano?

It was well said by HALLAM, in "Middle Ages," "There are but two possible modes by which the produce of the earth can be increased: one by rendering fresh land serviceable, the other by improving the fertility of that which is already cultivated. This last is only attainable by the application of capital and skill to agriculture, neither of which can be expected in the ruder ages of society." One consequence of being no longer in the "middle ages," is that very little "fresh land" can now be "rendered serviceable" within reach of the great and growing centres of population. Previous to 1846 an immense resource of that kind was available; it has been exhausted in that short space of time. We have also, within the same period, increased the capital of farming, and we all know that the farmer who employs £10 an acre must send more corn to market than he who employs £5. But the secret we want to discover is how to grow corn and meat at a less cost, for it cannot be said that agriculturists get rich too fast, although prices are continually rising.

We are no longer in "the ruder ages of society," yet nothing can be more confused and less scientific than public opinion on the questions of food supply and of agriculture. The law of compensation is ignored. The land is regarded as a machine into which we put seed and labour, in order to *manufacture* crops; and to carry the illustration to its limits, when the crops have been eaten by man, they are considered to be worn out, like old clothes, and to be good for nothing but to be thrown away. London throws its consumed crops into the Thames at Barking, other towns throw them into other rivers, and sea-side places cast them out to sea.

So long as this barbarous system is permitted, the towns will drain the fertility of the soil, and the cost of producing food will continually increase, for the consumed crops are the remains or dead body of our waving corn crops and fields of Turnips; and if these remains or ashes of the food we eat were buried in our fields, they would be again renewed in their old forms.

One would have thought that "public opinion" could realise that there could be no good farming without pigs, cattle, and farmyards; cannot "public opinion" realise also the effects on agricultural production of adding 30 millions to the number of the farmer's live stock, and of making every town a source of manure?

Public opinion, however, cannot be formed without knowledge, and ignorance of the elements of agricultural chemistry on the part of those who are chiefly concerned in the food question prevents them from even knowing that by means of a national economy food might be produced more cheaply and so abundantly in our own fields, on the home farm, that the little we should require from abroad, if we required any, would be obtained on easy terms from the nearest and best markets.

We cannot but anticipate with deep interest

the effects of educating the masses. The working classes will then undoubtedly interest themselves with social subjects of real importance to them. At present they are chiefly interested in purely political subjects, such as forms of government, which are of comparatively slight importance to them; but then no subject is so easy to understand as politics; for, even if a man is without education, talents, or advantages of any kind, he most likely has ears, he can listen to his favourite demagogue, and all the rest is clear enough.

We repeat—What shall we do without guano? and what will the Royal Agricultural Society do to maintain its influence? Will it associate itself with the important social question to which we have referred? We should like to see it, in concert with Government, instituting a variety of trials to test the merits of various methods of economy. Sewage appears to be in good hands, so far as testing its value is concerned. There are other plans. MOULÉ's earth closet is working well in India, and in England too; and a still simpler method, consisting of a water-tight cesspool, easily emptied, and a tub of dry earth, has been perfectly effective in our own experience.

A medical practitioner informs us that by dint of endless pains he had the latter system adopted in a certain large establishment; it proved to be entirely unobjectionable, and he believes that by proper organisation, including the artificial crushing and drying of earth, it might be adopted in towns with success. But public opinion was against him in the experiment which he began so successfully; simple but necessary details were omitted, and the establishment returned at length to its former abominations. Success depends on good organisation, and on the sprinkling of earth instead of the jet of water. Consequently certain police regulations may at first be necessary to overcome the influence of prejudice and habit. Large public institutions would be the best fields for tentative measures; and the aid of Government would be necessary; and the results, domestic and agricultural, should be laid before the public, to show the ease with which bad national habits might be corrected, and the cost of the national subsistence diminished.

A GOOD deal of attention has been drawn of late to the use of CONCRETE as a BUILDING MATERIAL, and much has been said as to the ease and economy with which it can be worked. So simple, indeed, is the process of erecting buildings by means of it, that any ordinary labourer may be set to work with almost the certainty that he will at once be equal to the task. The only thing requiring anything like the exercise of skill is the setting up of the framework at first starting. Once that is accurately adjusted mistakes are impossible—the workmen are, indeed, compelled to do their work accurately; and this does not apply merely to the case of plain work—the ease and rapidity with which ornament can be added to a concrete structure is one of the most striking features connected with the system.

As regards the economy of the material as compared with stone or brick, a good deal has been advanced without one reservation which we deem important, and which, had it been made at the same time as the economy was urged, would have saved some from disappointment and loss in its use. No doubt measuring off a given bulk of concrete, and calculating the cost of the materials of which it is composed, it will be found much cheaper than either stone or brick; but taking the working up of the material into a house or other structure, the question assumes a different aspect. In the first place the apparatus costs so much as to form a pretty fair percentage on the cost of a structure where only once used, and the smaller the house to be built the higher the percentage. Again, if men be employed specially to do the work, and if that work be small in extent, as the concrete requires to be allowed to remain so many hours after being put into the mould, the men have to remain idle for a certain time; for the time employed in filling up the moulds for a given length and height of wall bears but a small proportion to the length of time which the material takes to set: the more elaborate the work, the greater, however, is the gain—the plainer the work (such as that of barn buildings) the greater the loss. Again, an adjustment of the apparatus can be done for a large amount of work as quickly, or nearly as quickly, as for a small amount. The conclusion, then, which these

facts—all our experience in the use of the material corroborates them—bring us to is, that for a considerable extent of work concrete is a much less costly material than stone or brick; but for a small job it is, at least, quite as costly. We would not, for example, recommend anyone to employ its use in the construction of a small building, as a single stable or a cottage—purchasing or making the apparatus for the same specially; but we would be much inclined to recommend its use where long stretches of plain walling, such as constitute the major portion of farm buildings, were to be erected, or where a number of proprietors clubbed together to purchase the apparatus and employ a staff of men to erect a number of cottages. In short, the greater the amount of work to be got out of the apparatus the less costly will the work be. And it is only in the case of plain wall, such as a wall, is very much less costly than that required for the various parts of a house. For example, the making of window and door voids is by no means the difficult matter which at first sight it would appear to be, on the contrary, it is a very simple operation—one which any labourer will learn to carry out in half-an-hour; and our readers know that walling, with voids, makes up the buildings of a farm. Where partitions are numerous, and chimneys are required, the apparatus is of course more costly, and the work required to be done a little more difficult.

The concrete used in the erection of the structures, to which so much attention has been drawn of late, is different in its constituents from the old-fashioned concrete so called, in which lime formed the principal ingredient. In the concrete used where the building material is Portland cement, all the materials used in conjunction with it may be of a most diverse character, as broken bricks or stone, gravel, sand, breeze, broken pottery ware, or indeed any hard substance not easily decomposed. Broken brick is a material much used, the lumps being reduced to the condition of fineness necessary by passing them through a roller mill. Sand makes an excellent material for using with the Portland cement. Some maintain that only river sand, or sand from sand-pits away from the sea can be used, sea sand being bad; we have not found it so, having with sea sand done concrete work of undeniable excellence.

The strength of the concrete depends of course upon the quality of the Portland cement, and on the proportion which that bears to the other materials. If the cement is of first-rate quality the proportion may be as high as eight parts of the materials (as small broken brick, &c.) to one part of cement; seven parts or six would, of course, make stronger concrete. The cement and the materials are mixed together, water being added in quantity sufficient to make the whole of such a consistency that it can be easily passed from the buckets to the interior of the mould, and run between the interstices of the large-sized stones or broken bricks, or smith's fire clinkers, which are placed in the centre of the mould, and form what is called the "heating" of the wall. When the thin concrete thus poured in "sets," it binds the heating together, making a compact and solid wall. The outside of concrete walls is often rough when the moulds are taken down, arising from causes not now necessary to be named; this roughness may be prevented by taking a thin sharp metal blade and passing it down and to and fro between the inside of the mould and the outside face of the concrete when this is partially "set."

The strength of concrete is, when properly done, very great, a wall of it being much stronger than a wall of brick of greater thickness. But strong as it is, in some cases, especially where the foundation soil is poor and likely to "give," or yield, a length of hoop-iron band should be built into the wall. At the corners L shaped pieces of the same should be let in, reaching in both walls at least 3 or 4 feet beyond the corner; also T pieces, at the point where partitions join the main wall. Where window or door openings are close to each other, forming narrow pillars or pilasters behind them, it will be necessary, or at least advisable, to build in an iron rod, the lower end of which should have tongue pieces going right and left into the wall for a short distance. In the making of floors we know of no material so admirably adapted as concrete, upon which we purpose to give a leaf from our note-book.

CHAFF-CUTTERS, AND PULPERS.

The Framingham Club paper on "Pulping roots for stock feeding," introduced by Mr. Frederick Long, of Stowmarket (see p. 563), contributes a large amount of successful experience on the subject, which in a season like the present has a twofold value. The feeding practice thus recorded includes the whole live stock of the farm, viz., horses, cows, ewes, fattening bullocks, sheep, pigs, and poultry. The object of pulping roots being to mix the pulp with chaff, so as to enhance the dietetic value of both, the former is inseparable from the latter, as Mr. Long justly observes. Of the judges' Oxford report on "chaff-cutters" six illustrations will be found at pp. 52, 53, No. 2, January 14, 1871, of the *Agricultural Gazette*, to which we refer,—fig. 15 being "Mr. Maynard's patent portable steam-power sifting engine," quoted by Mr. Long. The fermenting of straw with green forage plants cut into chaff is prominently brought forward as a promising practice. Dr. Voelcker contributes a valuable paper on this subject in the first part of the Journal of the Royal Agricultural Society of England for the current year. In principle the practice is old, straw and green Rye or Tares, Clover, water-meadow or sewage grasses having been mixed together long ago; but the modern practice is vastly superior, the materials blended being more economically proportioned, and from being cut into chaff a more successful fermentation takes place.

The illustrations of the Oxford prize chaff-cutters, referred to above, were "Class I." power machines (steam or horse). Fig. 111, Richmond & Chandler's, and fig. 112, Picklesy, Sims & Co.'s, are the 1st and 2d prize machines, to be worked by hand. "Class II.": What was said of the former (Class I.), will, with the engravings of Class II., render further description unnecessary.

Mr. Long next goes into pulping machines, commencing with Mr. Philips' machine, shown at Lincoln, 1854, and concluding with Oxford, 1870. The illustrations on the opposite page are (fig. 113) R. Hornsby & Sons' 1st prize pulper, and (fig. 114) Picklesy, Sims & Co.'s 2d.

The economy of the subject follows. The practice, it will be seen, on reference to the lecture, is very diversified, some giving the mixture fresh, others giving it fermented. Cake and meal are in some cases given separately, in others mixed with the pulp and chaff when to be fed. The proportion of hay and straw is also different, but in every case results warrant a favourable conclusion. It is virtually converting unpalatable winter food into summer food, the latter being the natural food of stock, the former being hitherto the reverse.

At a time when the general health of stock is low, and infectious disease prevalent, it is not easy to calculate what the advantages of this new system of feeding may ultimately be, subject as it doubtless is to further improvement. For example, beginning with horses, it is very evident they ought not to suffer as they have hitherto done, on dry food during the winter season. The gain here will be great, apart altogether from the saving of corn. As soon as sewage grasses, green Rye, Tares, and Clover can be had, they can be better fed on such cut into chaff with straw, &c., during the summer season, than under the common practice now followed. The conversion of root crops into whole-some food for milch cows not only augurs well for butter and cheese factories but for breeding stock also; for, depend upon it, what is good for ourselves is good for young calves, and *vice versa*. Galen fed his milch

cows on medicinal herbs, purposely to physic his patients; and we are apprehensive the pungent taste of Turnips and oilcake have more to do with the bowel and other complaints of calves than is generally imagined. This also applies to milch ewes and lambs. For fattening stock generally the difficulty will be to

keys, and has a wearing surface of three-quarters of an inch, so that when one is worn out or broken by accident the keys can be undone and a new one put on by the attendant, at a cost of 3d. At the base of each knife is a clearance hole, through which the pulp falls. One of the chief peculiarities of this machine is the horizontal oscillating bar, furnished with teeth, between which the pulping knives pass as they come round. The traversing motion is given to the bar with its projections by an eccentric on the disc spindle, the centres being three-sixteenths of an inch asunder; the length of the transverse is thus three-eighths of an inch; and as the knife-points are arranged in circles at three-eighths of an inch distance, the movements of the knives and projections or teeth on the bar are so calculated that the latter performs the two-fold function of cleaning the former (the knives), and of insuring the last piece of the root being cut, as it cannot escape except through the small holes, seven-eighths of an inch in diameter. Hence the pulp falls from the machine very uniform, and as fine as you like to set the knives, and free from portions of rind, long shreds, and mashing. This latter is an important result, as was proved by experiment at Oxford, for Hornsby's pulp remained fresh for 72 hours, whereas the greatly mashed pulp from other machines did not keep half this length of time. The hopper of Hornsby's machine is also a complete success, as was specially reported by the judges, both at Bury St. Edmund's and at Oxford. The knives make best work when the hopper is full, as the pressure from above keeps the roots being cut closer to them; but they cut the last root without any hand pressure, and the roots cannot get wedged, as was the case during the trial of several other machines at Oxford. The hand-pulpers are similar in construction to the power-pulpers, the disc being of less diameter. In outward appearance the pulper of R. Hornsby & Son very closely resembles their disc turnip-cutter, for which they got the 1st prize both at Bury St. Edmund's and Oxford.

Picklesy, Sims & Co.'s pulper (fig. 114) is on the disc principle. The disc is divided into sections, with rows of knives in each, so arranged that each takes on its own cut regularly. Each knife has a wearing surface of half an inch. The openings for discharging the pulp as it is cut are longitudinal, and extend radially from the inner to the outer knife; consequently, long strips occasionally pass through, so that at the Oxford trial the pulp was not so uniform as that from the 1st prize machine. The hopper also was not so successful, less or more hand pressure being needed; and the juice expressed in the cutting, so that the pulp did not keep so well. This latter objection is to some extent obviated by mixing the pulp immediately with chaff or meal, which would absorb the juice before much waste is sustained; but, owing to the rapidity with which chemical change sets in, the juice becoming black, the cleaner the cut and the freer from expressed juice the better. When the cut is clean, and of uniform thickness, there is a much less exposure of surface to the effects of the oxygen of the atmosphere, and hence less waste, consequently when mixed immediately, as it always should be, the dry chaff or meal, as the case may be, absorbs the juice fresh from the thin slices of the pulp. The fermentation will thus be more successfully effected when such is had recourse to, as it will generally be, more especially where straw chaff only is used. How far the heating of brown meadow hay a second time may be considered advisable, is a question which may require long time for consideration, but the heating of straw chaff is a question which may be said practically to be settled already. W. E.

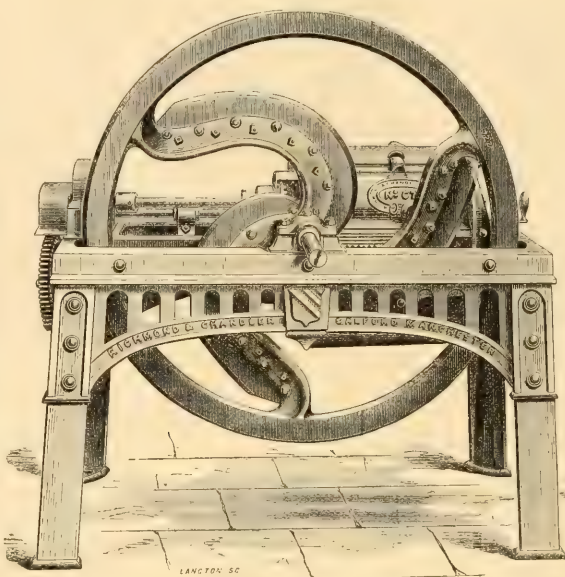


FIG. 111.—RICHMOND & CHANDLER'S PRIZE CHAFF-CUTTER.

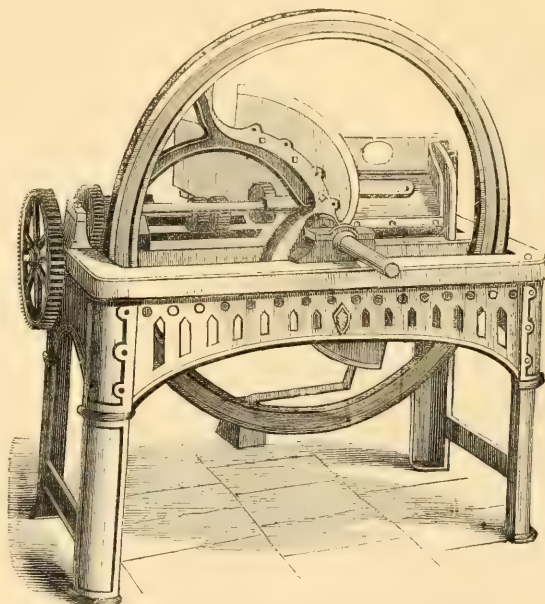


FIG. 112.—PICKLESY, SIMS & CO.'S PRIZE CHAFF-CUTTER.

get straw enough. The old practice of making straw into manure with rain-water in open yards is at an end, and covered yards the rule. Farmers can now grow eggs and chickens for their bacon, and bacon for their eggs and chickens, with profit.

In Hornsby's disc root-pulper (fig. 113) the cutting is effected by a series of angular pointed steel knives. In the power machine there are 12 rows of knives, 13 in each row. Each knife is held in its place by wedges or

STEAM-PLUGHING BY DIRECT TRACTION.

[The following communication appeared in the columns of the *Engineer*, March 24.]

LOOKING over old papers and reports, I was really surprised to see how many successful experiments of the kind, and in the direction of the "Dunmore trials," have been made from time to time. England, years ago, France somewhat later, but especially America, up to the present day, favours the world once or twice a year with the announcement that the long-expected era in steam-ploughing has arrived. There is a charming similarity in all these reports. The admiring and astonished public is largely represented, and "has no doubt" about anything. The ingenuity of the inventor is only equalled by the perseverance of his partner. "No sooner are difficulties met with, than they are overcome by Messrs. X. and Y." The irrepressible "revolution in agriculture" is an accomplished fact. "No farms will in future be without a steam-cultivating apparatus" manufactured by Messrs. X. and Y. Our Transatlantic contemporaries naively but invariably mention the fact that "a sumptuous luncheon was prepared in the field by the gentlemanly inventors, of which everybody heartily partook," which fact seems of some importance for the success of the revolution. There is always something or other making the apparatus work under a certain disadvantage, in spite of which it works admirably. There is always a calculation, dealing largely in sinking funds, in which some very unimportant detail, such as, for instance, the interest on a water-barrel, is oddly prominent, whilst some very important items are palpable blunders. This calculation proves always indisputably that the most superior cultivation, "worth 20 to 25" can now be had for anything less than 5.

Seeing this, and seeing, too, what came of all these very harmless agricultural revolutions, I hesitated at first to speak seriously about the enthusiastic report in the *Scotsman*, which you mention in your last leader on this subject. Nor is it pleasant to disturb "Ayllan's" touching confidence in a few hours' experimental steam-ploughing. But having had an opportunity of visiting several times in the course of last week similar trials near Grantham, I am now in a better position to appreciate the startling, though stereotyped facts, communicated by your northern contemporary.

Engine and plough were both supplied for these trials to a gentleman, who intended to purchase an apparatus if he could see a fair chance of making it work profitably for hire. The engine was one of Messrs. Robey & Co.'s traction engines, in construction almost identical with the one illustrated in your paper of December 9, 1870, after Mr. Thomson's plan generally, having two cylinders of 7½ in. diameter by 10 in. stroke, vertically arranged, a Thomson port boiler,—the whole standing on three wheels, with india-rubber rims and chain armour. The india-rubber has a breadth of 18 in., the chain-plates being about 22 in. wide. The general arrangement, as well as the workmanship, was in every respect of the highest order, as far as could be judged by appearance. The plough was an ordinary five-furrow balance-plough from Messrs. Fowler & Co., for light land, fitted with Kent breasts. Engine and plough whilst working were connected by a simple draught chain with hooks. Each of them was steered separately, the engine turning round at the headlands after being unhooked. There were three men employed, one for steering the engine, one for the plough, and one for firing. The whole method of working needs no further description.

The engine steamed from Lincoln to the farm, 5 miles from Grantham, and began work, if I am correctly informed, on Monday, February 27. The first field was an inclosure of 24 acres, of which a portion had been ploughed by horses. It was perfectly level and very dry considering the season. The soil was sandy, and throughout of the lightest description. The engine pulled the plough, driving five furrows the time, fairly 7 inches, occasionally 8 inches deep, with 120 lb. to 140 lb. of steam, at the rate of about 2 miles an hour, doing very fair work. About 5 to 6 acres was the maximum done in one day. This comparatively small average has to be explained by the fact that the boiler could only keep steam up with the greatest difficulty, and the engine had to stop frequently to take breath. The marks of the whole engine, of course, by no means imperceptible, being about ½ inch to 1 inch deep on an average, and considerably deeper on the headlands, where the engine turned. These were 45 feet to 50 feet wide, and were left unploughed. There were two serious stoppages, one caused by all the spare links for the chain-armour being used up, and no new ones having arrived from Lincoln, the other by the breaking of a bolt and key and the bend-

ing of a connecting-rod. The field, as far as it went, was finished on Saturday.

The nature of the next and last field, containing 31½ acres, was variable to a degree. In the middle and at the top end it was light and sandy, though a shade heavier than the previous one, but all along the bottom end it was clayey and pretty stiff, the clay stretching in a slanting direction over the whole lower side of the enclosure. It was at once perceived that five furrows were here too much for the engine, and a

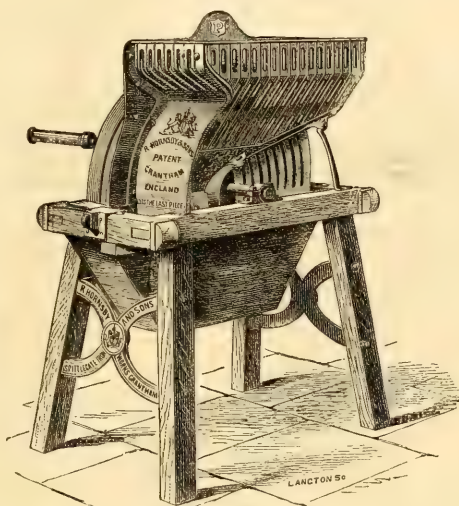


FIG. 113.—R. HORNSBY & SONS' HAND-PULPER.

plough was taken off. Thus the engine was able, with 160 lb. pressure, to pull the implement through the clay—by no means a particularly stiff one—but it was impossible to keep this pressure above half a minute, so that it finally was decided to work only the light portion of the field. Even with these improved tactics, altogether new in the history of steam-ploughing, stoppages for steam in the midst of the long furrow remained part of the business. About 5 acres a day, I am told, was the maximum done in this way, when the breaking of a cylinder cover put again a stop to the operation. Finally a second plough was taken off, but the attempt to plough in this way the stiffer portion of the field with three working ploughs behind

The time spent in doing 38 acres was actually 46 days. Deducting five days for breakages, rearrangement of chains, and perhaps for an occasional interruption by a passing shower—the weather was very favourable throughout—we come to 11 real working days, giving an average of 3½ acres per day. It is all very well to calculate the cost of steam-ploughing of the new area after an hour's inspection. It requires a bolder man than I am to place a similar account before your readers based on the facts of a three week's experience.

The land which was actually ploughed would, with any ordinary wire rope-tackle have cost at the utmost 1½ cwt. of coal per acre. A 10-horse power double set would have drawn in it six furrows to the depth of 7 inches with perfect ease, and an average amount of work per day of 12 to 15 acres would have been absolutely certain. Where, then, has coal and time gone to, in our case?

Let us look for a moment into a few figures.

The engine, near Grantham, whilst running in "slow gear" at the rate of two miles an hour, makes about 185 revolutions. The stroke being 10 inches it has, then, a piston speed of 308 feet. With 130 lb. pressure on its two 7½ inch cylinders, and cutting off at 5/8ths of its stroke (it probably cuts off later), it would theoretically develop 3,237,696 foot-pounds. Deducting 33 per cent. for piston friction and friction of gear, we would have, at the circumference of the road-wheel, 2,158,464 foot-pounds. As the engine advances at the rate of two miles per hour—176 feet per minute—this would indicate an absolute propelling power of 12,264 lb. = 5½ tons.

This agrees very nearly with the performance of an 8-horse power engine mentioned by Lieutenant Crompton. This engine, with two 6½-inch cylinders, pulled together 40 tons up an incline of 1 in 18, which, taking the frictional resistance of the whole train at 100 lb. per ton, would require an absolute traction power of 4½ tons. In both engines the strokes were identical, and the areas of cylinder in the proportion of 4½ to 5½, which, as shown, appears to be also very nearly the proportion of the propelling power.

Now, the five-furrow plough, drawn by ordinary means 7½ inches deep in the sandy soil of the Grantham fields, would have taken at the utmost 6 cwt. for the movement of its frame, and 5 cwt. for each plough, say, 31 cwt. altogether. In the dry soil with three furrows, we cannot possibly assume more than 7 cwt. per plough, and, again, 6 cwt. for its own weight, or 27 cwt. altogether.

This, again, agrees well with a statement of the *Scotsman*, that at Dunmore the draught of a three-furrow plough, drawn by an 8-horse—whatever that mean-traction-engine was, was something about 1 ton.

Well, here we have an engine working to its very utmost, and giving out a traction power for moving itself and whatever is hitched to it, of 5½ tons, drawing a plough which generally takes 1½ ton, and having literally not a pound to spare. We understand now where the coal goes to. But where is the power?

Your contemporary has to help me again. Although the marks of the engine wheels were scarcely perceptible, somebody injudiciously talked at Dunmore about the compression of the land. A horse plough was driven up and down the field—in the imperceptible wheel marks and down in virgin soil. The sceptic was deservedly discomfited. In the last case it took a draught of 6½ cwt., in the first of only 7½ cwt. The slight incline of the field, which is only mentioned at this juncture, I believe we can neglect altogether. Well, two 21-inch wheels cover 3 feet 6 inches of land in breadth at every journey—three ploughs, as used at Dunmore, cover 2 feet 6 inches. Thus the whole area of the field is more than completely covered by the compressing influence of the engine wheels, and we have at once 154 per cent. added to the resistance of the plough all over the land. This seems to be the case in fields where the wheelmarks are scarcely perceptible. Now at Grantham they were, and are still in the unploughed headlands, exceedingly plain. How much has to be added there?

Then there is the compression of the land itself. How much power does it take to compress, say 50 acres of soil, 7 inches thick, into 50 acres 6 inches or 5½ inches thick? Will any of your learned readers attack this problem theoretically, or have I to apply to the experience of road-rolling gentlemen, and they will tell me.

Then there is the question of the power required to move an engine over fields of every description in the state and during the season they have to be ploughed in. Lieutenant Crompton, for whose interesting Tables I, for one, am greatly obliged, does not pretend to help me here. It is a point about which everyone is

* It is possible that some of these figures are based on data which are not absolutely correct, but they will be found very near the truth by gentlemen who are in possession of more accurate details.

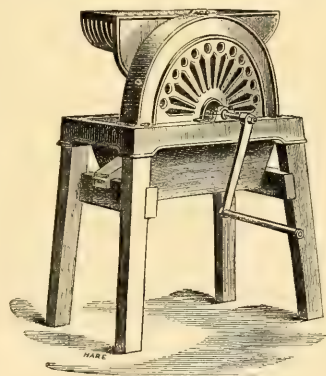


FIG. 114.—PICKLESY, SIMS & CO.'S HAND-PULPER.

the engine was abandoned on Thursday, March 16, the engine returning on Friday to Lincoln.

The total area of land actually ploughed in both fields was 38 acres. The accounts for coal amounted to £7 15s. 9d., coal being 15s. 9d. per ton. Thus nine tons were burnt in doing the work stated, which shows a coal consumption of 4½ cwt. per acre, being 3s. 9d. for coal alone in ploughing a perfect level field of light sandy soil, whilst in Scotland, after the *Scotsman's* showing, an acre of stiff land costs 2s. 6d., all included—coal, oil, wages, wear and tear, and interest even for the water-barrel of the future.

insinuations, repetitions of his former letters, and irrelevant matter. I am accused of being "personal." This is too ridiculous to take any notice of. Also of claiming for these societies "the credit of exposing fraud." I have never made any such "claim." Exposure is sufficiently made through other channels. What I "claim" for these societies are "honest dealings." I am also accused of "insinuating that the whole trade is dishonest," and of only giving as proof of dishonesty the "published analyses." The following extracts from my letters are sufficient to prove the incorrectness of this:—"This reminds me to ask if your correspondent believes those dealers whose proceedings have been brought so frequently to the notice of the Royal Agricultural Society by Dr. Voelcker, and to that of the agricultural classes by the *Mark Lane Express*, have taken for their motto, 'Live and let live,' and have acted up to its precepts?" But Mr. Spooner admits "long before these English associations were thought of, our agricultural societies, our chemists, and journalists, and none more so than this journal, have exposed these malpractices, so injurious to the interests of straightforward manufacturers." Where, then, is the necessity of my troubling you with such reproductions? And farther:—"But while the Co-operative Society in London will have this effect (destruction) on the value of adulterated food, feed, and manures, it will have precisely the contrary effect on the trade, commerce, and industry of those who manufacture and sell pure and unadulterated commodities. This society purchases nothing for its members but what is perfectly pure, thereby encouraging honest and fair dealings, and discouraging dishonest and unfair transactions." The foregoing is a clear admission that among those engaged in the "trade" some honest dealers are to be found. I deny *in toto* Mr. Spooner's declaration that I am not a member, but either a secretary or manager of one of these societies, and I appeal to you, sir, to contradict me if you have a shadow of a shade of a reason for doubting the accuracy of my statement. I also beg with all deference to contradict most emphatically your correspondent's assertion, that "the co-operative movement is confined to merely acting as broker, in buying American cake or artificial manures made from inferior materials." I can assure Mr. Spooner either to produce proof of the truth of these assertions, or to withdraw them, in order that such a stigma as false charges merit may not rest upon him. Mr. Spooner will hardly expect me to reply to the reproductions of his former letters, and irrelevant matter (which he appropriately calls "banter"), written evidently with the object of bewildering the agriculturist; suffice it, therefore, to say, if his worst fears are realised, the "invested capital" will simply be transferred to other hands, and as I have in previous letters pointed out in reply to the same expressed fears of your correspondent, every farmer in the two kingdoms will be richer and better able to meet all demands, and to buy more largely of manures and feeding stuffs, giving at the same time encouragement to honest manufacturers and dealers. I see nothing so very fruitful in this result, whatever Mr. Spooner fears. I have no objection to your correspondent calling the society a "charitable association," since the commercial morality is at such a low ebb. I have just read in the *Agricultural Economist* an extract from Mr. Carlyle's pamphlet, which I will give it—

"In my young time," said lately to me one of the wisest and faithfullest German friends I ever had, a correct observer, and much a lover both of his own country and of mine,—in my boyhood (that is, some 50 years ago, in Würtemberg country, and Central Germany), when you were going to a shop to purchase, wise people would advise you, "If you can find an English article of the sort wanted, buy that; it will be a few pence dearer, but it will prove itself a well-made, faithful, and skilful thing; a comfortable servant and friend to you for a long time; but if you find that the German article, 'cheap as it is,' is the reverse is the advice given. If you find an English article, don't buy that; that will be a few pence cheaper, but it will prove only a more cunningly devised mendacity than any of the others; avoid that above all!" Both were good advice; and the former 50 years ago was a good advice; the latter is now."

I can speak to the truth of this from my own observations on the Continent, and so persistent are some of the English merchants in having recourse to adulteration that the Act passed by Parliament a few years since with the design to prevent adulteration in seeds is found almost entirely wanting. The *Field* thus comments on this part of the question:—

"England is a great commercial country, and, taken as a whole, its shopkeepers will sell anything and everything,—if not the thing they pretend to sell, why, the nearest imitation to it. Adulteration more or less has crept into all trades, and hardly anything is what it appears to be. 'Lie tea,' unhappily, is by no means an institution confined to China. One portion of the public will literally suffer most from adulteration, perhaps, in the farming industry, and hardly realise the enormous amount of losses which they incur in a year from adulterated seeds. There are so many other influences at work in making bad or short crops, that it is hard to separate the damage caused by bad seed from other mischiefs. We all think that all who have been reared by their parents in our garden seeds have been growing more and more untrustworthy; how at times one kind refuses to come up, or another comes up too thinly, or it comes up something different or inferior to what is expected. The adultera-

tion of seed by the admixture of old and worthless rubbish is annoying enough, but a new and even more impudent method of adulteration has just been exposed in the *Farmer*. An extensive dealer at some seaport in the north lately received some samples and a letter from the Continent, the samples were composed of various coloured sands used for mixing with seed, the specimen recommended on this occasion was for mixing with Clover seed; it was to be sold as low as 10s. per cwt. The letter stated that the sender did a large trade in England, and that he had sent of various colours in order to match the seeds. There is no doubt that, thanks to our friends on the Continent and elsewhere, cheating is made as easy to us as possible, though it cannot be denied that in such things as these we are much too apt pupils. The subject of adulteration generally, and not in seed only, must sooner or later occupy the serious attention of our Legislature, or the world will begin to think that adulteration has even invaded that too."

In the midst of all these malpractices, the Agricultural Co-operation Association steps in and says to the farmer, "We offer you seeds of every description, and all kinds of manures and feeding stuffs of guaranteed purity at wholesale prices, but Mr. Spooner desires to advise the farmer not to accept the offer, because if he does, he will affect 'medicine and law.' Mr. Spooner does not say "because I will offer him manures on better terms." Will Mr. Spooner do this? If not, I may as well tell him that his letters will not deter the farmer from going to the cheapest market; but, on the contrary, they have had just the opposite effect. None but dealers in adulterated commodities need fear the action of these societies. But Mr. Spooner objects to co-operation. Does he not know our charitable and agricultural societies and railway companies are co-operative institutions, and that these institutions have "co-operated medicine and law," i. e., gentlemen practising law and medicine? Mr. Spooner compares a purchaser of these societies to "a man with £10,000 a year" living in a garret, who by saving saves £9900, and then says the "one must not put in a claim as a public benefactor, as more than the other." Well I was never aware before the farmer did claim to be a "public benefactor," but doubtless the manure dealers ought to think him so far as far as they are concerned; and if the farmer does not save his £9900 out of £10,000 in the way pointed out by Mr. Spooner, leaving others the great honour of being "public benefactors," all I have to add is that the farmer must be a fool! A Member of the *Agricultural and Horticultural Association*.

Liebig's Theory Verified.—Baron Liebig asserted that we cannot manure the subsoil through the top or ploughed soil, because the few inches of top soil has the power to arrest and fix more of the manural elements than we ever gave it; and he can readily see that it must be so, because, in recent rainfall, cutting and ploughing that only the ploughed soil is manured, and that the soil immediately below preserves its original pale, poverty-stricken appearance, not even shaded with manural filtrations. It is quite possible that he is right in supposing that it is owing to the very slight quantity of manure that reaches the subsoil in which the roots of red Clover feed, that it can only be grown once in five or twelve years. I prove this practically on my Camellia and other trees, which I consider to be the fill the earth in which they are planted with a dense mass of roots, packed so close that the guano in water is all appropriated by the surface-roots, and the plants do not prosper nearly so well as when I force my walking-stick or an iron-pointed rod through the surface matting of fibres to the depth of 2 or 3 feet. Having made several of these holes, water with guano and water, which runs down the holes and supplies the lower roots with food. The effect of this treatment is unmistakable, and the neglect of it equally so. A Camellia tree whose buds have come to a standstill, and drop off or refuse to open, is thus suddenly enabled to carry its flowers to perfection. The same remark applies to other shrubs, especially to Roses and other flowers that throw out more buds than they can perfect. Am I not justified in drawing the same conclusion as to roots and field crops? I know that I do, for the seeds of the manured independently of the top soil, or gradually intermixed with it by trench-ploughing. The late lamented Rev. Samuel Smith, of Lois Weedon, grew his immense crops by ploughing aside the surface soil and incorporating with the naked subsoil the manure he applied. Wherever I have done so the result has been most satisfactory. We all know that with the early sowing of seeds, and the going on well until the roots descend into the unmanured subsoil, and the top soil, when the poor plants turn yellow and sickly, having found an empty cupboard where their spring and summer repast should have been provided. That's why our Essex Wheats "go to Halstead fair" in May, and never come back again—that's why fruit trees cease to prosper. Let us then take means to fertilise the subsoil as well as the surface. Now, if our 50-horse power steam cultivators can break up looser the soil and send it to the depth of 30 inches, let us go on and into these crevices and openings a flood of town sewage: the result would be unmistakable. I remember, and so do many more, the late Mr. Wilkins' experiments in sandy soil at Reading. The liquid manure was poured down vertical pipes to horizontal pipes in the subsoil,

Plants, including Potatoes, knew that the food was sent down, and the results, and produced interesting and profitable results. A leakage, no bigger than a pin hole, in one of my iron sewage pipes, supplied manure to the roots of some cabbages in a field. They became monsters in comparison with their companions, who had not the subterranean advantage. Good gardeners, who show their splendid plants, take care that the bottom soil in the pots or tubs shall be as rich as the top soil. This is what we want in agriculture, to make it pay better than at present. *J. F. Mechi, Tipton, April, 1871.*

Farmers' Clubs.

FRANKLINIAN.

Pulping Roots for Stock-Feeding.—At the last monthly meeting this subject was introduced by Mr. Frederick Long, of Stowmarket.

Mr. LONG said: Chaff-cutting and root-pulping are so closely connected in stock-feeding that it would be difficult to separate them, therefore I propose first to start with the former. Chaff for cattle-feeding seems to be a very old institution, for nearly all the early and ancient agricultural writers recommend cut hay and straw. One of the first, Marcus Porcius Cato, who was born in 234, in "De Re Rustica," lib. 54, mentions chaff as the food for swine, and a very provender of the farmyard, and directs these to be given with salt. . . . The advancing price of meat, as well as the growing demand for it, made many farmers look inquiringly at their straw stacks, anxious to know whether all their value departed with the grain, or whether there was not beef and mutton latent in straw as well as in Turnips. It was this that created a demand for a large portable machine that would cut up the straw in such a manner that "Maynard's" sifting cutter into repute and extensive use. Of this machine I will quote the judges of the Oxford show. They say in their report:—

"Maynard's steam-power sifting-chaff-cutter is intended to be used in conjunction with a portable threshing-machine to cut the straw, screen and bag the chaff as fast as the straw comes from the machine. It is driven by a strap direct from the fly-wheel of the engine; the pulley on the knife-shaft being 25 inches in diameter, revolves 200 per minute, and as there are five knives we get 1250 cuts in that time. The chaff, as cut, falls into a sieve, which separates the cavings unavoidable in a power-machine; these cavings are brought out at the end of the screen, and in one of the straw chutes, which are provided, they are returned to the box incorporated with the straw and cut over again. The chaff, after passing through the riddle, falls into a shoot, which being finely perforated, allows the dust to separate during the passage of the chaff to the elevator, on which a sack is hung to receive it."

The most approved method of storing the straw after being cut appears to be to carry the cut straw into the chaff barn and have it well trodden down, mixing about a bushel of salt to every ton, and also a certain quantity of green stuff—Tares or Kye—cut green, into chaff, sown by hand as the cut straw is brought in. This causes it to heat. Adding the amount of green stuff required to give it a proper heat is the great secret of the successful operation of storing chaff. Respecting the quantity of green stuff to be mixed with straw and chaff, about 1 cwt. to the ton of straw is enough. But some judgment is required as to the state of the green stuff; if it is green Kye on the ear, a full hundredweight is required; if very green Tares, a rather less quantity will do, as the degree of fermentation depends upon the quantity of sap contained in it. I am not stating that straw-chaff can be rendered as valuable as hay-chaff for feeding purposes, but that it may, by judicious management, be made a very important auxiliary to the production of meat food for fast increasing population. The straw used for chaff should be Wheat and Oat, for these may be cut without loss in a far greater state than is generally done. If the chaff is prepared in spring and summer, it will come into use for October and the winter months.

Pulping.—I will now proceed to the second part of my subject. In 1854 the Royal Agricultural Society of England offered a prize for "The best machine to reduce roots to a pulp." At the Lincoln show, in that year, Mr. Frederick Phillips, of Downham, near Brandon, exhibited two machines, one was a barrel cutter with projections in form like a saw tooth; the other a disc cutter with projecting knives made adjustable. The Royal Society awarded the prize to the first, and the *Field* awarded it to the second, which the latter used in public favour. At the Oxford Royal show last year, the judges in their report of the pulper trials say:—

"There was considerable competition, and the trials in the pulper class especially were carefully watched. Two distinct principles were seen in the different machines, viz., a barrel or cylinder, with knives on the surface, and a disc, with knives on the periphery. In the first, the straw was cut by the knives on the surface, and passed; and a disk carrying the cutters, the cut stuff passing through the openings on the face of the disk, the difference between the cutters and pulpers being simply the form of the knife. After a patient and unanimous opinion was given, the judges were of opinion that the disk principle was right, especially in the case of pulpers, for several reasons. The centrifugal force in the barrel tends to throw the root away when it

comes in contact, and to give it a rolling action; this adds to the work, and, in the case of a pulper, causes a portion of the juice to be squeezed out of the root, which is a great drawback. The judges took particular notice of the keeping properties of the Mangel pulp as cut by different machines. In many instances when the barrel is used the change was rapid, the pulp turning quite dark after three or four hours, whilst in the best instance of cut slicing it was fresh and little altered after 72 hours. That machine which cuts the Mangel sufficiently fine with the least loss of juice must be the right machine, provided we get a fair amount of work done. The difference in the quantity of liquid produced during the experiments was very great. The plan adopted in the trials was to allow a given weight of roots and in the case of the rollers, to consume 20 seconds to illustrate the difference in power required for working. I will mention that the barrel-pulper of one exhibitor occupied 6 minutes 35 seconds in cutting 1 cwt. of roots, with an expenditure in power of 31,840 lb.; whilst the disc machine of the same maker, costing 50c. less in price, did the 2 cwt. of roots equally fine in 6 minutes 20 seconds, with an expenditure of power consumed of 11,550 lb., or about one-third the power taken by the barrel machine."

There are also other advantages in the disk pulper over the barrel: one is that you may adjust the cutters as the points wear away; or you can set the cut coarser or finer, as you require; also that when new cutters are required they can be easily replaced by a new set, labourer and expense being a charge. Another advantage of the new cutters is but a few pence each. The term pulper is still retained, although the roots are not pulped, but are cut fine; hence I think either grater or mincer would be a more appropriate name for the machines.

Having thus disposed of the machine part of the subject, I will now proceed to what are claimed as the merits of the pulping and mixing system. The principal are: It economises the roots, for, after being pulped and mixed with the chaff, either from threshed or cut hay or straw, the whole is consumed without waste, the animals not being able to separate the chaff from the pulped roots, as is the case when the roots are merely sliced by the common cutter, neither do they waste the fodder, as when given without being cut. By this system the quantity of hay or straw used in the season—a most important consideration on all large stock farms. Inferior hay or straw may be used. After being mixed with the pulp for about twelve hours fermentation commences, and this soon renders the most mouldy hay palatable, and animals eat with avidity that which they would otherwise reject. This fermentation softens the straw, makes it more palatable, and puts it in a state to assimilate more readily with the other food. In this respect the pulper is of great value, particularly upon corn farms, where large crops of straw are grown and where there is a limited acreage of pasture, as by its use the pastures may be grazed, the expensive process of haymaking reduced, and consequently an increased number of cattle kept. The masticatory process is materially abridged, and animals are enabled to fill themselves sooner and return to a state of repose, and digestion is easier. The condition of the animals is improved, and the quantity of disease entirely avoided. There is a great saving in the consumption of hay. Mangel may with safety be used much earlier in the season if required. Steamed food is in a great measure rendered unnecessary, thereby saving coals as well as avoiding the somewhat objectionable smell and trouble of the steaming apparatus. Choking is an impossibility; the roots are entirely consumed, and the last piece is in the feeding troughs.

There are as well as these many other advantages to recommend the pulping and mixing systems. I will briefly quote some of them, with various methods adopted by users of pulpers for horses, bullocks, cows, sheep, and pigs. First horses. In feeding horses with pulped roots, proportions may be varied to suit the time of year, and the work they have to do. One gentleman tells me he has kept his horses in winter through the winter by giving them pulped roots, with equal quantities of straw or corn, and allowing each horse a little hay and 28 lb. of corn meal during the week, effecting a saving of half the corn and hay he had previously given. Another says he gives one bushel of pulped root to two bushels of straw-chaff, mixed fresh every day, with half a peck of cracked beans, and a little hay for the night. Another gives 20 lb. of pulped roots with plenty of chaff, two-thirds straw, one-third hay. Another says that horses do not like hay; the pulper Mangel produces them to eat a quantity of chaff. He carries the pulp to the stable in a cask directly it is cut, and after mixing with the chaff and the corn the mangers are filled at night. The general report is—horses eat the meat with avidity, it allays their thirst, and frequently prevents colic and inflammation, which often turns out fatally from the animals getting an excess of cold water on an empty stomach. Aged horses are kept in good condition on the mixture. Horses will not refuse dry food when feeding on pulped food, and the state of their health is much improved. Parsnips and Carrots for horses are liked very much when pulped. Most agree that the pulped root is best for horses when fresh done, and all that a considerable saving in the corn takes place. Colts thrive well on the pulped mixture. For bullocks the method of the

feeding varies. One says, "I take the 24-year-old steers, I cut for them chaff about five-sixths straw, one-sixth hay, and sometimes nothing but straw. With this I give them about two pecks of pulped Mangel per day during the early part of the winter, and as spring approaches increase the quantity until they get up to four pecks per day. I mix the pulped roots with the chaff, and the whole is fed, and the roots, and the food thus mixed before it ferments. The oilcake and other artificial food I give separately."

Another writes: "I consider the pulped roots good for all live stock, more especially for those in which we suppose the digestive organs weakened from exposure or other causes. The proportions must vary in all cases according to the quantity and quality of the fodder, chaff, roots, &c., the farmer has in hand. I find in practice it is best to cut the roots immediately after pulping with chaff, throw the whole into a heap to allow the chaff to soak up the juices, and the whole mass to slightly ferment. In 24 hours it will be in the best condition to use; that is to say, mix up the quantity required for the day ensuing. I usually give the cake, corn, &c., apart from the mixture."

Another says: "I fattened some bullocks last year with pulped Mangel and cut Clover, and mixed one day before giving it to the beasts, and then mixed bean and barley meal with it at the time of feeding. I found them fat quicker than those fed on sliced Mangel, hay, and meal." All agree that, whether fattening or store stock, the animals thrive well on the mixture, are fond of it, keep healthy, get fat quicker, and are not so much trouble. For cows, pulping answers well.

One large cowkeeper says: "I use pulp fresh every morning, mixing enough to last twenty-four hours. At it from the roots of the field, and the roots are cut to two large boxes or troughs standing in the middle passage of the cow-house; in one it was mixed with cut hay, and in the other with cut straw. Cows giving milk had the former, dry cows the latter. The orders of the cowman are to feed every animal according to its appetite, that is, to give it as much as it will eat up clean, five times in twenty-four hours, when they are housed night and day, also to proportion the pulp and cut stuff (hay and straw) according to the state of the weather. By attending to this latter order I find it is quite easy to prevent either scouring or the opposite. Milking and fattening beasts had two dry feeds out of the five, consisting of cut hay and meal only. I deem it much preferable to give beasts a little and often, rather than very large feeds at a time, except when left for the night, when they get as much as their troughs will hold. I have no racks for uncut fodder for the cows. On this system all the stock was kept in fine health and condition, suitable to store, milkers, or feeders, with, as near as I can judge, an economy of hay and roots, but particularly of the former, of about one-third, as compared with the old system of sliced roots and long hay, besides avoiding all risk of choking. My young stock are fed the same as the cows in milk, there being no danger of making them too fresh, as might be the case with the cows about to calve. I house my dairy stock from about November 1 to the first of June. For of each of the milking cows, on being turned out to their pasture at the latter date depends entirely upon their condition, and I have no hesitation in saying that no stock could possibly have been in better order than mine was in May, very far exceeding that of the majority of my neighbours, as evidenced by the quantity of cut to each cow, viz., 4 lb. per 24 hours, on a yield of 18 quarts of milk per cow."

Another farmer says: "As regards the use of the pulper for cattle generally, irrespective of age, my plan is to have a layer of cut chaff, consisting of three-parts hay and one of straw, and 1 bush. of pulped Mangel or Turnips, and to repeat the quantities until sufficient is obtained for next day's consumption, allowing it to remain about 12 hours to ferment. The stock are then fed on it thrice a day, with sufficient to satisfy them. Last winter I left off giving my dairy of cows the mixture, as previously named, substituting Mangel sliced by a turnip-cutter, and butter and cheese. There was a deficiency of above a pound of butter each cow. I then reverted to my previous plan, and I found they produced the same quantity as before." It is generally agreed by all who have tested it that the pulped mixture not only improves the quality of the milk, but it also does away with that unpleasant flavour of the Turnips in butter, usually attendant to be got rid of by using saltpetre in making. The improved milk also produces a better quality of butter, and cheese. Less mastication being needed, it is a great consideration in the case of young cattle casting their teeth and old ones who have but few. It is an old saying, that "the milk comes from the cow's mouth," so the pulping must be an advantage in saving the cow's front teeth, which must suffer from the chipping of the whole Turnips; the dairy farmer cannot be too careful of this, so that when he has a good cow to keep her for a number of years, and for calves, the mixture and cheese, a soft nature suits their mouths, and they quickly take to it. Sheep: A greater number may be kept on the same occupation. In pulping the roots it is generally considered necessary to clean the roots well to prevent scouring in sheep.

Another gentleman says:—"Having an unusually

heavy crop of straw, and my Parsnips having partially failed, I resolved, as I wished to increase my stock of breeding ewes, on testing the pulping system, and try how far, by cutting up my wheat-straw and by pulping my Turnips, I might achieve the end I had in view. The system I pursued was of mixing about half Turnip pulp and half chaff the day before using. My expectations were, that the flock, which, at the end of the year from 80 to 90, and last year from 100 to 110, and the small and 140 to 150, and at lambing time they were in as nice condition as I could wish, and were particularly healthy, having consumed no more Turnips than my flock of 80 or 90 had done in previous years. Ewes will always suckle well on the food, and lambs will eat it much sooner than food otherwise prepared." Pigs: The methods for these are most simple. An extensive pig-breeder says: "I find great advantage in mixing the barley meal with the roots and straw. The manner I make use of the roots is this: First have them thoroughly cleaned and washed before pulping, then pulped and put in a large close bin or cistern, mixing a little barley meal with it before it is given to the pigs. The allowance to each pig is one peck of barley meal per week for the first three months, and as much Mangel or Swede as they will eat. After that I increase the barley meal gradually for the next three months up to one peck and a half each pig. By such treatment I make many of them weigh from twenty to thirty-five stones each."

Another gentleman who pursues the same method adds: "I prefer this plan to any other I have seen, and I reckon that pork can be made 15 per cent. cheaper than by meal alone; and the process of feeding being slower, it certainly gives a larger quantity of manure." Another says: "I consider pulping roots is the best way of using any thing else. My plan is to have a large two-hoghead kept on hand for the pulping machine as possible, so as to fill it with a malt shovel as it comes from the machine; at the same time I keep a lad sprinkling meal (either Barley or Indian Corn) with the roots, and this all done in fifteen to twenty minutes. It is then ready for use, to be carried to the pig. I never could find a pig with profit until I used pulped roots." Where Potatoes are given to pigs they are boiled in less time if passed through the pulper. An experienced pig-breeder writes: "I had a gentleman who had 1500 bushels of diseased Potatoes. They were pulped up and put down in a shed, where the atmosphere was kept from them, and at the end of five months they were as good as at first."

Fowls: Poultry are amazingly fond of the pulped food,—they surround it, and eat it greedily.

Having thus gone through the various classes to show that pulped food is beneficial for every description of animal, I would now remark that the above plan has been written and said on the system of fermentation. If hay or straw is at all tainted, then fermentation will remove the objectionable taste. The time for the fermentation must depend on the state of the weather and position of the place for admitting air at the time. Straw by this method of feeding comes round into manure much quicker. Straw that has undergone the fermented storing plan may be mixed with the roots, and as an equivalent may be mixed together a portion of the straw becoming moistened, may be given to the animals with great advantage. If time permitted I could give the results of many experiments that have been carried out on farms,—I will mention one: Two lots of year-old cattle were fed, the one in the usual way—sliced Turnips and straw *ad libitum*; the other with minced Turnips, mixed with cut straw. The first lot consumed 8 1/2 lb. sliced Turnips, 1 lb. oilcake, 1 lb. rape cake, 4 1/2 lb. bean meal, broken small, and mixed with a little salt and what straw they liked; the second lot ate daily 50 lb. minced Turnips, 1 lb. oilcake, 1 lb. rape cake, 4 1/2 lb. bean meal, and a little salt, the whole being mixed with double the bulk of cut straw or wheat chaff. In the spring the lot of cattle which had the mixed food were in as good condition, and equally well-grown as the others, though they had consumed in five months two tons less of roots a-piece.

I will conclude with a quotation from the *Frize Edition of Mr. W. Williams' "The Management of Cattle."* He says: "We introduced the pulper in the autumn of the year. For the first season we only fed a part of our number of cattle with pulped Turnips and cut chaff, to test the value of the system as against the usual plan of feeding with sliced roots. The result showed, firstly, a decided economy from the use of pulped food; and, secondly, that the cattle so fed were, if not better, at least as good as those fed on the old plan. From actual experiment we find that by giving each beast 10 lb. of cut straw mixed with the pulped roots, there is a saving of 21 lb. of Turnips per day on each animal. Two lots of eight each were set apart for the experiment. Those on sliced roots consumed on the average eight imperial stones per day, with 8 lb. each of oat-straw out of the racks uncut. They had what they would eat of both. The other lot had a mixture of straw and pulped Turnips, which they would eat, with oat-straw uncut *ad libitum*, and consumed on the average 6 1/2 stones of pulped roots, and 10 lb. of cut straw, with 4 1/2 lb. long straw per day each beast. We now pulp for 63 cattle, and, estimating the saving of roots at 1 1/2 stone each per day, we save about 4 tons 2 cwt. per week on the average, and above 100 tons

during the half year, equivalent to $\frac{3}{4}$ acres, at 30 tons per acre. Perhaps some might object, by a larger admixture of straw with the pulped roots, a far greater saving than that stated, without bias, as the result of our experience, and with which we are satisfied. Those who object to so considerable an admixture of straw should bear in mind that the stomach of the ox is fitted for a large amount of bulky food, not necessarily all of a nutritious kind. This must be filled before he lies to ruminate contentedly. He can and will eat as much of rich food as of the comparatively in nutritious sort, but not with an equally good effect. His system cannot assimilate more than a moderate quantity of the flesh or fat forming substances contained in rich food, and, consequently, it becomes overabundant, and irritated so that scouring is produced, especially at the first. All who are acquainted with the feeding of cattle know that when first put upon Turnips, as many as they can eat, they for a considerable time get worse in condition instead of improving. This is particularly the case with cattle low in condition, and could be entirely avoided by the judicious use of the pulper; besides, the argument for its use at first applies with no less force to its general adoption. Although the cattle with which we have to do are seldom low in condition, still we consider it a duty to economise as much as we can the available food for live stock as a means of increasing the number of our cattle, and, consequently, the supply of beef for the public. The demand for beef and mutton is not met by a corresponding supply, let us then welcome every idea which can help us either to grow more food, or to economise its consumption." I have compiled the following from various sources, to show the amount of feeding matter, with the amounts of moisture and mineral substances, contained in each food used on the farm—

100 lb. weight of	Dry organic matter or real food.	Moisture.	Mineral matter.
Wheat-straw contains ..	79	18	3
Barley-straw ..	69	28	5
Oat-straw ..	72	12	6
Pea-straw ..	82	12	6
Bean-straw ..	75	14	9
Rye-straw ..	78	12	6
Clover-straw ..	73	21	6
Ordinary hay ..	76	16	7
Mangel Wurzel ..	10	89	1
Swedes ..	14	85	1
Turnips ..	10	89	1
Beet and Mangel ..	12	87	1
White Carrots ..	27	72	1
Potatoes ..	75	25	1
Limeshake ..	80	16	4
Peas ..	80	16	4
Beans ..	82	14	3
Barley meal ..	86	13	2
Oatmeal ..	86	14	3
Bran ..	81	18	5
Oats ..	79	18	3
Lentils ..	81	16	1

Farm Memoranda.

WEST SUSSEX: April 17.—At last we have had a heavy fall of rain, and the ditches are fuller than at any time during the winter, so that we may expect to get grass and a crop of hay, and have need of both, as nothing is left now of hay, and straw has never been closer worked out. Fortunately, extra crops, such as Rye, winter Barley, and Italian Rye-grass have come in early and very convenient, and are now being fed off together with Mangel. Vetches and Trifolium are promising well, and will give in abundance of food. Already stock gets dearer, and especially good cows, as a many of the secondary quality were sold off in the autumn on account of scarcity of hay, and now they have to be replaced at a very high figure, which they will no doubt maintain all the summer, unless some unfavourable weather sets in. There is still much to be done in the way of improving the breed of dairy cows, every one likes to get a good cow, but few take care to breed them. As to the calves, they are a rough kind of cross, and are looked upon as an incumbrance to be got rid of at any price, and not being good for fat (I mean those crossed from Alderney), they seldom fetch high prices. It is strange that no more improvement takes place: where there is a little pansy taken it is too much in the direction of fineness, some fancy colour, and the result is too great delicacy. For a time the fashion has been to smoky fawn colour, but now the general choice is lemon and white, as they are harder, and in other respects appear quite as good as the more delicate sorts. Barley and Oats have come up well, and so have Peas. The greater part of the Wheat looks well, but some does not, especially that sown after Peas; it looks all rather thin, but this heavy rain may make it fill up, and we are never much afraid of a plant that looks like this at this time of the year.

Mutton still sells well, and lamb during Easter was sold at perhaps a higher rate than was ever known. Some in our market was said to have cost 12s. 6d. per lb., but now they have fallen sadly, and last market on the 12th they were hardly saleable at any price; but now a steady demand may be expected to set in, and we may have a fair supply, as the season has been rather favourable to the health of the flocks.

Our market is about to be removed from the streets, and time it was so, as it is now nearly impossible for

one to sell cattle and sheep, as they are sometimes nearly half a mile apart, and if we have pigs as well they are at another great distance off. The new market is a well arranged place, with iron enclosures for all the stock, and being compactly together, business will be much facilitated; tools will be rather high, and of course there will be a good deal of grumbling, but we have no doubt the market will continue to grow in importance as it has hitherto done,—and during the past 17 years it has more than doubled, and still increases. Of course there have been great objections to its removal from the streets, as tradesmen think it will injure them. But it is more likely to benefit them, as the streets are nearly impassable now on market days, and then shopping will be more comfortable.

Work is well forward, and the land has been got into good condition for Mangel sowing, so soon as it is dry enough for work again. There has been some sown, but on heavy lands we cannot get very forward, as the ground, if at all wet, settles down so hard. G. S.

WEST GLOUCESTERSHIRE: April 18.—We had last year to record a most remarkable season, and almost dreaded to face the winter with such a scanty supply of winter stuff which it produced; but we have now to record a very fine spring, ever known, and which has greatly alleviated the distress amongst the cattle which we all knew must come, had it been as cold and ungenial as in 1870. Happily we have all pulled through so far; even better than we could have at one time expected, considering the severity of the winter. It was unusually dry, so that the cattle had not to contend with wet as well as cold.

Store stock in general comes out small and poor, compared with a better time, but they are healthy, and will no doubt soon pick up condition when they are turned into the pastures. We must not lose sight of the fact that there is no old grass left to check the young from running through them too rapidly, therefore they should be allowed some dry food once a day at least for a week or two.

We hail the prospect of an early spring with extreme delight, for we never stood in greater need of it. Only a very small space is now sown in most rich yards, for either hay or straw. Some farmers have already turned some of their cattle out, having a very good bite, while others have been compelled to do so in order to make the fodder hold out. It is now close upon nine months since we began chaff-cutting, and have followed it very closely ever since. We have thus kept up the stock in very good condition, and sold out at a higher average than we ever before attained.

The Wheat plant has fallen off during the last six weeks to an alarming extent; whole fields have died away which, all through the winter, presented quite a promising appearance. It would be no exaggeration to say that there is not more than half a plant left over the whole acreage sown last autumn. In some instances where the plant has been left some of the roots again show signs of life, and the chit appears at the crown of the withered plant as if it were the first burst from the grain. What the result of this will be time alone will tell. Some farmers are resolved to await the issue. Many acres have either been resown or ploughed up and sown with Peas or Beans. Wheat sown since the frost looks well. Winter Beans are almost a failure.

Spring corn of every description never was sown in better style, and looks most promising at present. Barley sowing will be completed much earlier than usual, owing to the root crop being hastened off the land by the severity of the frost, which destroyed many acres of sheep keep upon the hills. Scarcely any Turnips escaped, which has put many of us to great inconvenience as regards food for ewes and lambs. The Mangel has kept well, so that we have managed, with this and an allowance of Oats, bran, and guano to make it through very well. The fall of lambs is quite an average, and no very serious loss has occurred. Fat sheep maintain a very high price, realising 10d. per pound in the wool. Beef is selling at 75s. to 80s. per cwt. for best quality. Store cattle have sold well all the season, notwithstanding the scarcity and high price of feeding stuffs, good springers fetching £18 to £25, and graziers £15 to £18 per head. Bacon prices are very reasonable, 9s. 9d. to 10s. per score. J. W.

MERSE OF BERWICKSHIRE: April 22.—Seed-time came very seasonably about the middle of March, and four weeks of steady weather put that all right, except a patch of snow which completely melted away, and a rare sight after such a winter. While "dust," and even clods were getting very plentiful, grass did not agree so well with the withering north winds and frosty nights. And so when ice was seen on the morning of the 11th, and the protected thermometer stood at 25°, it was thought that the bright day and wet night following could not bring us a change for the worse. Since that day, however, rain has accumulated in the soil to more than 2½ inches in depth, streams have been pretty well flooded, young grass much leached, and nothing to do but turn muck-middens and cart out more between showers. There are still a few stalks to be seen, chiefly of Wheat, but they could not be threshed in such weather. A fortnight (and it can be

no less) of absolute exclusion from the plough is no joke at this time; and the consequence is, that we find ourselves as far back as we did before seed-time, and must make another push when the sky clears. A few got their Potatoes planted, but we (the majority) may doubt whether they are the better for their washing. Fat hogs were washed and turned to grass this week, not certainly to the benefit of their pasture, but to demonstrate it was that they were still in their fleeces on Tuesday night. Lambs are numerous, and ewes milky, but gimmers (first crop) that got a nip during winter are not doing so well. There are still some cattle being finished off with Potatoes, hay, and all good things but the best, and with a prospect of pay; but how that is to be got next year, considering the price of store cattle, is not so easily seen. J. F.

NORTH OF IRELAND.—In the chief farming districts of Ulster the progress of outdoor labour has been very rapid, and already a great proportion of the corn lands is finished. The breadth of Oats sown within the past three weeks is much larger than that of last season at the same period; and, as the work proceeds, it is evident that the aggregate breadth of red fields will be unusually extensive. This crop, some years past, paid farmers much better than Wheat. In former times the price of Oats was usually little more than half that of Wheat, but the opening of the ports for the import of foreign grain has caused, among other changes, an immense equalisation, so that top quality Oats are frequently selling at rates nearly approaching the quotations for red wheat. Early Potato lands have this season been finished in good time, and from the admirable state of the soil, a bountiful crop is anticipated. An amateur farmer writes to the effect that two years ago he obtained from a friend half-a-dozen of the "old seedling" variety of the Potato, which he planted, and carefully preserved the produce. Last season he put the entire crop in a different class of soil, and the result was so successful, that he expects this year to have a considerable quantity of one of the finest of all the varieties of the table Potato. It will be within the recollection of many that, by the Potato disease, which fell with such devastating effect on the crop in the autumn of 1846, the "seedling" and the "long white" varieties were almost swept out of existence. Since then, except at agricultural shows, those descriptions of Potatoes have hardly ever been seen. Last year the tubers of the crops generally were so sound that nothing approaching the disease was showed itself. The oldest living farmer does recollect a season when there were not some portions of the Potato crop unfit for use. Long before the ill-fated years 1845 and 1846 the complaint of "missed sets" was heard, and, in many cases, whole acres were seen where one-fourth of all the seed had decayed in the ground, in which case the farmers were obliged to replant such portions of their land with new seed. Such defections are hardly ever known in the present, nor does the disease called "curl," which prevailed 30 or 40 years ago, make its appearance, except in rare instances. The cheapness and abundance of Potatoes gave great facilities for cattle feeding last winter, and to this cause may be attributed the superior quality of pork now offered at market. Extensive preparations are being made for Flax sowing; seed is moderate in price, and generally superior in quality; and the condition of the land is excellent—the turning of the land in the first of the past winter upon fields set apart for Flax, and ploughed in autumn. P.

The Week's Work.

April 29.—Farmyards are now cleared of live stock and manure in our southern counties, the former being sent to the pastures and the latter carted to the fields intended for root crops. Not a few farmers prefer turning the manure to the yards prior to its application to the land. Some do not, but prefer to keep it, and apply it fresh from the yards with as much natural heat as possible. Practically the question at issue applies to the degree of rottenness farmyard manure should be in when applied to the land. We have tried it in various degrees of rottenness, and prefer the mean between the two extremes in question (much rotting and no rotting), results proving that slightly fermented farmyard manure in a uniform state of decomposition, if got turning to the land in its normal state (i.e. with its natural sap), is the best for root crops. It follows that farmyard manure intended for Mangel Wurzel should have double the quantity of common salt required by Swedes or Turnips, the natural requirements of the land being uniform. When the farmyard manure is carted to the Mangel field or turned into the yards expressly for Mangel, it is better to apply the salt at the time of turning than to the land at the time of sowing. *Kohlrabi*, in favourable situations, should now be sown. In southern counties the crop is being preferred to Swedes, and accordingly the annual breadth sown is increasing. It is intermediate between Cabbage and Swede, but the produce and cultivation more resemble those of the latter than the former. Half farmyard manure, half superphosphate is the general rule of manuring; but to this there are many exceptions. Some make a point to grow this, and the whole of the root crop with artificial manure, farmyard dung being exclusively applied to corn crops. We have tried both extensively, but prefer the half.

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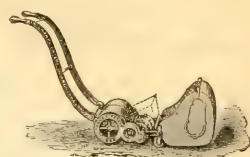
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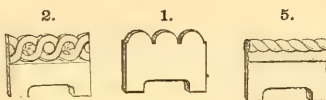
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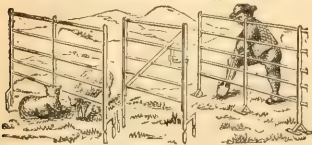
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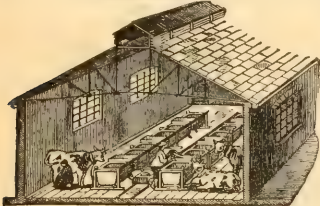
EXHIBITORS of Cut Flowers, Grapes, Cucumbers, Salads, &c. &c., will find CHAPMAN'S PATENT VENTILATED WATER TUBE CASES the best now in use, either for Exhibition or Transmission purposes. May be obtained through any of the Agents: the PATENTEE, Gloucester; or W. EASSIE, ASDO CO., who have arranged for their sole manufacture. Price Lists and Testimonials on application.—Gloucester.

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THE BEST, SIMPLEST, AND MOST DURABLE MACHINES.



They leave no ribs in the Grass, and are unsurpassed for keeping a Lawn or Croquet Ground in first-rate order.

They will either Collect the Cut Grass in the box according to the approved English method, or leave it on the lawn, by taking the box off.

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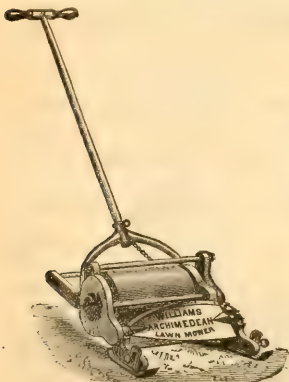
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Galls.
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THE "ARCHIMEDEAN" AMERICAN LAWN MOWER.

The only Lawn Mower that Cuts Wet or Long Grass (as well as dry) without Clogging,

Leaving the Cuttings in small particles, evenly scattered, never looking untidy, serving as a Mulch to Protect the Roots from Heat and Drought, and Fertilising the Sod, which cannot fail to invigorate and beautify the Lawn. Perfectly adapted to SLOPES, UNDULATING LAWNS, RIDGES and VALLEYS; and for the CROQUET GROUND is invaluable.

NOTICE.—GREAT REDUCTION in PRICES for 1871.—We have great pleasure in stating that owing to the unprecedented success of our "Archimedeian" Lawn Mower met with last year, we have increased our facilities for manufacturing, and notwithstanding that several important improvements have been made in the machine, yet we have made a large Reduction in Prices for 1871.

"Far superior to any of ours."—*Vide The Field.*

"We feel bound to recommend it to our readers as one of the best Mowers we have as yet made acquaintance with."—*Vide Floral World.*

"Remarkably easy to work."—*Vide Gardeners' Magazine.*

"The quickest, most simple, and most efficient Mower ever used."—*Vide Gardeners' Chronicle.*

Numerous Testimonials from the highest authorities in horticulture have been received.

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SHANKS'S NEW PATENT LAWN MOWERS FOR 1871.

UNDER THE PATRONAGE

OF

HER MOST GRACIOUS MAJESTY
THE QUEEN,



AND MOST OF THE
PRINCIPAL NOBILITY
OF
GREAT BRITAIN.

The Improvements introduced into Shanks's Lawn Mowers at different times have resulted in these machines occupying the first place in the market, to which the continued increase in the annual sale bears ample testimony.

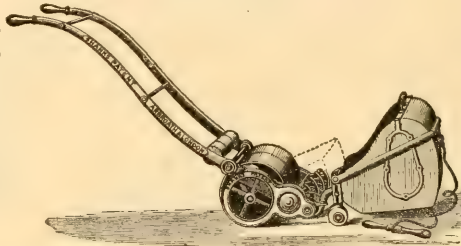
THE MACHINE

FOR 1871

IS MADE FROM

NEW PATTERNS,

AND IS SO ARRANGED THAT IT



CAN BE USED

EITHER

WITH or WITHOUT

THE USUAL

FRONT ROLLERS

ALEXANDER SHANKS AND SON, in bringing their PATENT LAWN MOWERS under the notice of the Public for the Season of 1871, desire at once to draw attention to the various points of merit which their Machine possesses over all others. These advantages have only to be known to ensure the success and to establish more firmly than ever the position of Shanks's Machine as unquestionably the cheapest and best Lawn Mower in use.

1. SHANKS'S PATENT LAWN MOWERS have been entirely remodelled for the Season of 1871. Every conceivable alteration has been made tending to improvement and reducing friction to a minimum. Notwithstanding the great expense which has attended these alterations, A. S. AND SON offer THEIR NEW MACHINE AT LAST SEASON'S PRICES.
2. SHANKS'S PATENT LAWN MOWER is fitted with a double-edged Sole-Plate. This Sole-Plate enables the Cutting parts to last twice as long as those in other Lawn Mowers.
3. SHANKS'S PATENT LAWN MOWER is fitted with a self-sharpening Revolving Cutter.
4. SHANKS'S PATENT LAWN MOWER is fitted with a Wind-Guard, which prevents the Grass escaping the Box when the Machine is in use during the prevalence of wind.
5. SHANKS'S PATENT LAWN MOWER has no obstruction in front of the Cutter, a most important improvement, just introduced.
6. SHANKS'S PATENT LAWN MOWERS are made of the very best material, carefully apportioned, so that no part has more weight than is absolutely necessary, and securing at same time the greatest rigidity as a whole.
7. SHANKS'S PATENT LAWN MOWERS are more easily worked and more durable than any other Lawn Mower, and are not at all liable to get out of order.
8. SHANKS'S PATENT LAWN MOWERS are silent in working.
9. SHANKS'S PATENT LAWN MOWERS perform their work in a manner vastly superior to the Scythe. The Lawn is not "ribbed" when cut, but has a most beautiful appearance, being as smooth as a piece of velvet.
10. SHANKS'S PATENT LAWN MOWER has not only obtained more Prizes and Medals than any other, but the highest Prize that has ever been given for a Lawn Mower at an International Exhibition was awarded to A. S. AND SON, who received a First Prize Silver Medal for their Machine at the Paris Exhibition of 1867. It is significant that no other Exhibitor received a Prize, not even an "Honourable Mention" or a "Bronze Medal."
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12. SHANKS'S PATENT LAWN MOWERS are delivered free at any Railway Station or Shipping Port in Great Britain. Orders are executed on the day they are received, either from the Manufactory, DENS IRON WORKS, ARBROATH, N.B., or from the London Office and Warehouse, at 27, LEADENHALL STREET, E.C.

PRICES:—SHANKS'S NEW PATENT HAND MACHINE.

8-inch Machine..	£2 10 0	By a Lady.
10-inch Machine..	3 10 0	By a Lady.
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14-inch Machine..	5 10 0	By a Boy.

The Hand Machines are all with Silent Movement.

16-inch Machine..	£6 10 0	By a Man.
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22-inch Machine..	8 10 0	By Two Men.
24-inch Machine..	9 0 0	By Two Men.

Easily Worked.

SHANKS'S NEW PATENT PONY and DONKEY MACHINE.

25-inch Machine..	..	..	..	..	£12 10 0	If with Patent Delivering Apparatus.
28-inch Machine..	..	..	..	..	14 10 0	25s. extra.
30-inch Machine..	..	..	..	..	15 15 0	30s. "
30-inch Machine..	..	..	..	..	15 15 0	30s. "

Silent Movement, 12s. 6d. extra.

Boots for Pony, 22s. per set; Ditto for Donkey, 18s. per set.

SHANKS'S NEW PATENT HORSE MACHINE.

30-inch Machine..	..	..	..	..	£19 0 0	If with Patent Delivering Apparatus.
36-inch Machine..	..	..	..	..	22 0 0	30s. extra.
42-inch Machine..	..	..	..	..	26 0 0	40s. "
48-inch Machine..	..	..	..	..	28 0 0	40s. "

Silent Movement, 20s. extra.

Boots for Horse, 26s. per set.

ALEXANDER SHANKS AND SON,
DENS IRON WORKS, ARBROATH; and 27, LEADENHALL STREET, LONDON, E.C.
27, Leadenhall Street is the only place in London where intending purchasers of Lawn Mowers can choose from a Stock of from 150 to 200 Machines.

All sizes kept there, whether for Horse, Pony, or Hand Power.

Editorial Communications should be addressed to "The Editor," Advertisements and Business Letters to "The Publisher," at the Office, 41, Wellington Street, Covent Garden, London, W.C.
Printed by WILLIAM RICHARDS, at the Office of Messrs. BRADBURY, EVANS, & CO., Lombard Street, Second of Whitefriars, City of London, in the Co. of Middlesex, and Published by the said WILLIAM RICHARDS, at the Office, No. 41, Wellington Street, Parish of St. Paul's, Covent Garden, in the said County.—SATURDAY, April 29, 1871.

THE GARDENERS' CHRONICLE AND AGRI-CULTURAL GAZETTE.

No. 18.—1871.]

SATURDAY, MAY 6.

Registered at the General Post Office as a Newspaper. Price 5d. POST FREE, 5½d.

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Notice to Gardeners' Chronicle and the AGRI-CULTURAL GAZETTE.
The VOLUME for 1871 is now ready, in cloth, £1 6s. 6d. W. RICHARDS, 41, Wellington Street, Strand, W.C.

Notice to Subscribers.

THE SUBSCRIPTION TO THE GARDENERS' CHRONICLE and AGRICULTURAL GAZETTE is £1 2s. 6d. for 12 months, including postage to any part of the United Kingdom. May be had of all Booksellers.

Published by W. RICHARDS, 41, Wellington Street, Covent Garden.

ROYAL BOTANIC SOCIETY. Regent's Park. LECTURES ON ECONOMIC BOTANY will be delivered by Professor BENTLEY, in the Museum, at 4 o'clock, on Fridays, May, June, and July, commencing May 19. The Fellows of the Society and their Friends are admitted as ordinary days. On FRIDAY, May 19, at 8 o'clock, Mr. M. SOWERBY, Secretary.

Royal Horticultural Gardens, South Kensington.
ROSES, &c.

MR. Wm. PAUL, Waltham Cross, N., will hold a SPECIAL SHOW OF ROSES, PELAGONIUMS, and other Plants, from May 10 to Sept. 30. GRAND DISPLAY OF ROSES from the 5th to the 20th May.

TESTIMONIAL TO WILLIAM THOMSON, Esq., Dalkeith Gardens.—The Committee beg to intimate that the TESTIMONIAL will be presented at a DINNER in honour of Mr. THOMSON, to be held in EDINBURGH, on WEDNESDAY, May 31, and they request that intending subscribers will be kind enough to forward their names before the 24th inst., to either of the Treasurers, viz.:—
JAMES WOOD, Esq., Banker, Dalkeith; or
WILLIAM YOUNG, Esq., 33, South Bridge, Edinburgh.

New Roses of 1871.
JOHN CRANSTON offers a selection of TWELVE NEW ROSES of the present year. Fine plants ready in April. Descriptive LIST on application.
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Pines.
B. S. WILLIAMS has recently rebuilt and enlarged his PINE HOUSES, and can now offer splendid grown Plants of all the best kinds. Prices on application.
Victoria and Paradise Nurseries, Upper Holloway, London, N.

WEBB'S PRIZE COB FILBERTS, and other PRIZE COB NUTS and FILBERTS. Lists of these varieties from Mr. WEBB, Calcut, Reading.

WEBB'S NEW GIGANT POLYANTHUS.—The new Flowering Plant GIGANT POLYANTHUS, also fine plants of all the varieties, with Double PRIMROSES of different colours; AURICULAS, both Single and Double; with every sort of Early Spring Flowers. LIST on application.—Mr. WEBB, Calcut, Reading.

F. AND A. SMITH'S SPRING CATALOGUE, containing many NOVELTIES for the present season, is now ready, and may be had on application.
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Seeds for 1871.
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Highgate Nurseries, London, N.

RICHARD SMITH'S SEED CATALOGUE contains a Calendar of Time for Sowing, particulars of Collections, with Prices, Directions for Growing well and economically. Soil, Manure, Depth, Distance, Season, Hardiness, Duration, Form, Height, Colour, Storing, Use, &c., and other qualities described. The list free by post for one stamp. Seeds direct from the Growers, and the surest way to success.
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3000 plants, 250s. 6d.; 3024 plants, 252s. 6d.; 3048 plants, 254s. 6d.; 3072 plants, 256s. 6d.; 3096 plants, 258s. 6d.; 3120 plants, 260s. 6d.; 3144 plants, 262s. 6d.; 3168 plants, 264s. 6d.; 3192 plants, 266s. 6d.; 3216 plants, 268s. 6d.; 3240 plants, 270s. 6d.; 3264 plants, 272s. 6d.; 3288 plants, 274s. 6d.; 3312 plants, 276s. 6d.; 3336 plants, 278s. 6d.; 3360 plants, 280s. 6d.; 3384 plants, 282s. 6d.; 3408 plants, 284s. 6d.; 3432 plants, 286s. 6d.; 3456 plants, 288s. 6d.; 3480 plants, 290s. 6d.; 3504 plants, 292s. 6d.; 3528 plants, 294s. 6d.; 3552 plants, 296s. 6d.; 3576 plants, 298s. 6d.; 3600 plants, 300s. 6d.; 3624 plants, 302s. 6d.; 3648 plants, 304s. 6d.; 3672 plants, 306s. 6d.; 3696 plants, 308s. 6d.; 3720 plants, 310s. 6d.; 3744 plants, 312s. 6d.; 3768 plants, 314s. 6d.; 3792 plants, 316s. 6d.; 3816 plants, 318s. 6d.; 3840 plants, 320s. 6d.; 3864 plants, 322s. 6d.; 3888 plants, 324s. 6d.; 3912 plants, 326s. 6d.; 3936 plants, 328s. 6d.; 3960 plants, 330s. 6d.; 3984 plants, 332s. 6d.; 4008 plants, 334s. 6d.; 4032 plants, 336s. 6d.; 4056 plants, 338s. 6d.; 4080 plants, 340s. 6d.; 4104 plants, 342s. 6d.; 4128 plants, 344s. 6d.; 4152 plants, 346s. 6d.; 4176 plants, 348s. 6d.; 4200 plants, 350s. 6d.; 4224 plants, 352s. 6d.; 4248 plants, 354s. 6d.; 4272 plants, 356s. 6d.; 4296 plants, 358s. 6d.; 4320 plants, 360s. 6d.; 4344 plants, 362s. 6d.; 4368 plants, 364s. 6d.; 4392 plants, 366s. 6d.; 4416 plants, 368s. 6d.; 4440 plants, 370s. 6d.; 4464 plants, 372s. 6d.; 4488 plants, 374s. 6d.; 4512 plants, 376s. 6d.; 4536 plants, 378s. 6d.; 4560 plants, 380s. 6d.; 4584 plants, 382s. 6d.; 4608 plants, 384s. 6d.; 4632 plants, 386s. 6d.; 4656 plants, 388s. 6d.; 4680 plants, 390s. 6d.; 4704 plants, 392s. 6d.; 4728 plants, 394s. 6d.; 4752 plants, 396s. 6d.; 4776 plants, 398s. 6d.; 4800 plants, 400s. 6d.; 4824 plants, 402s. 6d.; 4848 plants, 404s. 6d.; 4872 plants, 406s. 6d.; 4896 plants, 408s. 6d.; 4920 plants, 410s. 6d.; 4944 plants, 412s. 6d.; 4968 plants, 414s. 6d.; 4992 plants, 416s. 6d.; 5016 plants, 418s. 6d.; 5040 plants, 420s. 6d.; 5064 plants, 422s. 6d.; 5088 plants, 424s. 6d.; 5112 plants, 426s. 6d.; 5136 plants, 428s. 6d.; 5160 plants, 430s. 6d.; 5184 plants, 432s. 6d.; 5208 plants, 434s. 6d.; 5232 plants, 436s. 6d.; 5256 plants, 438s. 6d.; 5280 plants, 440s. 6d.; 5304 plants, 442s. 6d.; 5328 plants, 444s. 6d.; 5352 plants, 446s. 6d.; 5376 plants, 448s. 6d.; 5400 plants, 450s. 6d.; 5424 plants, 452s. 6d.; 5448 plants, 454s. 6d.; 5472 plants, 456s. 6d.; 5496 plants, 458s. 6d.; 5520 plants, 460s. 6d.; 5544 plants, 462s. 6d.; 5568 plants, 464s. 6d.; 5592 plants, 466s. 6d.; 5616 plants, 468s. 6d.; 5640 plants, 470s. 6d.; 5664 plants, 472s. 6d.; 5688 plants, 474s. 6d.; 5712 plants, 476s. 6d.; 5736 plants, 478s. 6d.; 5760 plants, 480s. 6d.; 5784 plants, 482s. 6d.; 5808 plants, 484s. 6d.; 5832 plants, 486s. 6d.; 5856 plants, 488s. 6d.; 5880 plants, 490s. 6d.; 5904 plants, 492s. 6d.; 5928 plants, 494s. 6d.; 5952 plants, 496s. 6d.; 5976 plants, 498s. 6d.; 6000 plants, 500s. 6d.; 6024 plants, 502s. 6d.; 6048 plants, 504s. 6d.; 6072 plants, 506s. 6d.; 6096 plants, 508s. 6d.; 6120 plants, 510s. 6d.; 6144 plants, 512s. 6d.; 6168 plants, 514s. 6d.; 6192 plants, 516s. 6d.; 6216 plants, 518s. 6d.; 6240 plants, 520s. 6d.; 6264 plants, 522s. 6d.; 6288 plants, 524s. 6d.; 6312 plants, 526s. 6d.; 6336 plants, 528s. 6d.; 6360 plants, 530s. 6d.; 6384 plants, 532s. 6d.; 6408 plants, 534s. 6d.; 6432 plants, 536s. 6d.; 6456 plants, 538s. 6d.; 6480 plants, 540s. 6d.; 6504 plants, 542s. 6d.; 6528 plants, 544s. 6d.; 6552 plants, 546s. 6d.; 6576 plants, 548s. 6d.; 6600 plants, 550s. 6d.; 6624 plants, 552s. 6d.; 6648 plants, 554s. 6d.; 6672 plants, 556s. 6d.; 6696 plants, 558s. 6d.; 6720 plants, 560s. 6d.; 6744 plants, 562s. 6d.; 6768 plants, 564s. 6d.; 6792 plants, 566s. 6d.; 6816 plants, 568s. 6d.; 6840 plants, 570s. 6d.; 6864 plants, 572s. 6d.; 6888 plants, 574s. 6d.; 6912 plants, 576s. 6d.; 6936 plants, 578s. 6d.; 6960 plants, 580s. 6d.; 6984 plants, 582s. 6d.; 7008 plants, 584s. 6d.; 7032 plants, 586s. 6d.; 7056 plants, 588s. 6d.; 7080 plants, 590s. 6d.; 7104 plants, 592s. 6d.; 7128 plants, 594s. 6d.; 7152 plants, 596s. 6d.; 7176 plants, 598s. 6d.; 7200 plants, 600s. 6d.; 7224 plants, 602s. 6d.; 7248 plants, 604s. 6d.; 7272 plants, 606s. 6d.; 7296 plants, 608s. 6d.; 7320 plants, 610s. 6d.; 7344 plants, 612s. 6d.; 7368 plants, 614s. 6d.; 7392 plants, 616s. 6d.; 7416 plants, 618s. 6d.; 7440 plants, 620s. 6d.; 7464 plants, 622s. 6d.; 7488 plants, 624s. 6d.; 7512 plants, 626s. 6d.; 7536 plants, 628s. 6d.; 7560 plants, 630s. 6d.; 7584 plants, 632s. 6d.; 7608 plants, 634s. 6d.; 7632 plants, 636s. 6d.; 7656 plants, 638s. 6d.; 7680 plants, 640s. 6d.; 7704 plants, 642s. 6d.; 7728 plants, 644s. 6d.; 7752 plants, 646s. 6d.; 7776 plants, 648s. 6d.; 7800 plants, 650s. 6d.; 7824 plants, 652s. 6d.; 7848 plants, 654s. 6d.; 7872 plants, 656s. 6d.; 7896 plants, 658s. 6d.; 7920 plants, 660s. 6d.; 7944 plants, 662s. 6d.; 7968 plants, 664s. 6d.; 7992 plants, 666s. 6d.; 8016 plants, 668s. 6d.; 8040 plants, 670s. 6d.; 8064 plants, 672s. 6d.; 8088 plants, 674s. 6d.; 8112 plants, 676s. 6d.; 8136 plants, 678s. 6d.; 8160 plants, 680s. 6d.; 8184 plants, 682s. 6d.; 8208 plants, 684s. 6d.; 8232 plants, 686s. 6d.; 8256 plants, 688s. 6d.; 8280 plants, 690s. 6d.; 8304 plants, 692s. 6d.; 8328 plants, 694s. 6d.; 8352 plants, 696s. 6d.; 8376 plants, 698s. 6d.; 8400 plants, 700s. 6d.; 8424 plants, 702s. 6d.; 8448 plants, 704s. 6d.; 8472 plants, 706s. 6d.; 8496 plants, 708s. 6d.; 8520 plants, 710s. 6d.; 8544 plants, 712s. 6d.; 8568 plants, 714s. 6d.; 8592 plants, 716s. 6d.; 8616 plants, 718s. 6d.; 8640 plants, 720s. 6d.; 8664 plants, 722s. 6d.; 8688 plants, 724s. 6d.; 8712 plants, 726s. 6d.; 8736 plants, 728s. 6d.; 8760 plants, 730s. 6d.; 8784 plants, 732s. 6d.; 8808 plants, 734s. 6d.; 8832 plants, 736s. 6d.; 8856 plants, 738s. 6d.; 8880 plants, 740s. 6d.; 8904 plants, 742s. 6d.; 8928 plants, 744s. 6d.; 8952 plants, 746s. 6d.; 8976 plants, 748s. 6d.; 9000 plants, 750s. 6d.; 9024 plants, 752s. 6d.; 9048 plants, 754s. 6d.; 9072 plants, 756s. 6d.; 9096 plants, 758s. 6d.; 9120 plants, 760s. 6d.; 9144 plants, 762s. 6d.; 9168 plants, 764s. 6d.; 9192 plants, 766s. 6d.; 9216 plants, 768s. 6d.; 9240 plants, 770s. 6d.; 9264 plants, 772s. 6d.; 9288 plants, 774s. 6d.; 9312 plants, 776s. 6d.; 9336 plants, 778s. 6d.; 9360 plants, 780s. 6d.; 9384 plants, 782s. 6d.; 9408 plants, 784s. 6d.; 9432 plants, 786s. 6d.; 9456 plants, 788s. 6d.; 9480 plants, 790s. 6d.; 9504 plants, 792s. 6d.; 9528 plants, 794s. 6d.; 9552 plants, 796s. 6d.; 9576 plants, 798s. 6d.; 9600 plants, 800s. 6d.; 9624 plants, 802s. 6d.; 9648 plants, 804s. 6d.; 9672 plants, 806s. 6d.; 9696 plants, 808s. 6d.; 9720 plants, 810s. 6d.; 9744 plants, 812s. 6d.; 9768 plants, 814s. 6d.; 9792 plants, 816s. 6d.; 9816 plants, 818s. 6d.; 9840 plants, 820s. 6d.; 9864 plants, 822s. 6d.; 9888 plants, 824s. 6d.; 9912 plants, 826s. 6d.; 9936 plants, 828s. 6d.; 9960 plants, 830s. 6d.; 9984 plants, 832s. 6d.; 10000 plants, 834s. 6d.

Geraniums.
W. POTTER can still supply strong plants, as advertised in the *Gardeners' Chronicle* of April 1 and 8. A BORDER PLANTS, all the leading varieties, also of BEDDING and other plants, from the 1st to the 31st of May. Price 1s. 6d. per doz. W. POTTER, Seedsmen and Florist, Sissinghurst, Staplehurst, Kent.

CUTTINGS OF GERANIUMS, &c.—100 Geraniums, 1s. 6d. per doz.; 200 Geraniums, 2s. 6d. per doz.; 300 Geraniums, 3s. 6d. per doz.; 400 Geraniums, 4s. 6d. per doz.; 500 Geraniums, 5s. 6d. per doz.; 600 Geraniums, 6s. 6d. per doz.; 700 Geraniums, 7s. 6d. per doz.; 800 Geraniums, 8s. 6d. per doz.; 900 Geraniums, 9s. 6d. per doz.; 1000 Geraniums, 10s. 6d. per doz.; 1100 Geraniums, 11s. 6d. per doz.; 1200 Geraniums, 12s. 6d. per doz.; 1300 Geraniums, 13s. 6d. per doz.; 1400 Geraniums, 14s. 6d. per doz.; 1500 Geraniums, 15s. 6d. per doz.; 1600 Geraniums, 16s. 6d. per doz.; 1700 Geraniums, 17s. 6d. per doz.; 1800 Geraniums, 18s. 6d. per doz.; 1900 Geraniums, 19s. 6d. per doz.; 2000 Geraniums, 20s. 6d. per doz.; 2100 Geraniums, 21s. 6d. per doz.; 2200 Geraniums, 22s. 6d. per doz.; 2300 Geraniums, 23s. 6d. per doz.; 2400 Geraniums, 24s. 6d. per doz.; 2500 Geraniums, 25s. 6d. per doz.; 2600 Geraniums, 26s. 6d. per doz.; 2700 Geraniums, 27s. 6d. per doz.; 2800 Geraniums, 28s. 6d. per doz.; 2900 Geraniums, 29s. 6d. per doz.; 3000 Geraniums, 30s. 6d. per doz.; 3100 Geraniums, 31s. 6d. per doz.; 3200 Geraniums, 32s. 6d. per doz.; 3300 Geraniums, 33s. 6d. per doz.; 3400 Geraniums, 34s. 6d. per doz.; 3500 Geraniums, 35s. 6d. per doz.; 3600 Geraniums, 36s. 6d. per doz.; 3700 Geraniums, 37s. 6d. per doz.; 3800 Geraniums, 38s. 6d. per doz.; 3900 Geraniums, 39s. 6d. per doz.; 4000 Geraniums, 40s. 6d. per doz.; 4100 Geraniums, 41s. 6d. per doz.; 4200 Geraniums, 42s. 6d. per doz.; 4300 Geraniums, 43s. 6d. per doz.; 4400 Geraniums, 44s. 6d. per doz.; 4500 Geraniums, 45s. 6d. per doz.; 4600 Geraniums, 46s. 6d. per doz.; 4700 Geraniums, 47s. 6d. per doz.; 4800 Geraniums, 48s. 6d. per doz.; 4900 Geraniums, 49s. 6d. per doz.; 5000 Geraniums, 50s. 6d. per doz.; 5100 Geraniums, 51s. 6d. per doz.; 5200 Geraniums, 52s. 6d. per doz.; 5300 Geraniums, 53s. 6d. per doz.; 5400 Geraniums, 54s. 6d. per doz.; 5500 Geraniums, 55s. 6d. per doz.; 5600 Geraniums, 56s. 6d. per doz.; 5700 Geraniums, 57s. 6d. per doz.; 5800 Geraniums, 58s. 6d. per doz.; 5900 Geraniums, 59s. 6d. per doz.; 6000 Geraniums, 6

VICTORIA and PARADISE NURSERIES, UPPER HOLLOWAY, LONDON, N.

Choice Tricolor and other Geraniums.

THOMAS PESTRIDGE can now supply for cash:—		Per dozen—s. d.	
Achievement (Turner's) ..	24	May Queen ..	5
Lacy Grieve ..	12	Princess Alexandra ..	4
Sophia Casack ..	4	Egyptian Queen ..	4
Mrs. Turner ..	5	Model ..	3
Glen Eyre Beauty ..	3	Refulgens ..	3
Charming Bride ..	4	Rev W F Radcliffe ..	4
Plants over 3s. per dozen package free. A LIST of other varieties on application.			

Plants over 3s. per dozen package free. A LIST of other varieties on application.

The Greenway, Ubridge.

DR. DENNY'S ZONAL GERANIUMS.—These splendid GERANIUMS will be sent out in May next, at 3s. for the set of seven varieties. For descriptions, see WM. PAUL'S SPRING CATALOGUE, free by post.

MR. POSTANS' new white-flowered, white-edged GERANIUMS, SNOW WREATH and VIRGIN QUEEN, price for 6d. each; WALTHAM BRIDE and AVALANCHE, 5s. each, or two latter cheaper by the dozen. Ready in May.

WILLIAM PAUL, Paul's Nurseries, Waltham Cross, N.

GEORGE SMITH has much pleasure in offering the three following ZONAL GERANIUMS, viz.:

NOSEGAY GERANIUMS.—MR. GLADSTONE (REG. 5870).—Extra large truss, colour rich scarlet, shaded with purple, the edges of petals shaded with carmine; the tips are much larger than a rosette, and of good substance. 4s. 6d. warrants this to be the finest Nosegay ever offered. Awarded a First-class Certificate by the Royal Botanic Society, Regent's Park; also taken 1st prize given by the Royal Horticultural Society, open to all England, as the finest Nosegay Geranium yet offered. 7s. 6d. each. Where 6 are ordered 2 will be sent, and where 12 are ordered 15 will be forwarded. Beautifully coloured Drawing of Mr. Gladstone, by Mr. MacFarlane, post free, 1s. 6d. each.

KINGCRAFT (WISBORO).—Dark carmine-scarlet, with large compact trusses of bloom, globe-like shape of splendid habit. 7s. 6d. each. Where 6 are ordered 2 will be sent, and where 12 are ordered 15 will be forwarded.

ZONAL GERANIUM, CONFLAGRATION (WISBORO).—Very deep scarlet of brilliant shade; truss and pile large, the latter stout and circular, with large trusses flowering in profusion; of fine habit, and one of the finest Zonals in cultivation. 5s. each. Where 6 are ordered 7 will be sent, and where 12 are ordered 15 will be forwarded.

The above Novelties, in good plants, to be sent out the first week in May.

Tollington Nursery, Hornsey Road, Islington, London, N.

Bedding Geraniums.

ALFRED FRYER offers the following at per dozen for cash:

GOLDEN TRICOLORS.

GOLDEN TRICOLORS.					
Per dozen.—s. d.			Per dozen.—s. d.		
Lady Cullum ..	..	3 6	Lacy Grieve ..	..	12 0
Mrs. Pollock ..	..	3 6	Spanish Beauty ..	..	12 0
Sophie Dumaresque ..	..	2 6	Mrs. Dix ..	..	18 0
Louisa Smith ..	..	6 0	Sophia Casack ..	..	9 0

SILVER TRICOLORS.

Irish Union ..	2 6	Caroline Langfield ..	6 0
Prinella ..	2 6	Princess Victoria ..	6 0
Mrs. John Clutton ..	18 0	Princess Victoria ..	18 0

SILVER-EDGED IVY-LEAVED.

L'Elegance ..	3 6	Duke of Edinburgh ..	3 6
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GOLD and BRONZE.

A. H. Wells ..	6 0	Painted Lady ..	3 6
Beauty of Calderdale ..	6 0	Perilla ..	2 6
Beauty of Ribblesdale ..	6 0	Princess Alice ..	2 6
Black Knight ..	6 0	Princess of Wales ..	4 0
Cleopatra ..	6 0	Stanza of Wales ..	4 0
Countess of Kellie ..	6 0	Her Majesty ..	6 0
Keats's Hero ..	3 6	Luna ..	2 6
Mrs. John Todd ..	6 0	Verona ..	2 6
Duke of Edinburgh ..	4 0	E. G. Henderson ..	3 6

DOUBLE FLOWERED ZONALS.

Andrew Henderson ..	1 6	Emile Lemonie ..	3 6
Captaine d'Hermite ..	3 6	Trompette ..	3 6
E. G. Henderson ..	3 6	Trompette de Thunesail ..	3 6

Hampers and packing 1s. for a single dozen, 6d. extra for each subsequent dozen. Remittances requested from unknown correspondents.

A LIST of 200 varieties post free.

ALFRED FRYER, The Nurseries, Chatteris, Cambridgeshire.

Novelties.

DOWNIE, LAIRD, and LAING have much pleasure in offering the following NOVELTIES, which are now ready for distribution.

NEW PELARGONIUMS.

Golden Bronze ..	Zonal and Hybrid Novelty	George Peabody
Annie Ketter ..	Moore of Venice ..	Black Knight ..
Black Douglas ..	Champion ..	Earl of Rosslyn ..
Champion ..	Marquis of Lorne ..	Reine Victoria ..

NEW PELARGONIUMS.

Colonel Long ..	Rev. C. Peach ..
Delicatissimo ..	Stantead Rival ..
George Amer ..	W. E. Gumberton ..

NEW ANTIKIRKUMS.

Charming ..	Orange Boven ..
Hirt ..	Queen of Crimsons ..

NEW PHLOXES.

A. F. Barron ..	Lothair ..	Mrs. Laing
Edna McNab ..	Macrae ..	Princess Louise ..

NEW CALADIUMS.

Barillet ..	Madame Dombrian ..	Quadrilateral ..
Herold ..	Maritimo ..	

The most choice of the older varieties are fully detailed in our Catalogue.

For Descriptions and Prices of all the foregoing, see our FLORIST PRICE LIST, which is sent free on application.

PLANTS of Pelargoniums Reine Victoria and Pink May Queen, Caladiums, Maritimo, and Queen of Crimsons, to be sent out in May next, at 3s. for the set of seven varieties, post free.

CHOICE TRICOLOR GERANIUMS.—Each—s. d. Per dozen—s. d.

MRS. HEADLEY ..	1 6	15 0
SIR E. NAPIER ..	1 6	15 0
ALICE LEE ..	1 6	15 0
LADY EDITH ..	1 6	15 0
VERONICA BLUE GEM ..	1 6	15 0

NEW IVY-LEAF GERANIUMS.

GEM OF THE SEASON ..	1 6	15 0
ALICE LEE ..	1 6	15 0
LADY EDITH ..	1 6	15 0
VERONICA BLUE GEM ..	1 6	15 0

NEW GERANIUM L'ASSEUILHII, 6d. each.

COPROSMA BAUTIANA VARIEGATA, 1s. each.

MESEMBRYANTHEMUM CORDIFOLIUM VARIEGATUM, 6d. each.

NEW GOLDEN FANSY, CLOTH OF GOLD, fine bedder, flowers all the year, 6s. per dozen.

NEW ZONAL and NOSEGAY GERANIUMS of 1870, 12s. per dozen.

Descriptive CATALOGUE of NEW PLANTS for 1871, now ready, and will be forwarded free on application.

L'ASSEUILHII, 6d. each.

VERONICA BLUE GEM, 1s. each.

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MESEMBRYANTHEMUM CORDIFOLIUM VARIEGATUM, 6d. each.

NEW GERANIUM L'ASSEUILHII, 6d. each.

COPROSMA BAUTIANA VARIEGATA, 1s. each.

NEW GOLDEN FANSY, CLOTH OF GOLD, fine bedder, flowers all the year, 6s. per dozen.

NEW ZONAL and NOSEGAY GERANIUMS of 1870, 12s. per dozen.

Descriptive CATALOGUE of NEW PLANTS for 1871, now ready, and will be forwarded free on application.

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those who were fortunate or unfortunate enough to spend some hours broiling in a sub-tropical temperature, not a fourth part, we imagine, could possibly see even the "oofs of the 'orses." With the modern Coliseum immediately adjacent, this seems to have been a great oversight.

Another prolific source of discontent arose from the arrangement with regard to the admissions into the Albert Hall—neither ticket-holders nor officials seemed to know what constituted the "passes" to the building. Stewards, who were certainly numerous enough, professed entire ignorance; policemen, sorely tried as to patience, pertinaciously denied access even by the corridors or entrances specially designated on the spectator's ticket. As the police arrangements are in general so good on occasions of this kind, we are quite willing to believe that all this was inevitable; still, as the regulations were clear enough in print, we think the stewards should, at least, have made themselves acquainted with them. From our own experience we know it is almost hopeless to expect the public to understand regulations, however clearly expressed.

Our own special grievance relates to the somewhat slighting manner in which horticulture and the fellows of the Royal Horticultural Society were treated. We believe this to have been purely unintentional, moreover the Society will in the event of the exhibition proving financially successful reap substantial benefit from the Exhibition. Yet bearing all this in mind, the proceedings on Monday last tend to confirm the uncomfortable impression that the Society is becoming more and more a mere convenience or tool in the hands of the "Commissioners," and that sooner or later that august body will wrap its anachronistic folds around the helpless Society, and wholly absorb it. For our own parts, we should not in the least regret this in the present unsatisfactory financial state of the Society, if the Commissioners manifested the slightest symptoms of appreciation of the objects, or concern for the advancement of horticulture proper.

The Commissioners' idea of horticulture, if they have any idea of it at all, seems to us to be confined entirely to its decorative phase—an affair of upholstery, so to speak (though as such not to be too lightly esteemed), and to its powers of transferring shillings from the pockets of loungers to the corporate coffers. We have nothing to say against this either. It is quite legitimate in its way, but it is not the be-all and end-all of horticulture; it is not carrying out the objects for which the Royal Horticultural Society was originally founded; and if it is compelled, by force of circumstances, to take this narrow view of the subject, the Society will speedily become nothing but a floral bazaar on a large scale, where the most showy rather than the most meritorious and the most useful objects will command the palm.

The Society and its Fellows, however much pushed out of the way on Monday last, will have an opportunity of asserting themselves at the fortnightly meetings, and as the interests of the Society and of the Commissioners are so inseparably connected, we may hope to see that the slight passed, unintentionally we are sure, on the Society, will be replaced by a more becoming recognition.* We are by no means sure that the Council of the Society is to be wholly absolved from blame in this matter. Appearances would rather lead to the opinion that had a little more self-assertion on its part been manifested in the first instance, and a little more regard for the privileges of its Fellows, a better bargain might have been made, on any rate than the position of the Society, as the representative assembly of British horticulture, might have been more thoroughly asserted. Again, the absence of "gardeners" was commented on in a procession where fishmongers, grocers, vintners, and we know not what other guilds were really or metaphorically represented by the presence of their respective "companies," &c., though most of these representative bodies really represented nothing proposed to be exhibited at this time in the galleries of the Exhibition. A deputation from the gardeners of Britain might well have formed part of the procession in a garden which they or their brethren are expected to decorate. It would have been a graceful and fitting compliment to a body

of men as fully deserving such recognition as any of the workers whose skill and industry are represented in the galleries.

Impartiality has induced us to pen these remarks in the interests of horticulture—let us add to them the recommendation to every one who has the power to do so, to visit the exhibition, not merely on the occasion of the fortnightly meetings of the Royal Horticultural Society, but at other times, when the contents of the galleries will amply repay the visitor for his pains. The picture galleries seem on the whole the best we have yet seen in London, and their contents comprise much that is of the highest order. The collections of porcelain are exceedingly beautiful and varied; and though, from the limited character of the scheme, there is necessarily less to be seen than on former occasions, yet there is still ample provision for persons of very different tastes and accomplishments, while the principle of selection that has been followed in the arrangement of the objects exhibited, renders the value of the Exhibition for educational purposes greater than on any previous occasion. A word of praise should be awarded to the catalogues, produced, we believe, under very great pressure as to time, but containing under the circumstances very few blunders. Let us hope ere the season ends, that fair France may be enabled to fill the now empty court which her public spirit erected at her own cost, but which her misfortunes have partially prevented her from utilising.

THE subject of HEATING BY HOT WATER has always engrossed a large share of the attention of horticulturists. For years past the boiler question has been intermittently under discussion, and the vexed question as to which is the best and most economical form for horticultural purposes, appears from the controversy now going on to be little nearer to a settlement than at the commencement. New boilers there are in plenty, and new boilers there will be, so long as there is a demand for them; and until their management is made more a matter of intelligence than at present, the demand will no doubt continue. It is well known that in most establishments the biggest blockhead on the place is selected to fill the important office of stoker, but in no greater mistake than this could well be made. Notwithstanding all the criticisms that have appeared about the merits and demerits of one or the other kind of boiler, and although there may be, and no doubt are, abundant grounds for merit, it is not questionable if there is now in use a really bad one, bad setting and bad management; we believe, the principal causes of nearly all the heartburnings about hot-water boilers.

Although, from the commencement of the hot-water era, the statements concerning the different forms of boiler have been most conflicting, yet all critics seem to have been unanimous that, in the matter of the circulation of the water, there was only one way of procedure, *i. e.*, to make the highest pipe the flow, and the lowest one the return. Under this system the secret of economy lay in having plenty of piping. But as long as this view prevails, the expense of such fixtures will prevent horticulture from ever becoming anything but a luxury for the rich. From what we have lately seen, we are, however, disposed to regard the above mode of heating as a fallacy. All agree that the great desideratum in every form of hot-water apparatus is a rapid circulation through both the boiler and the pipes, and the arrangement which, within certain limits, best secures these conditions is the most economical. Under the present system the circulation is in too many cases the reverse of rapid, and the return-pipe towards the boiler is comparatively cold. Now, we believe that the colder the return-pipe is, the slower will be the circulation, and *vice versa*, because it is the expansive power of the heated water, and not the cold water, which is the motive power in circulation. Hence it follows that of two sets of pipes of equal length, the one in which the return is heated to nearly the same temperature as the flow must warm a given body of air to a much higher temperature in a given time than that in which the return-pipe at the boiler is cold; and this arrangement would be at once the most effective and the most economical, for where the circulation is brisk the more heat will be extracted from the fuel.

For the opportunity of drawing attention to this fact, we have to thank a horticulturist who has already rendered good service by his

advocacy of the Vine extension system; we allude to Mr. CANNELL, of Woolwich. In the system of heating now in use, often occurs that the return-pipe does not get hot enough to carry up any moisture that may be thrown upon it, but do as Mr. CANNELL has done, and make the ordinary return-pipe the flow, and the water will circulate so rapidly that the return-pipe (the highest one) will become heated right up to the boiler, with only a slight perceptible difference between the two. What a saving this will effect in the cost of piping, and in fuel!—why everybody will be able to have a small heated house, or a large one either, if it suits his means. Practically this valuable discovery will put hot-houses within the reach of the million, and the impetus which it will give to horticulture is well nigh incalculable.

In effecting this important change, the only difference—but that is a great one—will be of having the top of the boiler set on a level with the bottom pipe, which is the flow. If these are connected, the water gradually rises until it leaves the house, and then suddenly dips into the boiler again at the bottom. By this means a rapid circulation is caused, and both pipes, as we have had ocular demonstration, are heated to nearly the same temperature. This is no theory, but an accomplished fact. To those who are at all sceptical in the matter we say, pay a visit to Mr. CANNELL at Woolwich, and he will show his system in operation in more than one instance; and after comparing the advantages of the two systems, which he can show at work almost side by side, we make no doubt that scepticism will give place to assent.

THE international character of the series of fortnightly exhibitions of the Royal Horticultural Society was distinctly asserted on Wednesday last by the presence of M. DE CANNART D'HAMALE, Sénateur, and President of the Federation of the Belgian Horticultural Societies, and who was formally received in his official capacity by the Council of the Royal Horticultural Society. Those who know how much good has been effected by the Federation, and those who have seen the opportunity of estimating the value of M. DE CANNART'S services to horticulture, as well as his personal qualities, will rejoice that a formal compliment of this kind has been paid. It will be remembered by our readers that M. DE CANNART is the author of a monograph of Lilies, of which we had occasion to speak lately in favourable terms. At future meetings we are led to hope that other eminent representatives of Continental horticulture will be present.

—In reference to the new HARDY JAPANESE PRIMROSE (*Primula japonica*), alluded to at p. 584, we have been favoured by Mr. FORTUNE with the following note:

"In the early days of May, 1861—just 10 years ago—when I was sojourning in an old temple, near Yeddo, the capital of Japan, I had occasion to my garden a basketful of this beautiful Primrose in full bloom. Its flowers, of a rich magenta colour, were arranged in tiers, one above another, on a spike nearly 2 feet in height, and its leaves were not unlike our own English Cowslip. It was beyond all question the most beautiful of the kind I have ever seen. I thought it crowned it at once as the 'Queen of the Primroses.' I need scarcely say that I bought all the basketful, and added it to my already rich collection of Japanese plants. Unfortunately, however, I did not succeed at that time in getting the plants home alive, and the seeds which I had gathered failed to vegetate on their arrival in England. Since that time I have made many efforts to get home living plants and seeds. Mr. FITCH, the talented artist, kindly made drawings for me from dried specimens in the Kew Herbarium, and from the dried seeds which I had gathered in order that the plant might be recognised by my correspondents. I am, however, almost uncharitably enough to believe that some of those to whom my letters were addressed considered the plant too valuable to send to me, and therefore refused to do so. I have great pleasure in stating that I succeeded at last, through the kindness of W. KESWICK, Esq., of China, and Messrs. WALSH, HALL & Co., of Japan, who sent me seeds, which vegetated on their arrival in this country. These gentlemen are doing me the honour of allowing me to introduce a very lovely hardy plant from the gardens of Japan to those of Europe. There are several distinct varieties, with flowers of various hues of colour, and all are beautiful. It will prove a grand plant for our hybridisers, owing to its fine habit, large flowers, spikes, and brilliant colouring, and no doubt will become the parent of a new race of hardy Primroses. I have only to add that the plant has withstood the late severe winter in the open air without any protection whatever, both in my own garden at South Kensington, and in Mr. BULL'S establishment in Chelsea. Robert Fortune."

—At a recent meeting of the Royal Society Mr. FRANCIS GALTON recorded the results of some experiments undertaken to measure the correctness of Mr. DARWIN'S notions of PANGENESIS. According to this theory or provisional hypothesis, as its author modestly terms it, every cell of which a plant or an animal consists contains myriads of minute reproductive bodies, or gemmules, which have a quasi-independent existence,

* Since these remarks were written, a graceful compliment has been paid by the Commissioners to the members of the various committees of the Society—a numerous body—by presenting them with season tickets, and this has been done with so much tact and consideration that our use of the word "unintentional" has been amply justified. Moreover, the Council, on its part, has vigorously repelled an audacious infringement on the Society's rights and privileges.

by gum, glue, or marine glue, or a single pin may be driven through so deeply into the wood that the head of the pin rests on the insect, and sometimes by carefully lifting one of the elytra of the beetle the pin may be passed through beneath it, and the wing-cover returning to its place will entirely conceal the artificial support.

Pupæ may be fixed with glue and concealed pins, and the larger larvæ, such as those of the goat-moth, may be well represented by plaster models from life, fixed in the injured timber from which the original was taken; but in all these matters the characteristic position and colouring of the insect should be well studied before any attempt is made to represent it, and all artificial attachments or supports should show as little as possible. If it is quite unavoidable that they should appear, a little earth or wood-dust applied to the surface of the glue or gum, and a few touches of paint on the wires, will usually deaden them, so as to attract little notice.

Besides the substances mentioned, there are others still more perishable, such as fruit, leaves, or roots, which it is necessary should be represented, in order to give perfect illustration of the destructive habits of many of our insects. In some cases these can be shown by accurate drawings; in others, models in wax or plaster give a satisfactory representation, and in the Entomological Collection of the Horticultural Society at South Kensington are many specimens of models in plaster of Paris, representing vegetable substances injured by insects, the insects themselves in their larval form, and other subjects connected with economic entomology. The process of making these is as follows:

The object to be modelled should first be coated thickly and strongly with wax; this may be done by placing it on a smooth board which has been slightly dampened to prevent adhesion, and then brushing the melted wax rapidly over it with a camel's hair pencil: The wax should at first be almost boiling hot, so that it may flow from the brush like water, and leave no marks where the successive applications join each other, and when a thin coating of wax has been secured over the entire surface of the object (or such parts as it is desired to model), the mould should be gradually thickened by the application of successive brushfuls of the rapidly cooling wax till it is of the required strength.

If the object to be modelled is a leaf, it is best to remove it from the mould before the wax is perfectly cool. In this state it can be gently lifted and drawn from the mould without injuring the most delicate folds. If it is a fruit or root the wax should be left untouched till it is thoroughly cold and hard, and the object may then be cut away carefully with a knife or curved chisel, the central part being first gradually removed till a mere film remain of the rind or bark of the object immediately touching the wax mould. This may be broken away or withdrawn by a pair of forceps, and moved through the opening which has been left where the object was placed on the modelling board.

The cavity is then to be filled with plaster of Paris, mixed smoothly with water to about the consistency of cream, and laid into the mould in successive brushfuls, with the kind of paint-brush known as a hog-tool. Much of the beauty of the model depends on the care exercised in this part of the work. If the plaster is sufficiently liquid, and worked well into all parts of the mould with the brush, all is well; but if the plaster is too thick, or allowed to run at once to the mass into the mould, air-bubbles and other defects are most likely to appear, and the model to be totally useless.

It is necessary to procure the best plaster of Paris, such as may be procured from the London dealers, as what is procured in country towns seldom sets properly, and consequently causes much disappointment. When the plaster has set firmly the wax should be removed by pouring scalding water over it, and the model, after having been properly dried, either by warmth or by setting it aside on blotting-paper for some days, should be carefully examined, and all superfluous plaster and imperfections removed, and it will then be ready for colouring.

In colouring the great object is to give the natural tints without injuring the perfect representation of texture of surface already obtained; unless the colouring materials are used with great care, the fine markings which, through their truth of representation, give the life-like appearance to the model, will be lost sight of, and its value much deteriorated.

To meet this point we should be careful to avoid the application of paint in layers, which are liable to leave the projecting parts bare, and the fine depressions clogged, and to render evident the markings of the brush, and the junctions of the various tints of paint. If the model is prepared by being soaked on the surface with drying oil, and after being slightly warmed, the paint (which should be the ordinary good oil paint used by artists) is to be so, say, floated with the brush over the surface, and then the brush is to be run into each other in some places, the superfluous matter being carefully removed from the hollows with a fine brush—this method will usually, with care and patience, succeed, so that the object may be satisfactorily tinted in a very short time, and will only require the addition of a few characteristic touches (or possibly corrective

washes of transparent tint), applied where requisite, after the first coat has dried.

The minute work, such as kinds of varnish and different methods of manipulation, would be too long in detail to enter on here, but it may be added that the natural appearance of the model may often be much enhanced by the addition of such parts of the original as are durable: for example the dry scales of the pseudobulbs of Orchids, or the outer coats of some bulbs, may be carefully removed from the object to be modelled before the mould is taken, and being replaced on the model in their proper position after it has been tinted, will give a truthfulness and beauty to the work which could be obtained in no other manner. O.

HORTICULTURAL BOILERS.

In accordance with my promise, I now send you a sketch of my improved Cornish boiler. The boiler (fig. 116) consists of two wrought-iron cylinders, rivetted together in a very substantial manner, having about

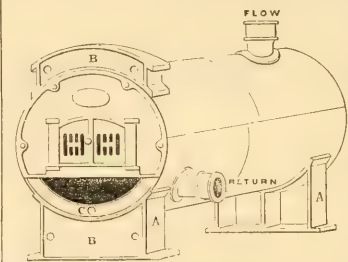


FIG. 116.—STEVENSON'S IMPROVED CORNISH BOILER.

2 inches of water space between the cylinders, and the door frame being firmly attached to the end of the boiler. The boiler is carried by two cast-iron chairs (A A), the front chair forming the frame for the lower flue door. The flue doors (B B) fasten by a simple catch, and can be lifted off, for sweeping, cleaning, &c., with the greatest facility. At the bottom of the boiler (C) is shown a plug, which should be unscrewed, and all accumulations of dirt thoroughly raked out of the boiler once in three or six months, according to the tendency of the water to deposit solid matter. Fig. 117 shows a vertical section of the boiler, with upper and lower flues, firebricks and asphalt, &c., and will require no explanation.

It will be seen that the furnace is inside the boiler. The heat then passes over the upper half of the boiler, then under the lower half, and into the chimney, or the flue which leads to it. This mode of setting, I find, gives more heat for a given quantity of fuel than when the heat passes under the lower half first, and then over the upper half into the chimney.

The principle of the boiler is such as not only to

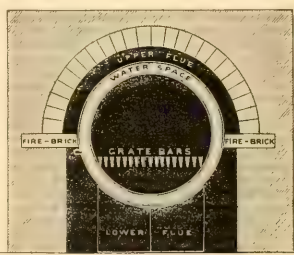


FIG. 117.—VERTICAL SECTION OF STEVENSON'S BOILER.

expose a large area of water to the direct action of the fire, but the fire operates with its greatest force on the upper part of the boiler, where there is no possibility of solid matter accumulating, to cause the iron to burn and thus destroy the boiler.

In my experience, I have found that nearly all kinds of boilers wear out prematurely for the want of means to keep them thoroughly clean inside. A simple tap at the lower part of a boiler is not sufficient to clear out the heavy matters which accumulate there, and unless a boiler be so constructed that all accumulations of solid matter can be got at and raked out with ease, it may be concluded that sooner or later it will crack or burn out. A good deal has been said about the desirability of dispensing with brickwork in the setting of boilers, as if the heat absorbed by bricks was altogether useless. Have such thinkers ever carried the family dog to the village bakchouse and seen it "set" an hour after the fire has been out of the oven? The brickwork of a properly set boiler is not so much a consumer of heat as a reservoir for holding

it and dispensing it as the boiler demands it. After the novelty of boilers set without brickwork is over, we shall still recognise boilers set properly in brickwork as the most steady and economical arrangement for horticultural purposes.

One word with regard to the material of which boilers must be made. I believe that horticulturists generally are of one opinion—that the days of cast-iron boilers for our purpose are numbered. We require stronger guarantees against the annoying and costly emergencies that they frequently involve us in, and immunity from the awful nightmares which the anxious gardener or nurseryman experiences when the thermometer is at zero, and he has hundreds, or perhaps thousands, of pounds value in the keeping of a fickle cast-iron boiler. Copper and brass are too expensive to be generally adopted, though where fuel is very expensive, boilers made of this metal would pay the investor, and so we come to wrought-iron plates, as the best material for constructing horticultural boilers.

The boiler figured here is not a preliminary sketch of water, but has been tested by me for nearly four years. We have upwards of three miles of 4-inch piping to heat, nearly the whole of which is forcing house or stove heat. It is displacing the tubular boilers at Messrs. Veitch's. At Combe Abbey it is heating nearly 4000 feet of 4-inch piping, in place of two large tubular boilers. It has been in use at Huntroyde Park for two years; at Earl Shrewsbury's garden at Ingestre, and many other places; and I hear from one and all the same opinion, that it is the simplest and most economical boiler with which they are acquainted.

I had designed a bridge for the back of the boiler, through which the heat was to pass into the upper flue, but after a good deal of consideration I abandoned the idea, as the advantage would have been more apparent than real, and would have tended to complicate an otherwise very simple arrangement. This boiler resembles the saddle depth of the stovehole for setting as the ordinary saddle, and is made in a very substantial style by the North Staffordshire Engineering Company, Fenton. It may be seen in operation here at any time, or at the places above mentioned.

In my last note I mentioned the qualities which I considered should be possessed by a horticultural boiler, and I now recommend the boiler and its arrangements as possessing those qualities. To all who are in difficulties with their boiler I say, Try this; it will not fail to satisfy. Z. Stevens, Trintham Gardens.

AMATEUR GARDENER.

Bedding Out.—So much has been well written on the advantages and defects of the "bedding out" system of modern gardening in the pages of the *Gardener's Chronicle*, and on the principles which the practice should be conducted, that we do not now intend to dwell on the general subject, but merely to furnish a few hints for the guidance of small gardeners of the amateur class, for whom this series of papers is intended. We will presume, first of all, that our friends are intending to fill their beds with new purchases, and, if so, we advise them to buy their plants in pots, and not as just taken up out of a nursery with their roots exposed and damaged. A plant which has been trained in a pot will be nearly a month in advance of another merely dug up and transplanted, even if the process could be performed instantaneously; but when the plants have to be removed from the nursery, packed up, and forwarded by some conveyance, the loss of time will often be still greater before they acquire the settled healthy look which is desired, and begin to produce flowers. In this country the season during which a bed of exotics can display its beauties is so short, say from the beginning of July to the end of September, that no means of prolonging the time of blooming should be neglected. It will be better to pay more for plants established in pots than to shorten and otherwise spoil the floral season by the rougher method of transplanting.

But if you grow your own plants, or buy a collection in pots, and have them ready for bedding out, you can wait upon the season, and need not be compelled to hurry the process at the risk of seeing vegetation disappointed by late frosts which often make their appearance in the latter period of May. Tempted by fine mild weather, we have often turned out our stock from the pots into the beds, and have prided ourselves for a time on the forward appearance of our parterres. But frequently "a change came o'er the spirit of our dream," and a frost, or cutting east wind, or both combined, have made our Pelargoniums become much smaller, and dried up *Verbas* and *Centauries* to a mere shadow of themselves. We have become wiser by these former disappointments, and prefer waiting till the end of May, though in balmy days and warm dewy nights hope tells "the flattering tale" that frosts will not return. The chief difficulty in this self-denying ordinance of delay, is the trouble occasioned by having so many pots to water and otherwise care for in the hot dry weather, which we generally have in May. But this is a less evil than the many evils and contrivances. Frames and pits may be shaded, or pots may be placed under a north wall, with the protection at night of a board or two, or an extemporised tent of matting to be drawn over them when the sun goes down. Remember that with a careful gardener no time is really lost by this delay. As

long as the plants remain in pots they admit of improvement in the way of stopping the advancing shoots, and giving a desirable direction to the growth. Even in the last week in May there is no certainty that a frost may not do damage, but the probability of such a catastrophe is but small, and the chance must be submitted to. Once only in the course of the last 20 years we remember such a mortifying ending of much careful labour. We had finished our bedding out to a much greater extent than we now practise, and went to Ireland at the end of May. On our return we found every *Dahlia* killed to the ground, and our exotics in the beds either dead or miserably crippled and dwarfed by the cruel and unseasonable enemy.

If, however, you are compelled to transplant from the nursery beds or boxes, you must shade as much as possible. A good deal of disappointment may be avoided in that way. *H. B.*

BOTANY FOR BEGINNERS.—V.

EVERY orchard is now gay with the lovely blossoms of the Apple, on which account, as well as because it illustrates certain principles of floral construction, and affords examples of some organs hitherto not alluded to, we select it as the subject of the present paper.

Unlike the trees we have previously mentioned, the Apple unfolds its flowers at or about the same time that the leaves expand. It is worth while, too, now that we have the chance, to notice the way in which the young leaves are rolled up, just as a plan or a roll of music might be. There are several modes in which the young leaves are rolled or folded in the bud, and, as is the case throughout all Creation, we shall find the mode of packing to be the best that could be contrived to avoid waste of space and secure the younger tissues from harm. The arrangement of leaves in the bud is technically called *vernation*, and the particular mode of vernation we have to deal with in the Apple is called *convolute*, or rolled. The beginner, too, cannot fail to notice that the leaves of the Apple are stalked, that they are *simple*, i.e., in one piece, notched or *toothed* at the margins, downy, especially on the lower surface, traversed by a *midrib* continuous with the leaf stalk, and from the sides of which pass off others, and form the veins; others, till a network of fine ribs is produced, resembling the branches of a tree in miniature. Owing to this netted arrangement of the ribs or fibres of the leaf, it is not possible to tear it without leaving a jagged irregular edge. In the Tulip and Hyacinth, on the other hand, the ribs are not netted, but nearly parallel, as previously explained. Now this disposition of the ribs of the leaf is a matter of some importance, because it enables us to distinguish at a glance the two principal subdivisions of flowering plants one from the other. The subdivision to which the Willow, Elm, Poplar, Ash, and Apple belong (*Dicotyledons*) has, subject to few exceptions, net-ribbed leaves. The subdivision to which the Tulip and Hyacinth belong (*Monocotyledons*) has almost invariably straight ribbed leaves. These are not the only differences between these two subdivisions. We shall point out several more by-and-by; at present we merely call attention to the fact of the ribbing.

On either side of the base of the leaf-stalk of the Apple may be observed a small leafy segment, looking like a supplementary leaf or segment of a leaf. Such indeed it is; but it is so different in dimensions that a different term has been applied to it,—viz., that of *stipule*. Note, then, that the Apple, like the Willow and Elm, has *stipulate* leaves, while the Ash, Tulip, and Hyacinth have *unstipulate* leaves, which are in the two last instances, as previously explained, *sessile*.

Each flower in the case of the Apple is stalked, and the stalks are collected together in a tuft at the end of the young shoots. In gardening operations, particularly pruning, it is of cardinal importance to notice the position of the flower-buds, else for lack of knowledge the pruning-knife may verily be made to kill the goose that lays the golden eggs. The same remark applies to training and to the management of timber trees.

At the top of the flower-stalk the beginner will notice a swelling like the thick end of a club, a peg-top, a bell, or some other form according to the variety of Apple; at any rate in the Apple the top

of the flower-stalk is always swollen in some form or another. The top of the flower-stalk is of course the part whence the several parts of the flower spring, and therefore it plays a most important part in the construction of the flower. In botanical language it goes by the name of *thalamus*, popularly (and therefore with less precision) it may be called the receptacle. The receptacle in many flowers has no very particular outward characteristic. It may be distinguished by its position, and that is all, at least on superficial examination. For instance, in all the flowers we have previously examined there was no special feature to distinguish the thalamus. It was simply the starting point of the several parts of the flower, but in the apple it is dilated and plainly visible. In some cases it is hollow or cup-shaped, in others it is rounded and dome-shaped, in others it is prolonged into a miniature shoot, around which the parts of the flower are disposed like leaves on a branch. It is easy to see from this how greatly the aspect of the flower depends on the form which the receptacle assumes.

At the top of the thalamus in the Apple we have the perianth, which here consists of two rows of segments differing in position and differing also in colour and form. In the case of the Tulip and Hyacinth (figs. 515, 549), we had a perianth in two rows, but the members of each row were, save in relative position, alike. In the case of the Apple, the outer perianth consists of five tri-

remarkable for their number; they are not easily counted, and are hence termed *indefinite* in number; but it will generally be found that they are about 20 (four fives). When the flower is cut through, as at *b* (fig. 118), there may be seen at the base of the stamens a yellow rim, which is called a *disc*, not clearly shown in the section, and which indicates in this case the point of emergence of the stamens from the receptacle.

A cut lengthwise through the flower will also show that the ovary is concealed within the club-shaped end of the receptacle *n*, and not only concealed within it, but actually *adherent* to it. By adhesion, as already mentioned under the Hyacinth (p. 549), the union of two or more parts of different character is designated. Here, where we have the ovaries joined to the receptacle, they are spoken of as *adherent* to it. This is a real case of adhesion, and not an apparent union arising from lack of separation. In the very earliest stages of the Apple blossom—when the flower is so small that the observer must have much practice and much patience before he can see its construction for himself—the ovaries, five in number, are entirely separate, but they very shortly become embedded in and adherent to the rapidly developing thalamus. The five styles of the Apple are free from one another above, but below they are *interpertate*, though, unlike the ovaries, they are free from the receptacle. The little knobs at the end of the styles are the *stigmas*. A cross cut through the receptacle below the sepals, as at *c* (fig. 118), will show the five ovaries with their ovules, surrounded by the receptacle.

What we have said of the Apple applies for the most part to the Pear, the most important distinction between them being, that in the latter the styles are free for their whole length. As the flower ripens into the fruit the already swollen thalamus will become more and more swollen and fleshy, will form, in fact, the fruit of the Apple or Pear, while the ovaries will be represented by the core (probably a corruption of the French *cœur*, heart), and the ovules which have ripened into pips or seeds.

Our main object in selecting the Apple as the subject of this paper was to illustrate the phenomena of *adhesion* of the ovaries to the receptacle, and the dilatation of the latter; and as this is a point of great importance in more ways than one, it should be carefully studied, and to that end we advise the beginner to make a cut lengthwise through a Cherry blossom, and to compare its structure with that of the Pear or Apple. They are similar in most respects, but the thalamus in the Cherry, although hollow, contracts no adhesion to the ovary (here solitary) which remains free in the centre of the receptacular cup. The beginner has only to imagine the consolidation of the cup and the ovary to understand the structure of the Apple or Pear. The fleshy edible portion of a Cherry is not the receptacle itself, but is the ovary itself become fleshy externally, woody within, the woody "stone" enclosing the kernel or seed.

TRADE MEMORANDUM.

MR. HARKNESS, Mr. Holt, and Mr. Gould are just now great patronisers of horticulture, and order evergreens and other articles largely. Their residences in the East of London are hard to find.

Home Correspondence.

Cacti v. Orchids.—The odium of the above designation rests with "Ex-Cathedra;" for I object to being made to set one tribe of plants against another. I can see as much beauty in the wild flowers of Old England as in any exotic, in fact I love them all. If your correspondent will read my first letter carefully he will see that I did not set Cacti above Orchids, but only claimed as much attention for them as for their brothers, and spoke of the comparative beauty of each; and if he were to see the collection which is grown here, he would see that his favourites are in the strong force as the Cacti. Now I am speaking of the two, I may mention, that if houses were built specially for Cacti, as they are for Orchids, and the same care given to each, they would be much more admired. Most people put the fine Cacti upon some shelf in the most out-of-the-



FIG. 118.—LEAVES, STIPULES, AND INFLORESCENCE OF APPLE.

a, Petal, showing its stalk; b, Cut lengthwise through the flower; c, Cross cut through the receptacle

angular leafy segments, bent downwards when the flower is expanded. Each segment also is sessile. The inner perianth consists of five coloured roundish sepals, larger than the outer ones, provided with a little stalk, as shown at *A* (fig. 118), erect and overlapping one another in the bud, but spreading nearly horizontally in the expanded flower. When the perianth consists of two rows, thus differing in character, the outermost is called *calyx* and its segments *sepals*, the innermost is called *corolla* and its segments *petals*.

The sepals are usually more or less green and leafy; the petals are usually more or less brightly coloured. The sepals serve to protect the flower in the bud; the petals, from their bright colours and perfume, attract insects, the visits of which are necessary in many cases to ensure the removal of the pollen from the anthers, and its deposition on to the stigma of another, or, perhaps more rarely of the same, flower. At any rate, the possession of a calyx and a corolla is a stride in advance in structural complexity over the flowers we have previously examined, and as such should be noted accordingly. Both sepals and petals are separate, and not really or apparently combined. The number of the sepals as of the petals is five; and it is here worthy of notice that plants with net-ribbed leaves usually have the parts of the flower in fives or fours, or double or treble those numbers, while plants with straight-veined leaves, like the Tulip and Hyacinth, have the parts of the flower grouped in threes, sixes, nines, twelves, and so on. The stamens in the case of the Apple are chiefly

way part of the house, and seldom notice them, and the consequence is they exist but do not grow. Let a small house be built with a full southern aspect, and let the plants get half the attention which "Ex-Cantab" gives his pets, and the beauty which they will reveal will surprise and charm the owner. The fact is, the public have had no chance of judging these plants, for though at Kew they have a fine house of succulents, it is entirely unsuited for the culture of the smaller Cacti; it is enough to do to keep them alive in it. Let a prize be offered at some of our large shows, and we should soon see them come out in better condition than at present. Your correspondent asks me to name 20 Cacti with as much beauty as the 20 Orchids he names, but he has no right to suppose that I meant the flowers only: I wrote then of the comparative beauty of the plants, and of that I adhere. Allowing him the full credit of 80 days out of the 365 which constitute the year during which time the Orchids are beautiful, I assert that the plants named below are beautiful all the year, so that we have 285 days to the credit of the Cacti.

Mammillaria seilii	Mammillaria rhodocantha
acanthophlegma	rosea
nivea longicoma	pacanacha
Parkinsonii	straminea
Neumannii	Echinocactus ornatus
spinulosissima	pectinatus
hastata	scopa candida
Schiediana	headorphia
discolor	Moravia
Caput-Meduse	bicolor

I wish he had asked for 40 more, for these are but a few of the many very beautiful species. I cannot conclude without remarking that I have only said a few words in favour of the too much neglected beauty of Cacti, without in any way detracting from the merit of Orchids, of which plants I am a lover as well as he. *J. Croucher, Sudbury House, Hammersmith, P.S.* I am authorised to send you a pair of £4 for the best grown four dozen Cacti, including Opuntia, Cereus, Phyllocactus, Rhipsalis, and Epiphyllum. [Our correspondent does not say when or where the prize is to be competed for. Eds.]

The Advantages of Growing Your Own Seed Cannot be Overestimated.—Two or three reasons may be assigned to show why your correspondent "Kitchener's" home-saved Onion seed germinated earlier than that which he purchased. I think the difference may arise from one being wintered in a dryer atmosphere than the other, which would at once account for its heavy slumbers, or it may be, perhaps, that the seed which "Kitchener" bought was not true to name. It is quite evident that if gardeners generally began to decrease in their purchases of seeds (as "Kitchener" represents) from one firm to the white Silesian, for I believe the variety of the true Silesian to be very rarely grown. *E. Morgan, Harrow-on-the-Hill.*

Horticultural Exhibitions.—Mr. Ayres' sense of propriety appears to have received a shock at my proposition of a friendly tournament—the money to go to a charitable object. I have the right to respect for genuine sentiments, and an equal contempt for those which are Pharaical. If I had proposed that the winner should gain anything in a pecuniary sense, then Mr. Ayres might with some show of reason have taken exception to it, but your correspondent's disgust has the appearance of being feigned, for instead of accepting my proposal himself he offers to find a man who will show me in May, June, and July, for £50 each event, and I will then let the winner produce the prodigy of his to the conditions equal to my own. Now I am prepared to concede anything in reason, especially after the shifts which Mr. Ayres has made to support his views, but I did not expect to hear such an absurd proposition as this. It reminds me of the clown in the circus, who expressed his intention of jumping a bar, but who could not do so because the man holding it could not hold it high enough. Now I will hold it as high as Mr. Ayres wishes, but he must jump. If he does not mean to get out of it, my first proposition was sufficient to bring the matter to a test. Mr. Ayres complains that his houses are not large enough to grow plants to compete with me. They are surely large enough to grow thirty small plants for two years, which was my proposition. Mr. Ayres says I appear indignant at the idea that the horticultural exhibitions of a quarter of a century ago appear superior to those of the present day. I have not written a single sentence upon which such a construction could fairly be placed. I have said that the London shows are inferior to what they were, but the leading provincial shows have improved a hundred per cent; and in the place of some dozen plant growers in the neighbourhood of London, they are to be met with now all over the kingdom. It may appear a convenient conceit for Mr. Ayres to try these evasive tactics, but I shall not permit him to do so with impunity. The question at issue is simply the merits of large well-grown plants *versus* small ones. Mr. Ayres'

fine-drawn explanation of his unwarrantable assumption in reference to Mrs. Lawrence's purchase of Messrs. Fraser's plants, is as ingenious a mode of getting out of a difficulty as any I have had the fortune to meet with. Through the whole of his communications on the subject, Mr. Ayres has not met a single argument I have advanced, but has indulged in reiterated assertions and exaggerated recitals of his own plant-growing exploits, which are totally irrelevant to the question. I were I to follow him I should simply submit to be drawn away from the subject at issue. If there is not more merit in the production of a collection of large well-grown plants than in a corresponding number of small ones, how is it that the small ones do not beat the large ones on the exhibition stage? The collection of plants here is kept up by the yearly purchase of some two dozen small trade plants; consequently, I have always a number of plants of all sizes, from the least to the largest, yet I never show the small ones, for the simple reason that if I did I should get beaten if I had to compete with good large ones; and I see only two ways of remedying this state of affairs—either for the promoters of leading exhibitions collectively to adopt Mr. Ayres as their sole judge, or to impute a number of fresh judges with his views on those matters. Mr. Ayres' ungenerous admission that he terms the "fourteen equivalent" which the exhibition of plants yields, may apply to those who show small ones; but those who are at the expense of moving large plants to distant exhibitions find they have little pecuniary reward for their trouble. Those who do not make the honour of victory their first consideration never attain a leading position. Mr. Ayres speaks of the Bougainvillea glabra I exhibited at Oxford. It is a useful plant, but one which I consider to be a little meretricious in growing. On another occasion when I exhibited a good plant of this Bougainvillea, I was told by an individual that he had a plant of it at home with five million flowers upon it! This must have been the plant Mr. Ayres had photographed. Do we not often hear of these wonderful plants at home? The plant I showed at the Crystal Palace in May was the same that I had at Oxford with a fresh lot of flowers upon it, and it was again shown in September.

Ayres try to get three lots of bloom out of his plant in one season in the little pot. Mr. Ayres says, the limited collections of large plants have had their day, and the foliage plants are in the sere and yellow leaf; and he frequently alludes to want of taste. I do not envy Mr. Ayres his taste when he would banish a class of plants that afford the most beautiful and elegant forms in the vegetable kingdom, to make way for the exhibition of his brick-red coloured favourites. Mr. Ayres admits that his small plants are not big enough to compete with the large ones, which shows rather suspiciously his object in trying to banish the large ones; but I can assure Mr. Ayres that if he constitutes himself an authority in matters horticultural, he will not meet with many so credulous as to accept his *ipse dixit* unchanged, in bolstering up one class of plants to the exclusion of others. What is required is not a present-day judicious selection of everything worth growing; and the horticulturist who is so limited or prejudiced as to advocate an exclusive line are not the men to occupy the watch-towers of the horticultural world. *T. Baines, Southgate, April 24.* [This discussion, waxing over personal, must now close. Eds.]

Aerial Roots on Vines.—Last year, if my memory serves me correctly, there was a short discussion carried on in your pages on the subject of air roots on Vines. According to some authorities on vegetable physiology, roots are formed as well as the layer of young wood in exogens, by the returning sap after its elaboration by the foliage. Now, admitting this theory, may not air-roots be induced by the coldness of the border? the returning sap being in a measure paralysed—if such a term is admissible—upon its reaching the roots, and in its efforts to fulfil its function, may give appearance in the form of air-roots in the more congenial temperature of the house. I may be told by some that they are caused by an excess of atmospheric moisture; to prove that this is not the only cause, I will cite a case in point. Here we have a house with the greater part of the Vines planted in an outside border—Hamburgs and Frontignans; others planted in a raised border inside the house—Mystecins. The borders being amongst the most freely rooting varieties we have. Those planted in the outside border emit an abundance of air-roots, whilst those planted inside have not a vestige of them. The outer border has been kept covered by gently fermenting material, but the roots I know extend considerably beyond the made border into the kitchen garden, the subsoil being a very stiff clay. Further, in support of this idea, is it not a fact that in late vinerias air-roots are but rarely seen? the borders being warmed by the increasing power of the sun. My sole object in bringing this subject again forward is that by so doing some of your practical correspondents may perhaps be induced to give us the benefit of their experience. *W. Bushell, Stanhope Park, Middlesex.*

To Prevent the Bleeding of Vines.—About eight years ago I had to cut down a very fine old Vine, after it had pushed into bud. I tried all the means then

existing, so far as I knew, to stop the bleeding, but without avail. At last I bethought me that india-rubber would bear a good pressure. I got some copper wire and a piece of elastic cloth, bound it tight over the end and down the stem of the Vine with the copper wire, and the result was, that it bulged the elastic a little, but did not lose one single drop more. I have since used many cases without losing any of the sap of the Vine which is essentially to the production of good rods; and I believe that if the proper thickness, according to the strength of the Vine, be used, that it will stop any Vine that ever grew, and if properly done, will not be so unsightly as many other methods. This method may have been in use, but as I never before saw or heard of it, I give it for the benefit of those who think proper to use it, and an certainty it will give satisfaction. *John Thomas Buckley, Gr. to W. W. Turner, Esq., South Syde, Suddworth, Yorkshire.*

New Zealand or Australian Plants.—In reply to "H." (p. 551), I beg to state that among many plants which have been planted out here from the above place, only the *Dracena australis* has done severe weather—New Zealand Flax, *Dracena australis* (this is not a very large plant, its stem only a few inches high), *Lomaria alpina*, *Dicksonia antarctica*, *Arundo conspicua* (this was killed to the ground, 1866-67), *Melaleuca myrtifolia*, *Edwardsia microphylla* (this loses its leaves in winter), *Eucalyptus* (of sorts). These have survived our severest winters, having been planted out for several years. The *Eucalyptus* however, are generally cut down to the ground by severe frost, but grows up again. The *Melaleuca* is well worth growing; it flowers freely, and has a nice Myrtle-like scent; its seed vessels are also pretty when out of flower. The *Dracena* is over 6 feet high; its young leaves get hurt by severe frosts, but recover again. Of three *Dicksonias* planted out only one remains; this plant grows beside a waterfall; and the others planted on higher ground have been killed. I may add that many other plants, including some *Conifers*, go on well for a time. *Pittosporum Mayi* for instance—but succumb to severe weather. Those mentioned above have not been protected by the shelter afforded by trees or shrubs. *H. M., Erey, Cornwall.*

Photinia arbutifolia.—If your correspondent at p. 550 means by *Photinia arbutifolia* the *P. serrulata* of the trade, nothing can be more opposed to our experience. It will not stand wind, which tears it to pieces, especially whilst in early leaf. Now, the cold alone suffices to cut them off. It will only do when sheltered from wind, and against a wall it is very pretty. With regard to ladybirds, we had one, at least, here a fortnight ago in the warm weather—near Weston-super-Mare, 400 feet above the sea. *Somerset.*

Roses and Mildew.—Having read that soft soap was a safe and effective cure for mildew and Aphis on Roses, I have lately tried it, with the best results. In the glass covered walk here there is a long row of Roses in pots, and just coming into flower, for cutting purposes, and in the beginning of April their foliage was infested with mildew and greenfly to a great extent. I therefore tried the syringing them with soft soap in the proportion of $\frac{1}{2}$ lb. to 5 galls. of water, and a handful or two of flowers of sulphur added. When the soap (it must be of the best kind) is put into the 5 galls. of cold water, it must be left to dissolve for a few hours, for I find it more effective this way than when dissolved in hot water, or tepid water. I have only used this mixture twice, and find the Roses are now free from mildew, and not an aphid is to be seen on them. For Roses in pots, if small plants, dipping them in a tub of the mixture will be found the most effective way, and in the case of standards or pillar roses the syringing must be done on each side, so as to reach all the foliage. Your correspondent, "E. L. G." (p. 551), will, I think, be triest this mixture, first, and then, when dissolved in hot water, the ill he complains of amongst his Roses. *William Tillery, Welbeck.*

Lawn Mowers.—As a regular reader and a gardener, allow me to protest against the way in which a bad machine is being advertised for sale. I purchased (per advertisement) a 16-inch machine to be worked easily by one man. He finds that it takes two instead of one. There really appears no improvement in respect of labour, for I remember Ferrabee's lawn-mower, nearly 20 years ago, and which worked quite as well as those made now. I have been three times deceived, each time trying a different maker. I cannot find fault with the work which the machine does, but as a practical working gardener I predict the labour of using the syringe to that of working a 16-inch lawn-mower. *J. H. C.*

Boilers.—Nothing is more antagonistic to my feelings than to appear in print, and be told by one who I have so much occasion to respect, which will really advance horticulture; but when I find Mr. Dunbar making erroneous statements and wrong quotations, I have no alternative but to reply to him. Mr. Dunbar says:—"My practice has always been to get the fire up thoroughly, red-hot right through, before leaving for the night, and then to nearly close the damper, leaving just enough opening for a draught, so allowing the fire to burn down, not up, as the morning advances."

Now this is decidedly at variance with all our highest and best authorities on plant growing. Mr. Dunbar stakes his fires up to the very highest heat in the middle of the night. Mr. Baines, whose authority from his almost unprecedented success cannot be doubted, tries (see p. 235) to avoid this excessive temperature in the dark, and takes every precaution to ensure the most heat as daylight approaches, and when the cold is generally the most intense. Now just at this time Mr. Dunbar's fire would be at the lowest ebb, and very probably out. If he cannot put forth more practical arguments than this in support of his views, I shall certainly not further waste your valuable time and space. He also endeavours to enlighten the public as to the height of my boiler (fig. 97, p. 484), and which, by his method of calculation, is 7 feet high; but on measuring the pattern (made from the wood engraving Mr. Dunbar alludes to) preparatory to casting, I find it to be 3 feet 10 inches high, with five flues; and should be only as much as to depth of stovehole two of the flues can be dispensed with, bringing boiler down to less than 3 feet. As there will shortly be a boiler exhibition, I trust Mr. Dunbar will honour me with a visit, when he will find my measurement correct, according to modern calculation; and as he expresses such horror at the word "registered," I will very shortly refrain from using it in substitution of "By F. M. P. Jones, London &c." Moreover, as he has a great desire to make acquaintance with anything appertaining to horticulture, I trust he will honour my nursery with his presence about the end of June, when I will give him convincing proofs of the power and value of the newly invented circulator, and of a system of heating horticultural buildings at present not in practice in any nursery but my own. *Henry Cannell.*

House Sewage as a Manure.—I agree with Mr. Morgan (p. 552), in his estimate of the great value of house sewage for garden purposes. The vast majority of the gardening fraternity who use it, are of course incapable of going into the exact merits of the greater or lesser value of liquid or solid manures. I agree with the bishop of old, who said: "Both are best, and I use both very liberally." Some years ago I built a tank at the bottom of my garden, and into this tank all the sewage, of all descriptions, from the house, stables, &c., is always flowing, with a fall of about 30 feet in 300. The tank gives us about 200 gallons every day, which we use just as it comes, considering that the water from washing vehicles, cleaning the yard, &c., is quite sufficient to reduce the house stuff to a proper condition. We distribute the liquid quickly and handsily with watering pots (minus the roses), holding 3 galls, each, two of which a man can carry very well, giving never less than two cans (6 galls.) at a time to our fruit trees, and often giving 20 galls. to some of the large heavily-laden specimens. This we do steadily all through the season, wet or dry, visiting the Pears, Apples, and Plums about once a fortnight, and giving a moderate dose to Peaches and Nectarines about blossom time, once or twice. I must state that I have never had a rose on an occasional dose. I obtain, with rare exceptions, large crops of splendid fruit every year. My Peach wall is now full of well-set young fruit and rich foliage, no protection being ever given. My Pears (over 100 varieties) have an immense crop, too—large, with foliage shining like rich satin. My Apples promise a heavy yield, and seem nearly all likely to set well. I have not an unhealthy tree in my garden in a stock of about 100, and I think we may have a good deal to do with those good appearances, aided, I should think, by our practice of washing, or rather painting, all our trees in January each year with a thick coat of soft soap, sulphur, and a little soot, well blended, and laid on with a paint brush from the ground to the top as near as we can go. We can dilute our sewage at a moment's notice if necessary by turning on a tap in the yard, which would wash all the drains down to the tank. *James F. Lombard, Dublin, May 2.*

Prizes at Exhibitions.—From your remarks appended to our letter in your issue of Saturday week, we think our meaning has been misapprehended. Our contention is that at a show where the principal prizes offered are for a certain number of Roses, exhibitions showing according to schedule are placed at a disadvantage if such prizes are by the judges made in pecuniary value or in position secondary to those given for miscellaneous groups of Roses, shown not according to schedule. In the group referred to in our note no nine plants would have compared with either of the "nines" shown by Mr. Turner or us. If the schedule prizes are not to be of primary importance, it would be all the better to grow miscellaneous groups of young Roses, such as are readily saleable after the exhibitions. Liberal extra prizes are welcome to us all, and they have helped to make the smaller exhibitions more attractive to both exhibitors and the attending public, but should they not be secondary to the schedule prizes for the same classes of plants? Our remark on the selection of judges was not influenced by the award of which we wrote: "We believe it is a general opinion amongst exhibitors, that successful or known growers of plants are the best judges of such plants; and here, in a Rose show, should not one or more Rose growers have been amongst the judges?"

Paul & Son, Chesham. [In the view current amongst exhibitors on this particular question we do not, as we have already stated, coincide; nor should we call the exhibition in question, in which pot Roses formed two out of thirteen inevitable classes, a "Rose Show." It was, in fact, a miscellaneous spring show; and we have no doubt the judges were selected accordingly. EDS.]

Asparagus.—Under this heading, at p. 452, are some remarks by your correspondent "K. K.," of Taddford, upon which I beg leave to comment. He says that Asparagus is quite hardy, and at p. 487, "W. E." thanks "K. K." for the information which he gives on the hardness of the above vegetable. If "K. K." and "W. E." had seen my Asparagus on April 7 last, they would have seen the so-called hardy vegetable, but to the ground by the frost, the Asparagus being at the time 4 inches high; every shoot that was above ground was entirely destroyed. The first shoot I cut was on March 27, *Edward Gilchrist, Gr. to R. B. Bowman, Esq., Field House, Gatehead-on-Tyne.* [This does not controvert the facts stated by "K. K." and "W. E." Young and tender shoots of Asparagus are as liable to be killed by frost as those of many other hardy plants, though the plant is perfectly hardy in the sense understood by our correspondents. EDS.]

Thuja occidentalis.—At p. 309 there is an account of a specimen of the above having attained the dimensions of a tree. There is one growing in a shrubbery here, which is 35 feet high, with a clean stem of 12 feet; the circumference at 6 feet from the ground is 39 inches. It stands 2 feet from a south wall 10 feet high, which may account for its unusual height. The bark is much twisted, as in the case of the one at Gordon Castle. It was blown partly down six years ago, and rested upon the tops of some under shrubs until a few weeks since, when we set it upright, and made it secure with some poles. Before it was blown down it had a very handsome top, but the branches on the under side have been very much injured by being buried amongst the shrubs. I may mention that the soil in which it is growing is a stiff clay, impregnated with chalk. *A. Grant, Manor House, Finckley.*

Vine Growing at Heckfield.—I have no intention to raise disputed points in reference to the culture of Vines, but wish simply to relate what Mr. Wildsmith is just now doing in reference thereto as an experiment, although possibly by no means an original one. The scene of operations is laid in a small, low, span-roof house, 24 feet by 12 feet, and having beds on either side, in which to grow Melons; these are 24 feet in width, and have, when filled, soil to the depth of 18 inches. Next the beds on either side of the walk are 4½ inch brick walls, having a space of 12 inches between them, and which are intended to be filled with some heating material when forcing is proceeding. Early last year one bed was filled with a compost consisting of mixed heavy and light loam two parts, and other parts being vegetable matter, with the addition of about three cubic feet of crushed bones. Upon this bed, about six inches from the outer side, and on March 9, were placed at intervals of 15 inches, 14 eyes of the Black Hamburg Grape, two eyes of the Royal Ascot Grape, and one eye of the Black Prince Grape. All of these grew and developed during the summer canes of the finest character, which were in proper time cut back to five feet of fruiting wood. The buds were in 1870 well commenced, and each rod broke with great regularity, and is now carrying five bunches, some of them being of good size, and the Vines are in the most robust state of growth. The crop will probably be ripe about the end of May next, when Mr. Wildsmith fully expects to gather a hundredweight of Grapes from his seventeen 14-months old Vines that are growing under an area of glass somewhere about 144 square feet. Next winter it is intended to remove the inner wall of the bed, and fill up the additional root space thus acquired with more of the same compost, whilst the fruiting rods will be carried half-way down the slope on the other side. It may thus be not unreasonably expected that the crop next year will be double that of the present one. The enriching material of the border is largely contributed to by means of a liberal supply of manure, which is removed from the dung, about once in seven days. Mr. Wildsmith's original purpose was to have grown a fresh lot of Vines on either side of the house every year, and not to have fruited the canes more than once; in this purpose, however, he was frustrated by the insufficient width of the house, which should be at least 3 feet wider to admit of its full development. It would appear that early crops of Grapes may be grown in this system, and in the same way. Whilst nicely kept bunches of Lady Downe's of last year's growth are still hanging in the fruit-room, the Hamburgs in the earliest viney are nearly ripe. As this house is to be replanted this season, in a short time the whole of the crop of Grapes will be cut and stored in the Grape-room, the old Vines rooted out, the border newly made, and planted with some strong Muscats that are now ready for the soil. These I saw in another viney, and they are each growing on shutters 18 inches broad by 3 feet in length, and in 7 or 8 inches of turfy loam. That these Vines will carry a strong growth right to the top of their new house during the summer can no

more be doubted than that they will produce next year a fine crop of fruit. *A. D.*

Lathraea Squamaria.—I venture to enclose a specimen of a rather rare plant, I imagine. It grows at one place, and only one that I know of, and is seen there year after year—this place is near a running stream, between Ambleside and Conistone, and close to the foot of some Abole Poplars. This has led some people to think it a parasite upon the root of the Poplar; but I am not disposed to think it has anything to do with it. If you can give me any information on the subject I shall be much obliged to you. *F. M. P. Jones, Ambleside.* [The plant is *Lathraea Squamaria*, which is usually parasitic on the roots of the Hazel. We cannot tell the Poplar from a single leaf. EDS.]

Myosotis dissitiflora.—A good many are doubtless asking how this favourite has stood the rigours of the past winter? I am glad to be able to answer, remarkably well—as well, or better, in the same position as such undoubtedly hardy plants as *Arabis alpina* and *Alyssum saxatile*. It is later than usual, and more purple than usual—that is all. Neither did it at all resist the late April frosts. It hung its head and sulked for a few days after those frosts. I began to fear that the flowers that were frozen would not recover. But they have; and now (April 16) no one would know that they had been so recently frost-bitten. Every day since the rain the purple is giving place to the blue—like rosy clouds retiring to reveal the azure canopy; and unless another stinging frost comes, it will soon be everywhere sheets or lines of blue. I find, however, that the mixture of purple, pink, and blue is very much admired, and some even get into raptures over a red Forget-me-not. Certainly when captured in masses the colours are pleasing. And as this variety will get more or less red in the face when put out of its normal condition by the cold, it may be wise to make the best of it. With any colour it is a lovely gem, far eclipsing any other Forget-me-not in profusion and earliness of flowering, neatness and compactness of habit, hardness of constitution, and longevity of bloom. One word on plants from seed *versus* those from cuttings or root division, and I have done. Until last year I raised none from seeds. By planting a stock in the open, I saved seeds and raised seedlings. The seedlings and divided plants were cultivated on the self-same border, and received in all respects the same treatment. Nevertheless the percentage of miffy plants among the seedlings was nearly double what it was among the others. This testimony is in direct opposition to that of several correspondents who wrote to the *Gardeners' Chronicle* last year. I cannot help it. I wish it were otherwise, but such is the fact; and as one of the largest growers in the country of this charming plant, I may also say that I believe this peculiarity is inherent to its constitution. Remedy for it there seems none. I have tried to stamp it out for years, but it always re-appears; and if the seedlings from our selected stock again reveal it, it seems strange that any other should be free from it. In fact, an experience of a good many years makes me sceptical of any stock of *M. dissitiflora* being true, if no miffy plants are produced. This scepticism is strengthened by other facts. Thus, in all cases where specimens of those marvellously strong and healthy plants have been forwarded to me, they have been found not to be *M. dissitiflora*. Therefore, it seems desirable that any one who affirms that he has no miffy plants in his stock from seed or otherwise should forward samples of the same to the Editors for verification. It is, however, important here also to give a caution. The plants seldom reveal this tendency till near the maturing, that is, bud forming or flowering period. Nothing can look healthier than the young plants, seedlings, or others, during their preliminary stages. But by-and-by some will look stunted and starved, as if a breath of fire had passed over them. Further, I have seen nothing analogous to this in any other *Myosotis*. Lastly, this failing, while of considerable pathological interest, is of less practical moment than it may appear from the space given to it. In our divided plants it did not average more than 5 per cent., among the seedlings from 10 to 15 per cent. By sowing and preparing six score hundreds where five are wanted, enough and to spare are sure to be ready for massing, edging, vase and house work, for all which purposes the *Myosotis dissitiflora* is valuable in the winter or early spring. This season it is only now in full beauty; but it has been a thing of beauty for the last six weeks outside, while in pots it has been blooming on snowed Christmas. It soon loses its beauty, if by rose-garden winds it is made grateful for the shelter, and opens its eyes wide, and reaches out its stemlets further in consequence. For these reasons, perhaps, it never looks so superbly, elegantly beautiful as when well grown under glass. Could I grow but one window plant in the spring, that one should be *Myosotis dissitiflora*. *D. T. Fish, April 17.*

Grapes Shanking.—About 18 years ago a new half-span roofed viney was built here. Its length was about 30 feet, and the breadth 18 feet. The border was an outside one, and the bottom of it was some 3 feet above the level of a brook which runs through the centre of the garden. The border was 12 feet or

more in width, made with great care after the orthodox fashion of that day. It was then planted with young Vines, which bore splendidly for more than 12 years. The Vines were managed so as to be ripe in September. After that term of years they began to shank, and continued doing so every year, until at length I could hardly obtain a single good bunch throughout the whole house. I suspected that the presence of the brook had something to do with the shanking of the Grapes, and in the autumn of 1869 I determined to lift them, at the first opportunity, in order to examine their roots. In January, 1870, I commenced operations by removing the whole of the soil from their roots. Having cleared to about 3 feet in depth, I discovered some of the Vine roots of the thickness of an ordinary walking-stick at the front of the border, descending perpendicularly to the water; I cut these roots off, not wishing to pursue them any further, taking great care, however, of the small fibrous rootlets. The roots were then taken for rolled up carefully in a mat, and allowed to remain for a week in this condition. It is needless to say that I discarded some of the Vines, in order to replace them with young ones of sorts suitable. I then covered the bottom of the border with a coating of Portland cement and small gravel to the depth of 3 inches. After this had dried a layer of 6 inches of coarse lime rubbish was put on, then a layer of fresh sods, with the green side downwards, next a mixture of loam and turf, and then a layer of third size rubbish, some spent hotbed dung, and a goodly quantity of pigeon dung, well mixed. The border was built up and the Vines planted, keeping the roots well spread out and near the surface. In the spring the Vines were allowed to grow naturally, without being forced. The wood was plentiful, but, as may be supposed, it was very weak. It ripened well, nevertheless, in due time. On March 10, this year, I commenced forcing them gradually, and they grew very well. On the 15th I showed what I should call a fair crop of fruit, which I removed entirely. They had made unusually fine wood so far, and I hope to crop them well next year. I may say that the roots are now perfectly under control. *D. Guthrie, Haedonius Gardens, North Wales.*

Foreign Correspondence.

BRUSSELS: Orchid Cultivation.—At p. 451 your correspondent "G. H." complains that in my last letter I did not give any temperatures. This I could not do, because all that I could have said would have been what the temperatures was during the few days, or even hours, that I stayed at any given place. If I had had such data at my disposal, and given it as being the rule, I should have been acting like the celebrated traveller, who, judging from his landlady, said that in Calais all the women were reidared and cross-tempered. The best I can do is to refer him to a book written by Isaac F. Holton, of New Grenada, published in 1857 by Harper, of New York, at 2 dollars. In an appendix he gives the mean annual temperatures in New Grenada as 71° at 4500 feet, 72° at 5000, 65° at 6000, 62½° at 7000, 60° at 7500, 58° at 8000, and 55° at 9000;—these data must be modified very much according to local circumstances. In another appendix he gives from personal observation a meteorological table of observations made during four months' stay at La Paila in the Canca. It is a locality that I know well, and one in which are found abundantly many varieties of Cattleya Mossie. It is my opinion that in cultivating plants from mountainous countries absolute dependence must be placed on any statements of atmospheric temperature, be it the mean accompanied with its higher and lower ranges, or even a complete set of careful observations. It is a well-ascertained fact that to thrive in our artificial climates plants found in the tropical mountains require a higher temperature than that of their native countries; and the higher the altitude they are found at, the greater the discrepancy. I will venture to furnish an explanation of my view to this effect.

Every alpine traveller knows that the higher he goes the more heated he becomes by any or every ray of the sun, and more so if he wears dark clothing. This is generally attributed to the extra exertion required in ascending, but the fact holds good even if he walks along on an even surface, as on an alpine plain.

On the other hand, when the celebrated astronomer of Edinburgh spent a season some years ago on the Peak of Tenerife, and the questions put in his programme of intended observations was that of the variations of the calorifying power of the sun's rays at different altitudes. Now when he begun his work at the Estancia de los Ingleses, at about 8000 feet, his thermometers exposed to the sun burst almost immediately for want of sufficient power of expansion, so terrific was the heat developed by the direct action of light at such a height, and so little heat he prepared for it, because the ambient air is always at such an altitude very temperate. So for want of proper instruments he was unable to carry further his observations on that particular question.

From these facts I conclude that the solar light playing upon the plants themselves, their roots and the water they adhere to, gives an extra amount of heat, of which no account can be taken in the records of atmospheric temperature alone.

We cannot supply our fair captives with any solar light of that power, so that we must make up for that want by applying heat to the atmosphere, and when the plants work during winter, this supplement of heat must be made still greater, as during our summers, the duration of the days as compared with those of equinoctial countries may, to a certain extent, make up by length of action what the light loses in intensity.

To add another example of the effect of heat as applied to the roots, I may mention that a few years ago I wished to restore to health some neglected plants, and I caused a pit four feet deep and six broad to be dug in the open air, and filled with tan. When it was in full fermentation, I put my plants into it, and though we had a cold summer, I obtained the most luxuriant growth and flowering I ever beheld. This may be a useful hint to the amateurs of tropical gardening out-of-doors, which is so much the fashion just now. Being on the eve of starting for a lengthened tour in the south of Portugal, I shall be unable to give any further contribution to the controversy for a few months.

Coccol-nut Palm.—I wonder that the possibility of cultivating this plant should be still doubted in England, because as far back as 1866 I saw at Syon House a splendid specimen of its dwarf variety, with several fronds upon it, some even perfectly ripe. I also saw an account of it in the horticultural papers at the time. I cannot but think that such a result can be obtained easily in this case. It required an unusual amount of bottom-heat afforded by tan to whose insufficient power were added large hot-water pipes.

My friend Mr. Linden has received since, I think, from the Amazons, through Mr. Wallis, several Coccol-nuts identical with the common one, although a little smaller, which he called *Coccol-nut gracilis*, and which he contended did not require such extraordinary heat and care. I felt incredulous, I must confess, but I have since seen with my own eyes the confirmation of it. I have been very lucky, enough to secure lately the last specimen but one of it left. *Franz Von Volzgen, April 16.*

Societies.

ROYAL HORTICULTURAL: May 3.—James Bateman, Esq., F.R.S., in the chair. At the conclusion of the ordinary preliminary business of the meeting, the Chairman, Mr. Bateman, was willing to appoint a secretary to read a list of donations, said that since the Horticultural Societies some years ago, books had not flowed into the library so freely as before, but he hoped that as the Society was now in a better condition that this would be altered, and invited the distinguished Belgian horticulturist on the platform (M. de Lannart d'Hamel) to evince his influence in that direction in Belgium. Mr. Wilson Saunders (who, as the chairman said, we were all pleased to see in his old place again) made some observations on the plants which he exhibited. He had lately employed collectors in Peru and Chili collecting bulbous plants, and he found that many of those obtained, from Chili especially, were for the most part novel and interesting in a botanical point of view. One at least of those shown was likely to become a popular favourite, in the shape of a flower freely and abundantly, and the flowers, which were white, have an exquisite perfume. The Rev. M. J. Berkeley said that he was in regret in stating at the last meeting, that the young shoots of *Ornithogalum nutans* were sold in the market at Bath as a substitute for the young shoots of the *peruianum*, and not *O. nutans*, which he had since been informed by Mr. Ellacombe did not grow in that neighbourhood. High praise was then bestowed upon a large collection of Narcissus shown by Mr. Barr, which contained many rare and curious species, and which, as far as possible, was correctly named. The subject of the Vine disease in Australia (see p. 512), and a new disease in the Coffee plantations of Ceylon (see p. 546), then came under discussion, and the speaker concluded by directing attention to a branch of a Passion-flower in which a portion of the stem had been killed, which was cut and treated, and appeared to be perfectly healthy. It was the opinion of Mr. Reeves, who brought it to the meeting, that it had been killed by a chill from the wall against which that particular part grew, and in this Mr. Berkeley concurred. To the effect that the plants which were cut and treated, and which were trained to iron pillars were more or less liable to the same fate. Mr. Bateman, after commenting upon several of the specialties amongst the exhibitors, alluded to the fact of these plants recently sent to the Society, which, however, were not worth the expense of carriage. He said it was of no use to send plants home from well-known localities; it is the unknown countries that must be ransacked, and those which rich in bulbs worth as little, rich in orchids. The star of the day, as Mr. Fortune's new Princess rose wood, then came under notice. Mr. Bateman recounting the history of the plant, which we publish from the pen of the introducer at p. 578.

Scientific Committee.—A. Murray, Esq., F.L.S., in the chair. The minutes of the last meeting were read, and as they were found to contain an error which also appeared in our columns, we hasten to correct it. The error was in the statement of the rain-gauge at Rothamsted as corrected runs thus:—Dr. Gilbert stated the recent results of the measurement of the amount of rain and of drainage water as collected in some new gauges at Rothamsted. The drainage water is collected in a tank 20 inches deep, and the surface, and at which the depth of the soil is cut off by a perforated pipe. About 20 per cent. of the total quantity was collected at 20 inches, 15 per cent. at 40, and 10 per cent. at 60 inches, although from pipe drains at a depth of 30

inches in an adjacent field no water was collected. The Secretary exhibited specimens of coffee sent by Mr. Thwaites, the director of the Botanic Garden, Peradenia, Ceylon. This matter was alluded to by Mr. Berkeley in our last issue, p. 546. On this occasion, however, he mentioned a circumstance which is not generally known, viz., that the true Mocha Coffee is a variety in which one seed only is necessary to carry to perfection, the remainder being abortive.

Mr. Alfred Smeed read the following communication:—

"For some years past the Siberian Crab trees at my garden at Wallington have been attacked at intervals suddenly by a disease in the spring of the year. Without any warning the leaves become covered with a sooty and black mould, and the outward portions of the leaf turn black, as though burnt, and the whole of the microscopical they appear to be covered with a Fungus.

"This disease comes, as far as I can observe, with a south-west wind, after dark and wet weather. When it does appear the crop of fruit is much damaged; but it does not appear every year.

"Last year every tree, and I have many trees, was quite free, and the crop of fruit was unusually fine. This year no tree was attacked as late as last Saturday, but on Monday one tree was severely injured for the season.

"I have had watered the trees, and the weather has been such as I had fully expected it to appear.

"My gardener has been instructed to forward fresh specimens to the Scientific Committee, with the view of eliciting further information upon this interesting subject."

Mr. Berkeley stated his opinion, that the disease alluded to by Mr. Reeves was caused by the attacks of a very common Fungus, *Helminthosporium plorum*, which frequently attacks fruit and tree trunks.

The Chairman exhibited Lemons marked with deep circular depressions in the rind, supposed to be the places where the Fungus was originally implanted.

Mr. Reeves exhibited at Chiswick, the stem of a Passion-flower, concerning which further remarks will be found in our record of the general meeting.

Mr. Giles Munby exhibited cones of Oxalis, from some of which were produced large fleshy roots like those of the cactus alluded to at a preceding meeting, p. 519, fig. 104.

The Chairman then read an important paper on the effects of grafting, as exemplified in specimens obtained at Chiswick during the recent alterations, and from which the following full abstract is made:—

The changes which have taken place at Chiswick afforded so favourable an opportunity of procuring specimens and sections of the grafted portions of fruit-trees of different kinds, that it seemed to me desirable to use the opportunity to make up for the Horticultural Society a case of specimens illustrative of grafting, which might be placed alongside of the cases of economic entomology for similar purposes of instruction.

I have been the more induced to do so from the circumstance that Mr. Barron, our able superintendent, informs me that he finds the theory and practice of grafting to be so little understood by the young gardeners, who come to the Society, that he is inclined to think it is rare that any of them are able to graft successfully until after the erroneous notions with which they come imbued are eradicated and corrected. It seems that the drawings and woodcuts of the process of grafting, which are given by the Society, are not so generally understood as they convey an erroneous impression on the very point of success entirely depends. The woodcuts of the slips and grafts prepared for adhesion turn the attention more to an equality of dimension, and to a correct fitting of the graft to the scion, than to the exact apposition of the cambium of the one to that of the other, on which, in point of fact, adhesion and grafting absolutely and solely depend.

It appears to me that the exhibition of the specimens I have obtained for the Society's case may serve to bring before the eye the nature of the advantages of grafting and budding, and as well as the disadvantages, in a form that may be useful.

I may observe that the specimens, of which the collection consists, have been obtained from Chiswick, and from Mr. William Patey, of the same place. The specimens received from Chiswick consist of a selection of sections of fruit-tree grafts of all kinds and ages. The vast number of old fruit trees at Chiswick now condemned, and about to be rooted out, furnished an almost unlimited supply of this material.

From the same Mr. Patey are a number of Roses of various ages, which I selected from the desire to show the difference of the effects of budding and of grafting on the part operated upon.

It may be mentioned that this committee know very well that in all instances of transfusing a part of one plant into that of another, whether by grafting or budding or any other mode, the only point at which transfusion or union can take place is the single outer circle of vessels which lies between the bark and the wood in which the passage is of the sap alone, and by which the connection between the roots and the leaves, and the consequent deposit of wood and growth of the tree, alone takes place. I am afraid that the more general impression however is that a branch grafted on to another is united to the stock on which it is grafted throughout its whole surface, that it grows together as two parts of an animal body united by the first intention, as for example part of a finger cut off and immediately clapped on again. The examination of the specimens which have brought before the eye will serve to show the mistake in this view. They show that there is no union whatever at any part of the wood of the scion applied to the wood of the stock, except at the single outer ring of the albumen already mentioned, indeed a small film of a brownish substance is the union of the wood of the scion and the wood of the stock, except the outer ring where the union takes place; and some of the specimens which I exhibit show isolated deposits of wood and woody fibre enveloped in this brown

deposit, which I imagine to be ooizings of woody matter, something analogous to what is called "proud flesh" in the animal body.

But what I wish particularly to point out is, that in every instance the inner part of the applied surfaces where the union has not taken place, both of the scion and the stock, is in a more or less advanced state of decay. In no instance is this absent; it is an inherent necessity in the very process of grafting, that the seeds of decay be shut up along with it. In fact, decay is the ingredient in the manufacture of grafts, concomitant, co-existent, and inseparable from it, is the simultaneous manufacture of an ulcer in its heart. Exactly the same thing takes place in budding, although on a smaller scale, and even the extent of the decay is not so great as in other the greater being the extent of future decay; and of course in budding this space is small in comparison with that in grafting, and of course, too, the smaller the amount of exposed surface or cut wood the less will be the amount of ulcer or decay subsequently manifested in the heart of the branch. I was about to say that the smaller the amount of this surface the greater would be the skill of the operator, but this would imply that the decay in the heart of the branch was necessary to the extent of the surface applied to be avoided, and I am not sure that we are to take this for granted. Of course, if we want a perfect tree complete of its kind, doing all its functions in the best manner for itself, and the general purpose it fills in organic nature, we must take the utmost care in the application of the heart of the graft, and that that decay must be looked upon as a blemish; but that is not what we want in every case of grafting: in fruit trees we do not want a normal amount of fruit, we want an excessive amount; in the case of ornamental flowering plants, the limit is Nature's natural bounty; like Oliver, we come back for more,—not once, but many times. Now, it is well known that one of the surest means of inducing an excessive production of flower and fruit is to weaken the vitality of the plant. It is no uncommon thing to hear people say that a plant had killed itself by its excessive flourish the previous year; whereas it was not the flourish that killed it, but the plant, knowing that it was going to die, made a desperate effort to propagate its species before its life was cut short. Nature's law is, that the decay in the heart of a tree is injurious to the health of that tree, it may have the effect of inducing something of this excessive effort at propagation. I have heard it said that grafted trees always bear better than those that are taken from the seed, and I have known men who can speak with authority. It is to be observed, too, that the decay of which I speak is limited in its extent and slow in its progress. It is shut up, and almost hermetically sealed in by the deposits of wood which are taken up by the user of the graft, and the graft; and although I have called it an ulcer, it is only so in the sense of being a source of decay: there is no active or malignant principle at work—it is merely the gradual decay of a perishable body, which is situated in the heart of the limb.

It may be asked, too, whether this decay in the heart really does any damage other than weakening the branch or stem at the point where it exists?—for it cannot be disputed that to that extent at least it must be injurious. It is the heart of the tree, and the food of the scion, for the support and solidity which it gives it? We see old piped trees flourishing away after all the heart is gone, and nothing left but a thin rind. True, the flourishing is not so vigorous as in a younger and more solid tree. It is the sturdy and the food of the scion, and is limited to a few clustered scrubby twigs. But it does not follow that this weakness of growth is due to the tree being piped. In such cases we must remember that the tree has generally been growing in the same ground for perhaps half a century or more, and the ingredients of the soil have been the same, and the elevation of the sap and fibre, and that if we remove the tree and plant another of the same kind in its place, it grows no better than the old one; seeming to show, at all events, that it is not the mere absence of pith and heart-wood in the old tree which has caused the declension in its vigour of growth.

The principles of physiology therefore would rather seem to say that in all those cases (such as fruit trees, Roses, &c.) where the acquisition of solid timber (whether by the support of the tree or for the purpose of grafting) is not the principal object, grafting, although attended by decay, is not attended with consequences injurious to the purposes for which the tree is cultivated; and where timber is the object, as in forest trees, the case is different. The tree is immediately the base of the time spent in an element of weakness to the tree at the very point where the leverage of the wind is strongest, and exposes it to be snapped off by the root. I do not think it can be said to be injurious to the growth of the timber in other respects, and I am entirely of the opinion that the decay in the heart of a solid and continuous stream, and I see no reason why the tree in all other respects should not be as good as an unworked plant. Still we all have a prejudice in favour of seedling trees, and I think that the liability of grafted plants to decay is a thing quite a sufficient reason why we should continue to retain it.

Rose and Azalea Show.—Although we have put the above heading to this paragraph, the show was not very largely indeed to the credit of the specialties mentioned by far the most attractive subjects appearing amongst the miscellaneous productions. In consequence of the ceremony of opening the International Exhibition having taken place in the conservatory but two days before the opening of the show, the display was, in its contents, it looked rather thin; this will, however, give Mr. Barron, who has already made a few grateful changes in the style of decoration, an opportunity of making a few more renovations, which are much needed, in the grounds of the show, and the display of plants in its disposal. The prizes offered for Roses were both numerous and good, but they were only meagrely contested. In the open class for 9, the best came from Messrs. Paul

& Son, Mr. Turner being ad. Amongst the specimens staged, the following varieties were well represented:—Marie Baumann, Madame Victor Verdier, Anna Alexieff, Comte Vigier, Marseillais, and La France. In the corresponding class for 12, Messrs. Veitch & Sons were 1st with medium-sized, neatly grown well-flowered specimens of Louis Van Houtte, Charles Lawson, Paul Verdier, Thyra Hammerich, &c. In the amateurs' class for 3, the only exhibitor was Mr. James, gr. to W. F. Watson, Esq., Isleworth, who won the 1st prize was awarded. Messrs. Paul & Son were also 1st for 12 varieties of 1868, 1869, and 1870, in 10-inch pots, with, amongst others, Marquise de Castellane, Dupuy Jamin, Duke of Edinburgh, Comtesse d'Oxford, Earl of Eldon, &c. Mr. Watson, who was 1st in his best plant, was 2nd in his best plant, was 3rd in his best plant, was 4th in his best plant, was 5th in his best plant, was 6th in his best plant, was 7th in his best plant, was 8th in his best plant, was 9th in his best plant, was 10th in his best plant, was 11th in his best plant, was 12th in his best plant, was 13th in his best plant, was 14th in his best plant, was 15th in his best plant, was 16th in his best plant, was 17th in his best plant, was 18th in his best plant, was 19th in his best plant, was 20th in his best plant, was 21st in his best plant, was 22nd in his best plant, was 23rd in his best plant, was 24th in his best plant, was 25th in his best plant, was 26th in his best plant, was 27th in his best plant, was 28th in his best plant, was 29th in his best plant, was 30th in his best plant, was 31st in his best plant, was 32nd in his best plant, was 33rd in his best plant, was 34th in his best plant, was 35th in his best plant, was 36th in 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COMMUNICATIONS RECEIVED.—G. H.—J. D.—R. D.—N. B.
(next week).—R. S. (next week).—W. F. B.—G. Bath.—O. O.
—P. H. G.—D. H. H. (we do not know the address).—A. C.,

other is easy, careless, lazy. It is on this ground commonly, and not because men differ in the accuracy of their scientific knowledge, or in the skilfulness of their practical ability, that one field is all corn and another nearly all weeds.

The subject of Mr. MECHI's lecture on Monday evening,—"How to Take a Farm and How to Let a Farm"—is that at the very bottom of agricultural improvement. It is that system which makes a landlord anxious and careful in the selection of a tenant—that system which makes the tenant all alive to the possibilities of the position he is accepting from the landlord, that is the one which we must all desire to see established in the interest of agricultural progress. The lease which gives land over to the farmer for a term of years—the Agricultural College which has quickened all the powers of the young man about to become the tenant—the tenant-right system, which ensures the maintenance of all his efforts up till the close of his connection with the land: these are the true elements of progress; and all of them might properly have been referred to in the course of that ample discussion of the business relations of landlord and tenant, which Mr. MECHI led last Monday.

The highly interesting paper which he read was well received by the London Farmers' Club, to whom it was addressed. A large number of land agents were present, and several of them contributed to the discussion which followed.

Mr. GENGE ANDREWS took two exceptions to the position which Mr. MECHI had maintained. Scotch farmers, so far as he knew, had not succeeded in the south-western counties of England. Although rent was less than in the North, the outgoings in other respects were much heavier, so that they returned home disappointed. He also thought the paper fell short of placing in its proper light the effect of local taxation, which was the close of the lease was often doubtful, what it was at its commencement. In support of this he quoted his own experience and that of others which had come under his observation.

Mr. CALDECOTT thought Mr. MECHI had not treated with sufficient plainness the solvency of the landlord. A farmer might hire a farm of a very good landlord, but if the latter should die, or sell his estate during the currency of his tenant's lease, it but too frequently happened that "the tenant was sold with the estate." Where 99 years' leases prevailed it was common either to renew the lease four years before its expiry, or else to seek an understanding previous to its termination. Mr. CALDECOTT also condemned the practice of letting farms by auction.

Mr. C. SEWELL READ, M.P., thought Mr. MECHI's "£20 per acre" in excess of the actual capital invested in his county, Norfolk. "During the last three years the man who had spent the most money in high farming had lost the most money," Mr. READ condemned, in severe and sweeping terms, the manner in which too many agents were appointed, and the injury they inflicted upon estates by reckless variations of rent. There was another "evil" about which more ought to have been said—estates were now being managed in London offices by men whose only commendation was that they had attended an Agricultural College and written a few articles to the *Times*. They might have a practical assistant, but that did not mend the matter much. The appointment of lawyers to manage estates was even worse. With regard to yearly tenancy and leases for longer terms, the latter, however much might be said in their favour, invariably increased rent. The management of estates by stereotyped leases was out of date, and he did not think Mr. MECHI's remarks about "Tyburnian farming" would be found to apply—for building leases and agricultural leases were two different things.

Mr. WILLIAMS discussed the several questions connected with tithes, rates, and taxes—contrasting Scotch and English practice. He thought all rates ought now exclusively to be paid by the landlord, and that rent should cover the outgoings of the tenant. If paid by the tenant in the first place, they ought to be deducted from his rent. He next took up the political question. Farmers who offended their landlords were liable to six months' notice to quit, which ought not to be the case with those who had large capitals invested in farming.

Mr. LEEDS admitted having said to Mr. MECHI on the occasion alluded to in his paper, that £20 might be invested in light land in his neighbourhood (Brandon, Norfolk), but he must

now qualify that opinion. In doing so he went into the details of cake and corn consumed in feeding off roots and other crops, with the guano bills that followed, and concluded by substituting for £20 from £16 to £18 per acre under high farming light land.

Mr. BRETHERTON, after alluding to the importance of the subject on the card, expressed his disappointment that Mr. MECHI had not answered in detail more of his long list of questions than he did. If a practical young farmer went into a county with which he was not acquainted, he would naturally make inquiry, and not rely solely on his own judgment. He next reviewed the questions raised by Mr. WILLIAMS, and said farms were now mostly let free. With regard to needy and poor landlords, they could now borrow money on easy terms for drainage and other permanent improvements on redeeming interest, whether their estates were burdened or entailed. He referred to the land companies in the metropolis, and their mode of raising money and investing it. There was no doubt a prejudice against the improvement of estates by Government money, but he had a good deal to do in the matter, and found no difficulty whatever. With regard to letting farms, good ones were seldom in the market, and there was no lack of competitors, even for bad farms. He did not agree with the paper that dairy farms and breeding farms exhausted the land—for dairy and breeding stock, if properly managed, would leave as much to fertilise the land as fattening stock. With regard to farmers purchasing their own farms, as commended by Mr. MECHI, he would say, as a rule, that "those who farmed their own land were the worst farmers." A young man might buy 300 acres, and start with his horse and gun, but it too frequently followed that he had a mortgage, and a secondly a sale. The time had come when ground game must be held a nuisance, more especially rabbits. Tenants ought to have a right to kill them. He next alluded to the several questions of taxes, politics, and capital; thought a 21 years' lease a speculation, and that tenants must abide by the consequences involved. The difference of capital actually invested in heavy and light land was more a question of skill and enterprise than book-rule. £20 per acre was certainly too high. From £10 to £15 was nearer the mark.

Mr. SMYTHIES thought greater security of tenure was needed by tenants than was advocated in the paper, in order to secure the investment of capital now required to farm successfully with profit. The last three years were exceptional, and therefore ought not to be quoted as embodying a general rule. Heavy land, cultivated by deep tillage, drainage, and manure, contained a greater source of wealth than light land, but more capital was needed.

Mr. NEILD thought they had wandered considerably from the subject on the card. Agricultural education derived at colleges and from agricultural publications could not be over-estimated. With regard to leases and covenants the old system was out of date. Land agency had become too much "a bidding for business." Mr. THOMAS thought that if a young farmer could not take a farm in a distant county with safety he ought to stay at home. Landlords ought to place more confidence in good tenants than in stringent covenants; and tenants ought to have the words with clergymen about tithes.

Mr. CHARLES HOWARD cordially thanked Mr. MECHI for his valuable paper, and thought it would be well received in the provinces. He once advocated long leases, but he now preferred yearly tenancy with compensation clauses. The covenants in some old leases reminded him of what was truly said, "Laws are made for sinners." Something like free trade in game and politics must now be the rule.

Mr. CADLE thought Mr. MECHI's statistics relative to the annual crop of young farmers and the total capital invested at £20 per acre involved an anomaly. He was one of those agents who had an office in town, and who had attended Cirencester College, but as he had served an apprenticeship at farming he assumed he was not the person Mr. READ had so pointedly alluded to. He also pointed out the influence of long leases on the sale of land, and referred to the judicious investment of capital in agriculture.—Mr. TRASK thought land valuers of practical experience might be useful, but a good understanding between landlord and tenant was better.—Mr. GLENNIE did not think it prudent to lay down a definite rule as to the capital which

could be profitably invested in farming, referring, in illustration, to the large capitals invested near towns.

Mr. MECHI briefly replied:—"Land was thankful for capital judiciously invested; and he would conclude by strongly recommending a better and more lasting understanding between landlord and tenant.—And thus, with the usual votes of thanks, the London Farmers' Club concluded its spring labours, with a paper most useful to both landlord and tenant.

—At Mark Lane on Monday a short supply of English Wheat led to a demand for last week's prices, with only a few sales; but on Wednesday, to force sales, less money was accepted.—At the Metropolitan Cattle Market on Monday prices were good, and on Thursday advanced.

—THE INTERNATIONAL EXHIBITION opened on Monday has some features of direct interest to agriculturists. The woollen manufacture, on the condition of which two centuries ago a notice appears in another column, is illustrated here by wonderful specimens of the goods it produces and the machinery by which they are produced. The various breeds of sheep, English and foreign, yielding the wool thus manufactured, are also to some extent represented by living specimens. Mr. STURGEON sends Merinos, Mr. WALLIS sends Oxfordshire Downs, Mr. BEALE BROWN sends Cotswolds, and Mr. DUDDING sends Lincolns. We ought to have had Lonks and Cheviots, Rylands, Shropshires, Southdowns, Leicesters, and others also represented; and perhaps breeders may yet offer specimens to complete the series.

—A somewhat animated discussion took place before the Surveyors' Institution this week on Mr. MORGAN's paper (which had been read at their previous meeting) on the SEWAGE QUESTION, and on the light which it had received from the experience of Lodge Farm, near Barking. The disagreement exhibited, however, was hardly of public interest, seeing that it did not lie between gentlemen differing on anything essential to the discussion of sewage utilisation. Both sides were equally certain of the agricultural value of town waste, and equally sure that only by irrigation could that value be realised. Whether perfect reliance can or cannot be placed on particular records of experience is a much smaller and less important question. Certain it is, that the sewage industry, and employ in a perfectly trustworthy manner, the experience of any farmer for the guidance of other farmers, is not an easy thing. Knowing, however, all the circumstances, we believe that there is less ground for doubt in the case of Lodge Farm than in that of any other, whether sewage farm or not, within our knowledge. The whole possibility, as it appears to us, of any error, lies in the means of measurement employed for the determination of the quantities of the liquid manure applied. These were of three kinds. The quantity was determined—(1) By measuring and counting the pump strokes which delivered it; (2) By the occasional use of measuring-bods holding a known number of tons apiece; and (3) By the application of a formula to the flow of the water in the troughs. Ascertained in these ways, the quantities may be trusted; and the Metropolitan Sewage Company, and Mr. MORGAN, in their respective ways, deserve the thanks of the public for the valuable and trustworthy information which they have given on the important subject of sewage utilisation. Mr. MORGAN's paper will be found on pages 427 and 428.

—At a meeting of the Central Council of the CHAMBERS of AGRICULTURE, held on Tuesday, the report of the Committee on Local Taxation was read. Its main features went to show the unequal bearing of local taxation on land and agriculture, and to criticise Mr. LOWE's original Budget, urging that if horses and carriages used in agriculture were to be taxed, the locomotives and carriages of railways, and all machine power used in trade, should be taxed. The report of the Council took into consideration the Rating and House Tax, and the Rating and Local Government Bills, in reference to which Mr. HENAGE moved, "That, in the opinion of this Council, some of the administrative clauses of Mr. GOSCHEN's Bills, namely, the consolidation of the rate and the demand note, the establishment of county financial boards, and the recognition of the principle of the application of a grant from Imperial resources toward the reduction of the poor and other local rates, are worthy of consideration; but that the Bills are most objectionable for the following reasons:—That they continue the exemption of income arising from personal property from contributing its fair share to the general burdens; that the division of rates between landlord and tenant does nothing to relieve owners and occupiers of houses and land from any of the burdens of which they justly complain; and that the powers conferred on the proposed new Government Boards will still further restrict local self-government and increase local expenditure." He criticised the details of the several measures referred to, and in reference to the proposal of allocating the house-tax in aid of local rates, he said that it would relieve the

towns at the expense of the country, and that what was put in the ratepayers' pockets on the one hand would be taken out of them on the other in the shape of Income-tax; but he held the principle embodied in the proposition as valuable, inasmuch as it admitted the justice of supplementing the local rates by the imperial exchequer. The proposed division of the rates between the landlord and tenant he objected to, as against the contracts under which, in most cases, the land or tenement was let.—Mr. HODGSON, who seconded the motion, contended that the local rates should be imposed as in olden times, according to the ability of the party, and not wholly according to the rental of the land.—Captain CARNEGIE denied the statement of Mr. GOSCHEN, that in Scotland or in Ireland all the rates were equally divided between the owner and occupier.—Colonel BRISE, M.P., while deprecating extreme views in reference to Mr. GOSCHEN'S Bills, but admitting the heavy burdens on land, thought Mr. GOSCHEN should give the land-tax, as well as the house-tax, in aid of the local rates.

Differing from some previous speakers he held that the Government proposal would operate quite as severely on the occupier as the owner.—Mr. READ quoted a speech of Mr. GLADSTONE'S several years ago, to the effect that land having been deprived of protection, which it had so long enjoyed, as a compensation for the poor-rate and other local burdens, was entitled to be relieved from a proportion of those charges.—Sir L. PARK, M.P., Mr. N. GRENFELL, Mr. BIDDLEL, and several other speakers, continued the discussion, pointing out the various objections to the Bills, the proposed constitution and mode of election of the local boards being amongst them; and ultimately, with the omission of the reference to the consolidated rate, the demand note, the county and financial boards, and the imperial aid to local rates, the resolution was unanimously carried.—In the evening the members and friends of the Central and Associated Chambers of Agriculture dined together at the City Terminus Hotel, Sir MASSEY LOPES again presiding. The attendance was numerous. The toasts were of the usual character, declaratory of the loyalty of the guests, and recognising the national importance of agriculture. Lord VERNON acknowledged the toast of the House of Lords, and Mr. WARD HUNT did duty for the House of Commons in a humorous speech, bearing upon the Budget and the threats held out by Mr. LOWE of additional taxation on land and agriculture, and suggested that Chambers of Agriculture might be made powerful means of influencing future elections for the protection of their interests.

—The *Aberdeen Journal* gives an amusing account of a trial for damages on the ground of injury by EXCESSIVE GAME, lately held before an Irish Court. The tenant having established a *prima facie* case, his superior was ordered to lodge £100 in court, leaving the final award of damages to a jury. The trial came in on Dublin. Fortunately, for himself, the pursuer had secured as his counsel a gentleman who holds the same place at the Irish bar as the Youngs and Clarks among ourselves. After a luminous and forcible argument, Mr. Serjeant Armstrong, in his peroration, happily appropriated, *mutatis mutandis*, a passage from their immortal and popular national poet's "Deserted Village":—

"Ye friends to truth, ye statesmen who survey
The rich man's joys increase, the poor's decay,
"Tis yours to judge how wide the limits stand
Between a splendid and a happy land."

Ill fares the land, to hast'ning ills a prey,
Where hares accumulate and crops decay;
Nimrods and game may flourish and may fade,
On wastes and deserts let them make their raid;
But when on labour's fruit they browse and fatten,
And can't be shot, let hungry jurors at 'em.

And so the jury did go at them, and gave the farmer £250, over and above the sum lodged in court, and all costs besides.

—Though Mr. GOSCHEN'S Bill on LOCAL TAXATION is being generally received with disapproval by the various Chambers of Agriculture throughout the country, yet several of its provisions have commanded the assent of influential speakers at the meetings held for its discussion. Thus at Hereford, in Devonshire, and at Monmouth, where adverse resolutions have been passed, it has been nevertheless acknowledged that in its proposed establishment of County Financial Boards, in its proposal to divide the increase of rates

to markets in which they were at once to be slaughtered as food for our people, and by this means to prevent their carrying disease throughout the length and breadth of the land. "O, when," he exclaims, "will our rulers learn wisdom? Is not the present high price of meat mainly caused by the losses that occurred from cattle plague in our breeding counties three years ago? And would it not be true wisdom to avoid the chance of its recurrence? And now, when a law is passed compelling the Corporation of London to make a market for foreign stock by January, 1872—this time being so fast approaching—does it not show a great want of plain common sense and discretion to run the risk of all the dire mischief this step may occasion, when we well know that pleuro is extensively raging in Holland? Is not this bad enough? And although Germany is at present free from cattle plague, what guarantee have we that it may not, notwithstanding the surveillance of the veterinary officials of our undecided Government, soon break out amongst us; and

then the disaster of a high price of meat will be complete. The constant vacillation of those to whom the destinies of this great country are unfortunately committed cannot ultimately tend to the good of the consumers. The only way in which they can be permanently benefited will be by confining and slaughtering foreign cattle at the markets now making for them, by this means preventing the spread of disease and promoting health among our own herds; then, when this security is established, allowing our home animals to be removed from London markets throughout the length and breadth of the land. This step firmly taken, and this only, would be the means of withdrawing the cordon now so heavily oppressing the consumer. I should much like to be told why London should have the animals brought to its market—doomed to be slaughtered there, and thus enjoy a privilege which is denied to all our manufacturing towns and our fashionable places of resort.

—The *Veterinarian* for May says that in France CATTLE PLAGUE is still spreading; it exists now in three communes of Douai, and also in Lille, and in three arrondissements of Brest. The whole of the department of Côtes du Nord is infected, and the disease is raging at Leon.—A fresh outbreak occurred at Berne, but active means were at once taken to prevent its spread.—In Belgium

no fresh cases have occurred, and the sources of contagion are presumed to be extinct, but the disease is raging all along the French frontier.—According to reports from Berlin, Germany is free from cattle plague, and stringent precautions against the introduction of the disease are maintained on the Russian and French frontiers.—We are informed that scab in sheep prevails in Stettin and Stralsund, and infected cargoes of sheep from Hamburg have been recently landed in London and at Middlesbrough. It appears from the returns that scab has decreased in Great Britain since the last report.

NOTEWORTHY AGRICULTURISTS.

PROFESSOR VOELCKER, F.R.S.

WE would gladly do our best, had it been necessary, to make known to the readers of the *Agricultural Gazette* the great agricultural services of Dr. Voelcker. The following short memoir, condensed from the pages of the *Farmer's Magazine*, does, however, so pleasantly and perfectly convey all that we would say, that we prefer using the language of our contemporary.



AUGUSTUS VOELCKER, PH.D., F.R.S.

between landowner and tenant, and in its intention to extend the area of rating to property hitherto excepted, it adopts ideas which have been long advocated in the interest of the tenant-farmer.

—At the wonderful sale of Mr. EASTWOOD'S small herd on Wednesday of last week—when the highest average ever, we believe, attained for an entire herd—upwards of £180 apiece—was reached under the hammer of Mr. JOHN THORNTON—the maximum prices were given by Scotland, Wales, and Ireland respectively: £420 having been given for *Mariottette*, by Mr. BEATTIE, of Newbie, N.B.; £367 10s. for *Brigantine*, by Mr. E. J. Smith, of Islanmore, Co. Limerick; and £315 for *Marchones*, by Mr. D. PUGH.

—A recent Order in Council removing the restrictions on the IMPORTATION OF CATTLE from several European ports and countries has called forth a letter from Mr. CLAYDEN, the chairman of the Home Cattle Defence Association, in which he speaks of it as thus undoing at one "fell swoop" all that the Cattle Defence Association has been endeavouring to do for the last three years, viz., to confine cattle from foreign countries

— We have received a catalogue of the Winterfold and the Turner's Hill herds. The earlier portion of the catalogue comprises the first-named herd, and commences with *Joan of Arc*, a white strain, originating in the herd of the Messrs. Strickland, and subsequently in the possession of the late Earl Ducie. Following *Joan of Arc* are her four daughters by the Duke of Devonshire's CHARLESTON (21,400). Next come eight representatives of the famous *Wild Eyes* by EMPEROR (1975), all by excellent sires. There are also two *Waterloo* by the Duke of Devonshire's *Alfred* (1975), and by DUKE OF CLARO; six descendants of *Sweetbread* by BELSHAZZAR 2D (14,154); a large collection of Blancs from *Constance* by SELIM (6454), and *Blanche* by BELVEDERE; six *Keturahs* by Wetherby and five *Lalys*. The second portion of the catalogue, devoted to Mr. Isaac Downing's herd, contains many animals similarly bred to the above. It contains also a representative of the *Claret* by *Wesley* by Mr. Sainsbury's CUPID (14,359), after which are six descendants of *Sweetbread* by BELSHAZZAR 2D (14,154), under the name of *Lady Dudley* 1st to 7th. There are also members of *Tortworth Surnise* by DUKE OF GLOSTER, and *Silence* by EARL OF DERRY tribes; of *Lady Gloster* by HARRY OF GLOSTER (14,624), *Genoa* by HENWOOD, and *Wesley* by LEO. There is also a mention of a "Wild" or "Kirklandings", which form an important section in this catalogue. The bulls now in use are 3D DUKE OF CLARO, 5TH DUKE OF WHARFADLE,

— We have received from Mr. Harward, of Winterfold, and Mr. Downing, of Turner's Hill, the pedigree of two Duchess bulls, which are advertised for use at 25 gs. per cow. Cows will be met at either the Kidderminster or Dudley Stations of the Great Western Rail-

and 8TH DUKE OF GENEVA, all of the noted "Duchess" tribe.

— The following prices were given on Friday, the 25th ult., for Shorthorns at Mr. Jefferson's sale, Preston Hovs; Mr. Thornton, auctioneer:—*Christmas Gwynne* by WILD DUKE 4TH, and of the "Princess" tribe, a fine large cow, brought 90 gs. (Mr. R. Hetherington); *Sonnie Bull* by CHARMING, (22,033), 72 gs. (Mr. J. Sterling); *Britain's Queen* by KING CHARMING, 52 gs. (Mr. J. Gunson); *Sonnie Dame*, a very fine show heifer by the same sire, 225 gs. (Mr. Marsden); *Charming Belle*, by the same sire, 165 gs. (Mr. E. J. Smith); *Pearl Ear-ring*, by the same, 51 gs. (Mr. T. H. Miller); and several other females made above 40 gs. In the bull sale FARMER BLITHE, by LORD BLITHE (22,126), was sold to Mr. R. Rawlinson for 52 gs., and COUNT DE BOY, by the same, was sold to Mr. J. Gunson for 40 gs. The general result was, that 35 cows made an average of £49 17s. 2d., 18 bulls averaged £31 14s. 8d. each, and 53 Shorthorns brought £2314 4s., or £43 13s. 3d. each.

On Wednesday the 26th ult. Mr. Thornton disposed of the "small select herd," bred for many years by Mr. Richard Eastwood, of Thorney Holme, Whitwell, Clitheroe. "The two sales at Whitwell on the 26th were distinguished successes. Some of our favourites fetched great prices. *Double Butterfly*, 11 years old last January, and by ROYAL BUTTERFLY, was sold for 195 gs. to Mr. H. D. de Vitre; *Duchess of Traveller*, from *Escompton* (22,070), 3 years old last April, by the same sire, was sold to Mr. J. Gunson for 240 gs.; *Phoebe Butterfly*, from *Double Butterfly*, was bought by Mr. Fox of St. Bees for 185 gs. *Double Butterfly* 2d. is now the property of Mr. Gibson, New York, for 325 gs.; and *Red Butterfly*, a very beautiful 2-year-old by BARON OXFORD (23,375) was purchased by Sir Curtis Lamont for 400 gs.; and *Double Butterfly* 3d., a yearling, by the same spirited proprietor, for 205 gs.

— We hear from Gaddesby that Mr. Cheney has this week purchased a Colling cow, *Princess Alexandra* by 8TH DUKE OF OXFORD (15,939), and her daughter *Princess Victoria* by EARL OF EGLINTON, from Mr. Fawcett, of Clitheroe. It is a fine lot, and appeared to be the animals formed part of the Nunwick Hall herd, and were sold last September with the rest of Mr. Saunders' stock. Mr. Cheney has also secured from Mr. Fawcett *Seraphina* 22d., a beautiful heifer, by ROYAL CAMBRIDGE ROSE, and out of *Seraphina* 20th by 6TH GRAND DUKE.

— The DUKE OF HILLHURST, purchased in the United States by Mr. Thornton for Colonel Kingscote, left America on April 15, and arrived at Kingscote on Saturday the 29th. An Oxford heifer, one of the purest of her tribe, and a good specimen of her kind, purchased by Mr. Thornton for Lord Dunmore, accompanied him. Both were under the care of Mr. Beadell, who delivered them in Liverpool in very nice condition, neither of them showing the least fatigue after the journey. DUKE OF HILLHURST is from *Duchess* 97th by 12TH DUKE OF THORNDALE, and his personal appearance does credit to his noble lineage. He is a deep red, stands on short legs, and has "undeniable" quality, heavy flesh, and excellent symmetry, with a tail remarkably well set on.

— The following calves have been added to Mr. Harward's herd at Winterfold since January:—

Jan. 21: *Virginia* 3d by CHARLESTON (21,400) calved a white bull calf, by 3D DUKE OF CLARO.
Feb. 10: *Clare* 6th by 10TH DUKE OF CLARO (20,309) calved a roan bull calf, by 3D DUKE OF CLARO.
Feb. 15: *May Fly* by DUKE OF MOSCOW (14,447) calved a roan bull calf, by 3D DUKE OF CLARO.
March 11: *Keturah* 4th by 2D DUKE OF WETHERBY, roan cow calf, by 8TH DUKE OF GENEVA.
March 14: *Lilly* 16th by 3D LORD OXFORD, a red and white cow calf, by 8TH DUKE OF GENEVA.
March 15: *Keturah* 3d by 7TH DUKE OF YORK, a roan bull calf, by 8TH DUKE OF GENEVA.
March 20: *Empress* of YORK by 7TH DUKE OF YORK, a white cow calf, by 3D DUKE OF CLARO.
March 24: *Cambridge* by CUPID calved a red roan cow calf, by 3D DUKE OF CLARO.
March 27: *Keturah* 2d by ARCHDUKE (17,136), a white cow calf, by 3D DUKE OF CLARO.
March 31: *Keturah* 10th by 7TH DUKE OF YORK, a roan cow calf, by 8TH DUKE OF GENEVA.
April 15: *Cambridge* 3d by CHARLESTON, a white cow calf, by 3D DUKE OF CLARO.
April 16: *Lady Mary* 2d by CHARLESTON, a roan bull calf, by 8TH DUKE OF GENEVA.
April 19: *Lilly* 15th by 3TH LORD WILD EYES, a roan cow calf, by 8TH DUKE OF GENEVA.

— The student of the Shorthorn Herd Book needs to handle his volumes with the greatest care, lest they fall to pieces in his hands. Would that we could have them sent bound or half-bound in a more substantial manner.

POULTRY.

How to prevent a HEN from EATING HER EGGS.—At p. 566, "Shell" asks, "What can I do to prevent a hen eating her eggs?" I have found that giving a fowl animal food will put a stop to the habit for a time. The fat and trimmings from a cooked joint are best. It is not good to give raw meat. If a hen has eaten eggs for some time it is almost impossible to cure her. G. E. O.

AN INDUSTRIOUS HEN.—A month or two ago the *Oxford Free Trader* contained the following account of a very busy hen:—"Sam Parr is going out to fight the

world, armed only with a setting hen. She can beat that other hen that sat four years on a couple of billiard balls and an ivory door knob. Since March 1 she has hatched out four lots of chickens. She hatched 11 in April and raised 8; in June she turned out 13, and raised 10; in August she produced 13, and raised 11; and in October she got out 13, and has 10 lively little chicks running around her at present: making in all 39 chickens raised, or nearly so, and 50 hatched this season. She laid the eggs herself, fed up her own nest in laydown, out of the reach of other hens, and conducted the transaction to suit herself. She is evidently a strong-minded female of the hen persuasion."

THE WOOLLEN MANUFACTURE IN THE OLDEN TIME.

(We take the following passages from a very interesting lecture lately delivered by Mr. C. Playne, of Thescumb, near Nailsworth, Gloucestershire, before the Literary and Mechanical Institution there, and fully reported in the *Standard*.)

In the reign of Henry VIII. the woollen trade was generally in a most flourishing state, and the worsted manufacture especially increased rapidly. One "Jack of Newbury" was deemed the greatest clothier in England. He was the owner of 100 looms, and is said to have equipped as many men-at-arms for the Scottish wars as his own cast. York, the most important city in London in population and wealth, had long been deemed the great seat of the woollen trade in the northern counties. At this time it should be observed that the freedom of trade and industry were wholly unknown. Guilds, or co-operative bodies, monopolised every trade or calling; the character of legislation was bad, and was indeed only tolerable because that of other countries was equally bad, or worse. The exportation of sheep was prohibited "for divers good causes and considerations," and in the following reign the export of white cloths was prohibited in order to give a boon to our dyers; but other countries adopted the same narrow policy, and by prohibiting the importation of British dyed cloths defeated the intended monopoly. Another Act, passed in the reign of Henry VIII., enacted that "cloth of every kind was to be fairly manufactured without filling, knotting, or curling, and might not be overwoven, and that the appearance of greater length or breadth than it ought to have; nor made to deceive the sight by putting flour of starch or chalk upon it, that the same might seem to be whiter or thicker than it really was." The Welsh came in for their share of blame, for it was enacted, "Welsh cloths shall be folded as the cloths of other counties," for the statute recites "that they had been used to be so craftily and hard ridden together, that the buyer could not perceive the untone lacking thereof." In the reign of Mary, an Act recites "that the rich and wealthy clothiers did oppress the poor weavers, by setting up and keeping in their houses diver looms, and by lowering their wages;" it therefore enacted "That no clothier out of a borough or market town shall have above one loom; no weaver dwelling out of a city shall have above two; no weaver shall be either tucker, fuller, or dyer; no fuller, tucker, or weaver shall keep a loom, and so forth."

Amongst other Acts passed in Queen Elizabeth's reign affecting the making of cloth, was one "abolishing a certain deceitful stuff used in dyeing of cloth, to wit, logwood," which, it seems, the people of England did not understand how to use properly. In the reign of King James, 1613, a tract, entitled, "A declaration of the estate of clothing now used within this realm of England, by John May, a Deputy Ambassador," is full of curious and curious particulars of the state of the trade. For instance, he writes of the cloth-makers: "But corrupting time not only infected some of this fraternity with the knowledge of deceit, but also stirred other intruders in this trade to usurp the name of clothiers, and to supply their want of knowledge by well studied fraud." Amongst other abuses that had crept in he charges the following:—"Mingling wool of divers kinds, as black, white, and grey, together, and the lamb's wool, which are contrary one to another, and make the cloth uneven."—"Mingling of fine flaxe with long wools, yet coarse, which being carded together doth hold spinning and working, but most deceitful in use and wearing."—"The use of short thrums, which they take and shred into short lengths, and then lay it to steep in strong lye or liquor, which openeth the threads into wool again, and thus card it with other wool which is worse than the flaxe, by making more uneven in the spinning."—"They have a practise in their woofe to shut in fine woof at both ends of their cloth, which serveth for a pattern to shewe; but all the rest of the cloth far worse."—"If a cloth will not thick kindly in the mill, by reason of its defects, then they have medicine to heal it, with oatmeal, and such like, which will remain in the cloth, and make it seem thus and thus, and it will not be so good as the cloth when all that stopping vanisheth, leaving it to shame by the true sight of its substance."—"When cloths have been too much strained, the tenter-hooks leave an evident marke which would plainly tell where they had been and how used; but they have a trick to hide that fault, for with a wet cloth and hottie iron, they overunne those lists, which shutteth up the marke, or tongues, of the tenter, as they say they shall tell no tales." These and many other

"tricks of the trade" are exposed with an unsparing hand, which shows that Mr. John May must have been behind the scenes, and to have been placed under his inspection must have been a sore trial to the crafty clothier. The woollen manufacture declined apace from 1620 to 1688. The legislation of the Commonwealth was just as unwise as that of the Stuarts. The exportation of wool, fullers' earth, and all the materials of manufacture was prevented, and it seems never to have entered the minds of the promoters and framers of these laws that other nations could produce such articles; nor was it until about the year 1660 that the superiority of Spanish wool was admitted, when our manufacturers began to mix it with English wool, to the great improvement of the cloth. Bad legislation continued its work until it had paralysed the trade. And the narrow-minded politicians of the time not only ruined trade here, but dealt equally unwise with the sister isle of Ireland. Many Acts of Parliament were passed, which were very oppressive to the Irish. They were forbidden to export their cattle to England, and on their turning their attention to the breeding of sheep, the exportation of their wool to any country except England was prohibited, and as there was already a superfluity of wool there, they could find no sale for it. Some clothiers from the west of England, induced by the low price of wool and the cheapness of living in Ireland, removed thither, and established the manufacture of cloth in Dublin and other places; but this was resented as a still greater injury to England, and we find an Irish gentleman writing to his brother in England complaining of this oppressive treatment, and thus stating his grievance:—"What was lawful for us, and profitable to you (the cattle trade) you prohibited; what you constrain as to the sheep breeding you accuse; you are neither well, nor for us, nor for the country, and yet you would have unless you could furnish us with a breed of sheep that bore no fleeces."

In the reign of Charles II. a singular Act of Parliament was passed, with a view to encourage the declining trade, ordering that all deceased persons should be buried in woollen shrouds, and a writer thus expatiating on the good results to be expected from it, says—"The late statute for burying in woollen, if duly put in execution, will consume much of our wool, and preserve the linen cloth for making of paper, which will save this nation some hundred thousand pounds a year." There were, however, some with more enlarged views than those generally entertained, for we find a Sir Josiah Child, in 1667, advocating a repeal of all the laws restraining freedom of manufacture as being hindrances instead of helps to the enlargement of trade, writes as follows:—"But some may ask me whether it think it would be for the advantage of the trade of England to leave all men at liberty to make what cloths and stuffs they please, how they will, where and when they will, of any length or sizes?" I answer, "Yes, certainly, in my judgment, it would be so."

Home Correspondence.

Manure Dressings.—This is becoming a question of great interest throughout the large and important district from whence I write. The various manure dressings are mainly applied to produce roots and winter food crops—green crops. The quantity and weight per acre in some instances used is prodigious. Chemical manures are used in various quantities, and in some cases the demand for Peruvian and other guanos, of superphosphates, blood manures, bones, kainit, salt, &c., is vastly increasing, and no one has yet discovered the limit to which any of these applications may be kept or profitably used; in fact, the more liberal the application, if judiciously given, the larger and more profitable is the crop. I am a farmer of many years standing, but my old-fashioned ideas and estimates of the value of manure in winter crops have often been at fault. I used to apply liberal dressings, in accordance with the times, but now they are in some instances exceeded in a tenfold ratio, and certainly the crops grown are much heavier, and amply pay for the extra outlay. Last year the Mangel crops were unusually good; this has led growers to try a still further outlay in artificial dressings for the present seeding. My next neighbour produced upwards of 60 tons of Mangel per acre last year; he is now putting in 1 ton of artificial aids, *i.e.*, I believe one-fourth guano to three-fourths superphosphates and salt, upon ridges manured with some 20 loads of foldyard dung, and upon land also previously manured and ploughed in the autumn or winter. He asserts that his crops abundantly pay for all, and he is no small farmer, as he occupies some 2300 or 2400 acres of land, certainly 60 tons of 74 tons per acre, which I can fairly show was produced last year, is worth a good deal of money as stock food, to say nothing of what might accrue from sales, but which most tenants are forbidden to take off their farms. For my own crops I am using 16 good loads of foldyard dung in ridges, about 6 cwt. of salt, and 4 cwt. of superphosphate, and on one crop kainit in the place of salt. It is thought to be inadequate, and the value to the public is pressing ideas in my mind. We are too timid—we avoid expense—and lose the extra 10 tons. For Turnips a similar course is laid out, but not quite so profusely—

Mangels, in this district, being the popular food crop. The large breadth set with Potatoes throughout the neighbourhood has been manured in like manner. I passed one field to-day upon which 17 cwt. of superphosphates per acre was applied, besides foyldram manure. The great fact is, that farmers are becoming in a sense real commercial men—buying and selling every crop. *O. F.*

Emigration to Canada.—I can conceive no subject more opportune than that revived by my friend, Mr. Charnock, in your columns of last Saturday. At the present moment there are numberless young men, the sons of farmers, who are looking far and wide for a new means of living, and there are also many more young men, the sons of labourers, who find it difficult to gain employment all the year round in their native villages. To both these classes Mr. Charnock's advice will be applicable. The question is, by what means are they to be planted in their several spheres in Canada? Where is the money to be found? It would be well if Mr. Charnock would address himself to these points, in a letter for your columns, before he starts on his journey, and then there would be some preparation made to meet his suggestions. What is the least amount a farmer's son would require to start him in a little farm of his own? What is the amount of money required to remove a labourer's son from a midland parish in England to an active part of Canada? I hope to see Mr. Charnock in England as an authorised agent of the Canadian Government. *J. Bailey Denton, Orchard Court, Stevinge.*

Certain Things that Pay.—New methods are frequently misunderstood and objected to from an improper mode of carrying them out. Twenty-five years of practical experience have confirmed my first impression that both covered and enclosed yards, and also sparred floors, would pay. Speaking of covered yards the other day, in the train, Mr. So-and-so said, with considerable energy, for though he meant it, "I have a covered yard, but I mean to take the roof off and convert it into an open yard and sheds." I was astonished, and mildly asked the reason for such an unprofitable change. "Oh," he said, "the manure 'fire-fangs'" (which means, "dries and wastes by superheating.") At once perceived that he had not duly considered the altered conditions, and that he had continued to litter the covered yard as abundantly as though the rains and water which were still present were the same. He then pointed out to the very success of a covered yard with a paved floor was to litter so sparingly that the manure should be sufficiently wet to exclude air and prevent fermentation—in fact, just enough to keep the animals clean; for otherwise, by the heating of the manure, the health of the cattle would be endangered. The solid and liquid excrement and the straw should be so inter-mixed and compressed by the treading of the animals, that there should be no means of escape, and that ultimately it should go into the carts as short and compact as from a well-made dunghheap. All the urine is absorbed by the trodden straw, and therefore nothing is wasted, lost, or drained away; thus all the excrement goes to the land direct, with only one filling and unloading, effecting a saving on labour as well as a gain in quality over the ordinary dunghheap. I call this the bullock-fodder. Then comes the question of the health of the cattle. About this there is no mistake; their healthy, perfect, their growth and maturity rapid, always provided that you have in the roof proper provision for ventilating, such as I have frequently already described. Strange to say, nine sheds out of ten have no means of ventilation, consequently what should be a benefit becomes injurious. This remark applies specially to stables, so that farmers prefer open yards and sheds, knowing that animals get diseases in their non-ventilated stables. Mr. So-and-so started up again, saying he was not convinced. Wherever straw is scarce, or considered to be of value as food rather than as litter, the sparred floors are preferable. I have so frequently divided lots of bullocks, and found them do well on the sparred floors, that I am confirmed as to their utility and profit. I have now a number of young cattle, purchased July 20 last year at £6 10s., a portion of them are in my covered yard, the rest are in open yards, and they are all fattened; those on the spars, being the largest and earliest fed, are as fat as pigs, and worth £22 to £23 each, and bear a fair proportion in value to those in the covered yard. We expect in another month to get an average of £20 a-piece for the whole 20. The manure in both the covered yard and under the spars does not smell, until disturbed by removal, and then its strength and quality give unmistakable nasal evidence. Cattle never catch cold in these draughtless yards and boxes. In the health, condition, and development of the animals this system is far more profitable than open yards and sheds, besides the saving in horse and manual labour and improved quality of manure. Truth is sure ultimately to prevail, and I foresee the disestablishment of open yards and dunghheaps. See how fallacious is the reasoning of the supporters of the open yards. They say a bullock generally lays out in the open; no doubt he does, but the cost of fattening he feels hot after feeding, and out he goes, lying down on rain-watered straw, exposed to the night air and atmospheric vicissitudes, and

often catches cold, and pleuro follows. No such result can take place in a well-ordered and well-ventilated, covered, and enclosed yard. Watson's plan is the true one, of ventilation without draught. On his plan the opening in the roof is divided vertically into two parts—up one runs the hot air, and down the other comes the cold pure air. No such action takes place in an undivided opening. I often illustrate this practically to my friends, who happen to call at my place of business in town. But there is this important advantage in shed and stall-fed animals—country butchers have found out that, this cold winter especially, open-yarded bullocks do not open so well as those in closed sheds or stalls. They are comparatively very deficient in internal fat and mottled, and we know that they consume more food, in proportion to their increase, than when kept at a proper even temperature. I observe that animals are as sensitive to changes of weather as we are. Like us, they prefer a temperate atmosphere and a dry bed, to wet and cold above and below. Long-woolled sheep, especially in the spring, do not mind dry bed, but like a dry bed; but Downs and half-Breds can stand under cover well, and are admirably adapted for open yards, and they are admirably. Short-woolled or half-bred ewes, with their lambs, especially aged ewes, require warmth and shelter in bad cold weather. Old ewes that will not fatten in the open, roaming at large, get as fat as pigs if well fed in a warm stable or covered yard. Hairy animals require more warmth and shelter than woolly ones. Our milk-giving ewes thrive much better with pulped roots than with those from the cutter. *J. F. Mechi, Tiptree, April.*

Sugar-Beet.—By way of warning to those engaged in the cultivation of Sugar-Beet in this country, we furnish some extracts from an article, by Prof. Kühne, on a species of tapeworm (*Nematodes*) which was first discovered on Beetroot in 1859 by the late Prof. Schacht, of Bonn. Prof. Kühne is Director of the Agricultural College of Halle, and the article in question is very deficient in internal fat and mottled, and we know that they consume more food, in proportion to their increase, than when kept at a proper even temperature. I observe that animals are as sensitive to changes of weather as we are. Like us, they prefer a temperate atmosphere and a dry bed, to wet and cold above and below. Long-woolled sheep, especially in the spring, do not mind dry bed, but like a dry bed; but Downs and half-Breds can stand under cover well, and are admirably adapted for open yards, and they are admirably. Short-woolled or half-bred ewes, with their lambs, especially aged ewes, require warmth and shelter in bad cold weather. Old ewes that will not fatten in the open, roaming at large, get as fat as pigs if well fed in a warm stable or covered yard. Hairy animals require more warmth and shelter than woolly ones. Our milk-giving ewes thrive much better with pulped roots than with those from the cutter. *J. F. Mechi, Tiptree, April.*

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Steam Cultivation v. Insecurity of Tenure.—I think much instruction may be gained from Mr. Smith's letters, which appear in your paper, and farmers are much indebted to him, and also to Mr. Mechi, for the narratives of their experience which they give us. Many of us would probably be tempted to emulate them in their efforts to extract from the soil what we know it might be made to yield, but for the fact that we hold our land subject to the landlord's six months' notice to quit. What sane man, with due consideration for those he may leave dependent on him, dare lay out his money so plentifully as he would if he were the landlord? He knows that the landlord will have his outlay in improvements? This insecurity of holding is at the root of very much of the backward farming. A few facts are worth with some people a multitude of

words. Here are some:—A neighbour of mine has this season threshed less than 6 bush. of Wheat to the acre, off land where he might reasonably have looked for 30 bush. The loss was caused by his landlord's rabbits. It was on an estate, where for a tenant to kill a rabbit without leave would be equivalent to asking for six months' notice to quit. Could either Mr. Smith, of Woolston, or Mr. Mechi, of Tiptree, farm on such an estate? My own farm is ridden over by foxhunters all winter. The footprints of the horses, on the stiff land sowed with Wheat, remain till harvest. It would not do to trust to a peck an acre of seed while the crop is subject to this. A landlord in my county gave all his farm tenants six months' notice to quit, about two years ago, not with the intention of turning them out, but to make them insure their buildings against fire. Another landlord sent a circular round to all the tenants, demanding a rise of rent at a certain percentage, on account, as stated in the circular, that the land would bear it, and he needed it. Who made the land worth more? I wish we could, and dare, farm like Mr. Smith and Mr. Mechi. I hope to see some time. For that reason, I wish success to Mr. Wren Hoskyns' efforts to remove the incubus of entail which strangles the land. If we could buy land in suitable lots—and, perhaps better still, if we could rent it, knowing that what we laid out on it in improvements would remain our own, instead of being at the mercy of the landlord, then, I think, we dare buy steam tackle—we dare cultivate deep, and plaster on the manure, and raise crops that would feed the people. Until then, I fear we must depend on foreign corn for much of our daily bread. If Mr. Smith and Mr. Mechi will strive to bring about such an alteration of our laws as will secure tenants in their outlay, they will still further deserve the approbation of their countrymen. *H. H. O.*

Societies.

ROYAL AGRICULTURAL OF ENGLAND.

MONTHLY COUNCIL: Wednesday, May 3.—Present: Lord Vernon, President; Sir John Lubbock, the Duke of Devonshire, K.G., the Duke of Richmond, K.G., the Earl of Lichfield, the Earl of Powis, Lord Chesham, Lord Kesteven, Lord Tredegar, the Hon. H. G. Liddell, M.P.; Mr. Acland, M.P.; Mr. Amos, Mr. Baldwin, Mr. Barnett, Mr. Barthropp, Mr. Bowly, Mr. Cantrell, Colonel Chalmers, Mr. Clayden, Mr. Clive, Mr. Davies, Mr. Dent, M.P.; Mr. Druce, Mr. Edmonds, Mr. Hornsby, Colonel Kingscote, M.P.; Mr. Laws, Mr. Leach, Mr. Mafson, Mr. Milward, Mr. Pain, Mr. Randall, Mr. Ransome, Mr. Rigden, Mr. Shuttleworth, Mr. Statter, Mr. Stone, Mr. Thompson, Mr. Torr, Mr. Turner, Mr. Webb, Mr. Welby, M.P.; Mr. John Wells, Mr. Wells, M.P.; Colonel Wilson, Mr. Jacob Wilson, and Dr. Voelcker.

The following new members were elected:—

Addington, Rev. Henry, Henlow Grange, Biggleswade. Angerstein, W. T. N., Ashby Lodge, Rugby. Bailey, Henry, Landisfield, Tenbury. Ball, George, North Kilworth, Rugby. Barnett, T., Jackson, 13, North Street, Wolverhampton. Barratt, Charles Underwood, Eccleshall, Staffordshire. Barton, James, Pipe, Bangley, Tamworth. Berry, Edmund, Ashley, Market Harborough. Blouville, John, Leamington, Warwick. Bostock, William, Meir, Lichfield. Broomhead, Edwin, The Hough, Stafford. Bridgwood, George, Bednall, Staffordshire. Broomhead, Bernard Platts, Broomhall Park, Sheffield. Brown, William, Selby, Faversham. Croudson, John, Urawick, Ulverston. Cummins, John, Jun., Nelfields, Nevent. Dobell, Joseph, Lefwich, Northwich. Dorrington, Charles H., Boyatt Farm, Otterbourne, Wiltshire.

Dyer, Major Henry C. S., Westhorpe, Bromfield. Ellis, Samuel Henry, Maldon. Fortune, William, The Drefor, Kerry, Montgomery. Gaskell, W. P., Fulmer, near Slough. Gorman, George, Broomfield, Melham. Griffiths, John, Houlston, Middle. Grindly, William, Weeping Cross, Stafford. Groom, James, Arleston House, Wellington. Holland, James, Deeping St. Nicholas, Spalding. Holland, John, Walsingham, Spalding. Hudson, Samuel, Wythcote Hall, Shavbury. Humphreys, W. T., Calcott Hall, Oswestry. James, J. P., Cople, Bedford. Jeffery, George, The Rutland Iron Works, Stamford. Jones, James, Norwiche, Wellingborough. Jones, Thomas R., Talarid, Llanbyther. Lawrence, John Wheatley, Chesterfield Grange, Lichfield. Le Page, T. Blondel, St. Andrew's, Guernsey. Lowe, Thomas, Trysall, Wolverhampton. Marson, John, Acton Mill, Stafford. Oswell, W. B., Eardiston House, West Felton. Perry, William, Hickmadders, Sedgely, Dudley. Ringrose, Robert Boyes, Swanland, Brough. Roberts, Benjamin, Belle Vue, Oswestry. Shrewsbury and Talbot, the Earl of, Ingestre, Stafford. Stanley, John, Wane House, Wellingborough. Smith, F. D. Lea, Halsesown Grange, Halsesown. Smith, Thomas, Stableford, Bridgnorth. Tongue, Edward, Manor House, Aldridge, Walsall. Tughaan, William, The Lodge, Weymouth, Evesham. Walker, H. B., The Hallingford, Wolverhampton. Willis, Thomas, Manor House, Carperby, Bedale. Wilson, George C., Dallam Tower, Milnthorpe.

FINANCES.—Colonel Kingscote, M.P., presented

the report, from which it appeared that the Secretary's receipts during the past month had been examined, and were found correct. The balance in the hands of the bankers on April 30 was £3,362 7s. 3d., £2000 remaining on deposit at interest.

JOURNAL.—The Chairman reported that the following gentlemen had been appointed judges of the farms entered to compete for the prizes offered in connection with the Wolverhampton meeting.—Mr. G. Jackson, Tattenhall Hall, near Chester; Mr. W. Sanday, Holmepierpoint, Radcliffe-on-Trent; Mr. J. Wheatley, Newswick, Driffield; and that Mr. Wheatley had undertaken to write the report for publication in the ensuing number of the *Chronicle*. It was recommended that the Society should prepay the postage on the numbers of the Journal sent to foreign members, and that applications for the Journal from the Royal Agricultural Society of Portugal and the Main State Board of Agriculture be granted.—This report was adopted.

GENERAL, WOLVERHAMPTON.—Lord Kesteven reported the recommendation of the committee that 15,000 copies of the stock record of 7500 copies of the *Implement Catalogue* of the Wolverhampton meeting be printed for sale in the showyard, and that the prices be 1s. each on the 5s. and 2s. 6d. days, and 6d. each on the 1s. days.—This report was adopted, with the addition "that Mr. Randall and Mr. Masfen be authorised to make arrangements to secure additional land for the trial of steam-cultivating machinery, at a cost to the Society not exceeding £100."—**EXHIBITION SECTION.**—Mr. Milward reported the recommendations of this committee in reference to implement judges, which were unanimously adopted, subject to an addition to the number of engineer judges.

EDUCATION.—Mr. Wells, M.P., presented the following report:—

"Four out of nine candidates who had entered their names for competition presented themselves for examination of these three were under the age of 21. Messrs. Smith and Ohry obtain certificates of the first class, and the privilege of life membership of the Society. Mr. Minton is qualified for a certificate of the second class. Mr. Smith passed an excellent examination in the science and practice of agriculture, stock keeping, and he is also entitled to the prizes for chemistry and land surveying. Mr. Ohry, being over age, does not receive a prize, although he stands first for geology. One candidate only entered for anatomy and animal physiology, and the committee did not think it expedient to give a prize. Three candidates entered for botany, and all failed."

"The results of the examination are that:—
"Mr. Smith, besides becoming a life member of the Society, and obtaining a first-class certificate, is awarded the first prize, as well as the following prizes:—Science and practice of agriculture, £10; chemistry, £10; book-keeping, £10; and land surveying, £5.

"Mr. Ohry gains a first-class certificate, and becomes a life member of the Society.

"Mr. Minton obtains a second-class certificate.
"The committee cannot, but express their regret that more candidates have not come forward for the prizes offered, and that out of the number entered more than half did not present themselves for examination."

This report was adopted.

SHOWYARD CONTRACTS.—Mr. Randall (chairman) reported that the surveyor had certified that the contractor is entitled to his first payment on account, amounting to £200, and that the committee had called the attention of the Wolverhampton Local Committee to certain works which were not in so forward a state as was considered desirable.—This report was adopted.

IMPLEMENT.—Colonel Challoner (chairman) reported that the following recommendation of the committee had been adopted by a majority of 1:—
"That a letter from Mr. Easton having been read, enjoining a report on Messrs. Eastons, Amos & Anderson, to him, respecting the Wolverhampton trials, the committee recommend that these trials be left in the hands of Mr. James Easton, Sen., the remaining consulting engineer of the Society, and that

* The following is the list of intending competitors for farm prizes:—

Arable Farms.

Boulton, John, Bowling Green Farm, Shifnal.
Bowen & Jones, Euxel House, Shrewsbury.
Brewster, William, Boldord Hall, Middle, Wem, Salop.
Cheale, John Arthur, Wigginton Fields, Tamworth.
Collins, William, Aston Farm, Stafford.
Curtion, George, Beam House, Shrewsbury.
Davenport, John, Blunton Waste, Stoke-upon-Trent.
Enviold, Mary, Harrington, Shifnal.
Forester, George Townsend, Sherlowe, High Ercall, Wellington, Salop.
Glover, John, Bangley, Tamworth.
Hodges, Thomas, Meadley, Patingham, Wolverhampton.
Keeling, Charles Reynolds, New Tree Farm, Penkridge.
Lowe, Thomas, Trysull, Wolverhampton.
May, George Anderson, Eford Park, Tamworth.
Nagus, Thomas Addison, Lynn, Walsall, Lichfield.
Sneyke, Elizabeth, Bratton Farm, Wellington, Salop.
Sing, Henry Swanton, Bridgton, Shifnal.
Spence, Charles, Little Holt Farm, Bridgton.
Stanier, John Edward, Uppington, Wellington, Salop.
Timms, Charles, Brimley, Shifnal.
Trevor, William Henry, Westwood, Wick Wenlock.
White, Edward, Knowle House, Lichfield.
Winterton, Thomas, Alwre, High Lichfield.

Dairy Farms.

Brown, Henry, Preston, Wellington, Salop.
Clay, John, Kinsale, Oswestry, Salop.
Swift, William Thomas, Toff Farm, Newcastle-under-Lyne, Staffordshire.
Walker, Matthew, Stockley Park, Anslow, Burton-on-Trent.

the consideration of any further appointment be deferred until after the Wolverhampton meeting." The question "That this report be adopted," having been put from the chair, Mr. Thompson stated that, as the opinions of members of the committee were so evenly divided, it was desirable that a vote of the Council should be taken, especially considering the nature of the previous resolutions of the Council and of the Implement Committee. He then read a letter, dated June 22, 1848, addressed by Mr. Hudson, the then secretary of the Society, to Messrs. Easton & Amos, which made it clear that the only official appointment was that of the firm; and he urged that it therefore required a special resolution of the Council to cancel that appointment, but that such a resolution had never been passed. Mr. Randall then moved, "as an amendment to the report, the same resolution which he had moved in committee, viz.: "That the secretary assure Mr. Easton that nothing could be further from the intention of the Implement Committee or the Council than to do anything which could in any way be offensive to him. The Council call Mr. Easton's attention to the fact that the original appointment of consulting engineers was the firm of Messrs. Easton & Amos; that, notwithstanding the gentlemen who then constituted that firm have retired from it, the responsibility of carrying on the business of the Society has, by tacit consent, been left in the hands of the firm, viz., that of Messrs. Eastons, Amos & Anderson." Mr. Milward having reported that the dissolution of the firm had been effected by the Duke of Richmond, Hon. Mr. Liddell, M.P., and Mr. Jacob Wilson, as well as by Mr. Ransome, who, as mover of the resolution embodied in the report of the Implement Committee, stated the arguments in justification of his view, and disavowed holding an opinion that Messrs. Eastons, Amos & Anderson were not well qualified to act as the Society's consulting engineer. On a division, Mr. Randall's amendment was carried by 26 votes against 11, and the amended report by 27 votes against 11.

VETERINARY.—Mr. Milward presented the following report:—

"The original purposes of the grant made by this Society to the Royal Veterinary College were twofold:—1. To advance veterinary science by means of the instruction afforded to students at the College. 2. To enable members of this Society to obtain the best assistance and advice in case of the outbreak of disease amongst their stock. In addition to these primary objects the Society hoped to present to its members in general, information on veterinary science, by means of reports on diseases treated, and measures to be adopted to prevent disease. The first of these objects has scarcely been so satisfactorily performed as could be wished; the number of veterinary surgeons who have gone out from the College, and become established reporters, have not so far taken advantage of the treatment of the diseases of cattle, sheep, and pigs as to give confidence to their employers, though thoroughly competent as far as treatment of horses is concerned, and generally of a higher standard of scientific education than their predecessors. Neither has the second object been satisfactorily attained."

"Members of the Society do not apply to the veterinary inspector in cases of disease so much as they might do, and complain that it is not easy in these cases to obtain the professional advice which they require; and that, thus, the Society do not receive from the College, or its professors, the current information on diseases, or the suggestions for their cure and prevention, which they think that they ought to have at their service. They therefore recommend that the conditions on which the grant should be made shall be as follows:—

"That the grant to the College shall be specially devoted to the advancement of veterinary science as applied to the diseases of cattle, sheep, and pigs."

"That it is desirable that the Governors of the Veterinary College should appoint an efficient assistant to the Professor of Cattle Pathology, in order that he may more satisfactorily attend to the applications of members of the Society, and by lectures and practical treatment of cattle in diseases of the College, more thorough instruction to the students on these subjects; and further, that the Professor should present to the Council quarterly reports on matters connected with diseases of cattle, sheep, and pigs, and on any question of veterinary science which may be of interest to agriculturists."

Mr. Thompson, while concurring with the report of the committee, moved the following addition to it:—

"That a deputation of the Governors of the Royal Veterinary College be invited to meet the Veterinary Committee and discuss the measures which the Council consider necessary to be adopted in order to render the cattle department of the Royal Veterinary College really efficient." This addition having been seconded by Mr. Dent Dent, M.P., the report of the Veterinary Committee was, as then amended, unanimously adopted. The Secretary thereupon instructed to forward a copy of the report, and of the foregoing invitation, to the Principal of the Royal Veterinary College. The annual report of the Governors of the Royal Veterinary College was received, and referred to the Journal Committee, with a view to its publication in the next number of the Journal.

COUNTRY MEETING OF 1872.—The report of the committee appointed to inspect the sites offered to the Society by the local authorities of Cardiff, Cheltenham, and Newport, was read, as well as a letter from the Mayor of Newport, stating that, as the committee had informed him that they could not report so favourably of the accommodation offered by Newport, as of that offered by Cardiff and Cheltenham, the authorities

of Newport were reluctant to occupy the time of the Council by pressing further the claims of that borough. The Council were then favoured by the attendance of the following gentlemen as deputations from Cardiff and Cheltenham:—

Cardiff.—The Marquis of Bute, H. H. Vivian, Esq., M.P., the Mayor of Cardiff (Charles W. Davis, Esq.), the ex-Mayor of Cardiff (E. Whiffen, Esq.), Mr. Alderman Alexander, and Messrs. J. V. Corbett, G. T. Clark, and G. Fisher.

Cheltenham.—Sir Michael Hicks Beach, Bart., M.P.; R. S. Holford, Esq., M.P.; H. B. Samuelson, Esq., M.P.; and the High Bailiff of Cheltenham (G. Parsonage, Esq.).

These deputations having successively stated to the Council the claims of their respective districts, and having answered the inquiries of the Council, the President expressed to them the thanks of himself and the Council for their interest in the Society, their anxiety to promote its objects, and their kindness in attending the meeting that day.

The deputations having withdrawn, it was proposed by Mr. Clive and seconded by Col. Kingscote, C.B., M.P., "That the meeting of 1872 be held at Cheltenham;" it was also proposed by Lord Tredegar, and seconded by the Hon. H. Liddell, M.P., "That the meeting of 1872 be held at Cardiff." On a division it was decided by 21 votes against six, that the country meeting for 1872 be held at Cardiff.

On the motion of Mr. Thompson, seconded by Mr. Torr, Sir Watkin W. Wynn, Bart., M.P., was unanimously recommended to the general meeting as President for the ensuing year.

HOUSE LIST.—In conformity with the bye-laws the Council then arranged by ballot the following election list, to be recommended by the Council for adoption at the ensuing general meeting on the 22nd inst.:

ATTENDANCES FROM THE RISING OF THE MANCHESTER MEETING IN 1869, TO THE PRESENT TIME.

Names.	Monthly Councils. Total, 15.	Special Councils. Total, 1.	Weekly Councils. Total, 10.	No. of Meetings.	Committees.
Acland, Thomas Dyke, M.P., Sprydon, Exeter, Devon.	5	1	..	39	2
Baldwin, John, Addington, Stratford-on-Avon, Warwickshire.	5	..	..	4	4
Barnett, Charles, Stratton Park, Biggleswade, Bedfordshire.	9	..	..	4	18
Cutcliffe, Charles S., Riding Court, Datchet, Bucks.	4	..	..	28	18
Dalrymple, John, Littlebury, Safron Walden, Essex.	5	..	..	32	7
Dent, John Dent, M.P., Ribston Hall, Ketterby, Yorkshire.	9	..	..	59	32
Jones, J. Bowdler, Emdon House, Shrewsbury, Salop.	..	..	..	..	..
Kingscote, Colonel, M.P., Kingscote, Wootton-under-Edge, Gloucestershire.	12	1	..	53	29
Leeds, Robert, Castlereagh, Brandon, Norfolk.	13	..	..	35	21
Liddell, Hon. Henry George, M.P., Ravensworth Castle, Durham.	3	..	..	4	4
Lopes, Sir Massey, Bart., M.P., Marston, Oxford, Devon.	7	1	..	28	7
Milward, Richard, Thurgarton Priory, Southwell, Notts.	12	1	..	80	58
Pain, Thomas, The Grove, Basingstoke, Hants.	13	1	..	4	1
Ransome, Robert Charles, Bolton Hill, Ipswich, Suffolk.	10	..	..	28	15
Ridgway, M. White, M.P., Bladon, Crumlington, Northumberland.	9	..	..	39	11
Rogden, William, Howe, Brighton, Sussex.	5	..	..	4	1
Stone, Nathaniel Chamberlayne, Aylestone Hall, Leicestershire.	5	..	..	4	2
Torr, William, Aylebury Manor, Glimby, Lincolnshire.	13	..	..	73	59
Turner, George, Bramford Speke, Exeter, Devon.	5	..	..	4	4
Torr, Jaber, Haddon, Huntingdonshire.	..	..	..	..	..
Wakfield, W. H., Kendal, Westmoreland.	9	..	..	23	10
Webb, James, Spring Hill, Fladbury, Pershore, Worcestershire.	9	..	..	23	10
Wells, John, Westbury, April 5, 1871.	..	..	..	..	..
Booth Ferry, Howden, Yorkshire.	..	..	..	..	..
Wilson, Lieut.-Colonel, Fuller Maitland, Stowmarket, Hall, Bury St. Edmund's, Suffolk.	6	..	..	28	7
Wilson, Jacob, Woodhorn Manor, Morpeth, Northumberland.	10	..	..	68	40

On the motion of Mr. Thompson, seconded by Mr. Torr, it was resolved that the country meeting for 1873 should be held in the district comprising the counties of Durham and Northumberland, as well as the North and East Ridings of Yorkshire, in accordance with the scheme of rotation adopted by the Council last July.

The draft of the report to the general meeting was discussed, amended, and ordered to be printed. Letters were read from the Rev. Mr. Coward, of Wolverhampton, and from the Secretary of the Suffolk Agricultural Association, and the Secretary was instructed to return suitable replies.

BATH AND WEST OF ENGLAND.

At the last meeting of the Council of this Society the deputation who visited Dorchester on the 15th ult. reported as the result of their conference with the local

authorities, that they were satisfied with the site offered for the showyard and the fields proposed for the trial of implements. Under these circumstances, the deputation, subject to the approval of the Council, had arranged to hold their meeting at Dorchester in 1872, and they recommended that an allowance of £20 should be made to the local committee in consideration of the making arrangements with the Turnpike Trustees for implements, stock, poultry, &c., connected with the Society's meeting, to be allowed to pass turnpike free for the week preceding and the week succeeding the week of the exhibition. The report of the deputation was received and confirmed, and all matters may now be considered to be definitely settled.

Requirements of Towns.—At the last meeting of the Council it was moved by Mr. Poole, that after the Guildford meeting the preliminary money payment required of towns desirous of receiving the Society be reduced from £900, at which it now stands, to £600; but, this, after an animated discussion, was lost by a majority of 2. Mr. Jonathan Gray now moved—“That whereas, prior to the Society's meeting at Dorchester in 1860, the preliminary money payment required of towns was £800 only instead of £900, as now required, the Council do, after the Guildford meeting, revert to the former sum.” To this an amendment was moved by Mr. Moore Stevens, in the absence of Mr. Knollys—“That with reference to the annual exhibition of this Society, a committee be appointed to consider whether any modification of the conditions and money payments required from towns is desirable, and to report thereon to the Council.” This amendment having been seconded by Mr. Poole, led to considerable discussion, and eventually it was carried by a majority of 16 to 2, and the committee was appointed, to consist of Messrs. H. Williams, G. S. Poole, J. E. Knollys, John Gray, Jonathan Gray, R. G. Badcock, Clement Bush, and J. C. Moore Stevens.

Guildford Meeting.—The programme for the forthcoming meeting was brought up and settled. It transpired that the entries of stock and implements are unprecedentedly numerous, in this respect taking precedence of even Bristol and Southampton. Resolutions of the poultry show and the horticultural tent, as the entries are not close till May 8. The Guildford show will open on Monday morning, May 29, at 10 o'clock, when the open judging of cattle, sheep, horses, and pigs will commence and be continued till the awards are made in the several classes. The Arts Department will open at 10 o'clock, and the horticultural tent at 1 o'clock. The splendid band of the Grenadier Guards will be in attendance, and will play at intervals till the yard is closed at 6 p.m. On Tuesday the yard will open at 9 o'clock, and the poultry tent will be opened as soon as the birds are judged, and will continue open until 6 p.m. At 1 o'clock this day (not on Wednesday, as heretofore) the annual meeting of the members of the Society will be held in the Council tent. At 2.30 p.m. there will be a public luncheon, to which ladies and gentlemen are invited, but whether it will take place in the showyard or elsewhere has not yet been finally settled. On Wednesday the yard will open at 9 o'clock. The competition of shoeing smiths operating on the feet of living animals, and not mere models, as erroneously supposed by persons unacquainted with the Society's meetings, will take place at portable forges in the yard, at 10 o'clock. At 11 o'clock a grand selection of music will be performed by the Grenadier Guards. At 1 o'clock an equally fine selection of music will be performed by the United Band of the Royal Marines at Plymouth; and at 3 p.m. concerted pieces will be played by the united bands. On Thursday and Friday, the shilling days, the yard will open at 9 a.m. for the exhibition of stock, poultry, implements, works or art, and the horticultural tent, and on each of these days the band of the Royal Marines will be in attendance. The trial of implements will take place on Monday and Tuesday in fields contiguous to the showyard.

For the convenience of members and others desirous of presenting tickets to their friends, a limited number, admitting once only to the yard, will be issued at 2s. 6d. each. Tickets not transferable, but admitting the holder to the showyard during the whole time of the meeting, will also be issued at 7s. 6d. each. It was also ordered that all new members of the Society who pay their subscriptions before May 1 shall be entitled to a chance in the Art Union.

Farmers' Clubs.

LONDON.

May 1.—The following paper was read by Mr. J. J. Moth.—

How to Hire a Farm.—I presume we shall all agree that, for the good of the individual as well as for the national welfare, it is desirable that the production of our food, as well as our other industrial arts, should be conducted with knowledge, intelligence, and capital. There is no greater mistake than to suppose that farming can be carried on successfully without those necessary qualifications, and thence arise those losses and disappointments of which we too frequently hear. Agriculture is a business requiring almost an apprenticeship practice, and, quite as much so, as the knowledge of navigation is essential for successful voyages. That experience must be varied if we have to

farm under varying circumstances of soil and climate and business conditions.

I commend these remarks especially to capitalists from towns and cities, making however this reservation, that I know of many keen observers who, not having been brought up to agriculture, and therefore not oppressed by antique prejudices, have succeeded in making many and successful improvements in agriculture, beneficial alike to themselves and to the district around them, and to the general welfare.

According to the Board of Trade returns for 1870, the total area of the United Kingdom consists of 77,573,585 acres; its population 30,986,460. But the total amount of land under all kinds of crops, bare or grass, is only 46,177,370, of which 22,085,295 are in permanent pasture. The population of Great Britain, including Wales and Scotland, in 1801, was 10,834,623; in 1870, 25,313,000. Ireland in 1801, 5,300,000; in 1870, 5,525,210. The contrast in increase is painfully remarkable.

If you ask me why I read this paper, I reply that, although the knowing old stagers of the London Farmers' Club want no advice in this matter, there arises annually a new generation of young farmers who have to gain or buy their experience, too often at great cost, and to such I desire to communicate my ideas. There are about 400,000 farmers in Great Britain and 600,000 in Ireland, and as the average of adult life is probably but 50 years, it follows that there must be about 20,000 new farmers annually—say 8,000 English, Scotch, and Welsh, and 12,000 Irish, to fill the places vacated, every year. Some of these may perhaps benefit by the introduction and discussion of the important subject now before us, especially as we number in our Club some first-class land agents, land stewards, and land valuers, as well as landowners.

A very considerable portion of the land in Britain is entailed, and in few hands. It has been stated that 150 individuals own one half of England, and only 12 hold one half of Scotland. In many of these estates, especially in England, leases are not granted, but the holding is continued from generation to generation, so that in a great many such cases within my knowledge farmers would decline to accept a lease, knowing that their tenure is secure and their rent moderate. An eminent land agent assures me that out of 1500 farms, which he had let, only one-fourth were on lease. Still, as a matter of business, I prefer a long lease, because it gives confidence to men of capital to invest largely in modern improvements; they are, also, thus politically unshackled, and, if of a very independent temper, or somewhat hasty, protected against the malign influence of an occasional vicious gamekeeper, or a disagreeable steward or landlord. In Scotland, leases of 19 years are, I believe, very general, and also very beneficial to the country at large. Certainly their tendency is greatly to increase the value and rent of the land, and sometimes the law of hypothec induces the landowner to accept inferior tenants at rack rents. Such tenants do not often sit out the lease, or make permanent improvements, but, on the contrary, leave the land in an impoverished condition. The law of hypothec is by many considered unfair and injurious.

Our subject is a very large one, taken in all its bearings, because, as it applies to the whole of the United Kingdom, we have very great variations in soil and climate, in modes of letting and tenure, in customs of valuation and times of entry; therefore any one seeking success in a new district, or entering for the first time in the practice of agriculture, should put to himself the following questions:—

1. Do I understand the business of farming?
2. How much capital have I got?
3. How much credit can I obtain, so as to have the use of some other person's capital?
4. How much capital per acre shall I invest?
5. Shall I be my own bailiff and manager, or shall I employ another?
6. Where and how shall I seek for a farm?
7. How shall I ascertain the general character of the land, the landowner, and his agent?
8. Shall the tenure be annual, or by lease?
9. What are the customs of the neighbourhood as to valuation of incoming tenant?
10. Shall I take live and dead stock by valuation, or let them go to auction?
11. Shall the farm be arable, pasture, or mixed?
12. Shall it be a rich natural soil near a river, a stiff clay, a hot gravel, a dry sand, a chalk, a limestone, or a useful and moderately good mixed soil?
13. Is it near a good market for either buying and selling, or obtaining artificial food and manures?
14. How are the good roads and suitable buildings in a central position, with residential accommodation?
15. Are they in good or bad condition?
16. Who is to keep them in repair, remembering the difference between tenable and substantial repair?
17. Has the land been well or ill farmed by the outgoing tenant?
18. Is the farm crowded with timber and fences, or are the fields of ample size, with neat fences and free from trees?
19. Is the right of sporting reserved by the landowner?

20. Is the land naturally or artificially drained? If not, who is to do it, on what conditions, and at what cost or charge?

21. How much of my capital will be invested in incoming valuation for tillage, &c., live stock, farm horses, implements and machinery, horse keep, labour, &c., until a crop is obtained?

22. Is there a good style of labourers in the neighbourhood?

23. How much per acre are the tithes—great and small—the poor rate, surveyor's rate, and taxes?

24. Is there a good supply of water?

25. Are there labourers' cottages convenient or on the farm?

26. Is the farm in an improving district or in a backward one?

27. What are the proposed conditions as to mode of cropping?

28. Is the aspect or slope to the north or south, east or west?

29. How many feet is its elevation above the sea?

30. Are there means for irrigating the meadows, and what is the quality of the water?

31. Have the landowner and his steward a good name for liberality and justice, or are they said to be oppressive and unjust?

32. Will any portion, and how much, of my capital be required to be invested on improvements?

Time will not permit my commenting on all these questions, but I would offer a few general remarks. As regards would do well to seek advice and information from some successful practical friend.

In seeking for a farm, get introduced to some first-class land valuer who has a good reputation in his locality. If in a strange locality, make some quiet inquiries in the neighbourhood as to the general character, not only of the land, but of the landowner and steward or agent.

It is a good thing to stand well with land agents in rich districts not over-rented. If you advertise for a farm you will have plenty of offers, but too often of the wrong sort in some way or other, such as a rack rent, an unpleasant landlord, too much game, or inferior soil. Farms hawked about or advertised require a very cautious approach. Farms having a bad name in the county are often advertised in distant counties, and a clever agent will take care to meet the applicant at the station, accompany him to the farm, dine him, and assure him safe off again by railway.

As a rule, a good or acceptable farm seldom comes into the market, for before the late tenant is deposited in his grave some wide-awake farmer has made his application, and generally there are several applicants for a single farm. An Essex landowner told me that he had 23 worthy competitors for one farm. Land agents or land stewards have generally in view some good men, who get notice of an approaching vacation. It is very desirable to hold the farm of a landlord who, having plenary powers, effects improvements by drainage, plover buildings, &c. The tenant's capital is then free and available for tenant's investments, and it always answers to pay a fair percentage on landlord's capital invested in suitable improvements.

A rich farmer can sometimes make good terms with the dilapidated landowners of poor unimproved land requiring capital and improvements.

In a district new to you, obtain a few catalogues of farm sales, which will enlighten you as to the probable requirements in live and dead stock, machinery, and implements.

Farmer's Capital.—Fit your farm to your capital: £1000 to every 50 acres would not be too much for high and improved arable farming, and not enough if you find it necessary to improve the farm. The question of capital is too important to be passed over lightly. Modern agriculture, with its costly implements and machinery, and its extensive use of artificial manures and purchased food for cattle, and its maximum crops, is a very different affair from the old pastoral and *laissez faire* system. In Scotland, where farms are let to the highest bidder for a 19 years' lease, the tenant is often expected to make a considerable outlay in drainage at a cost of some pounds per acre. Liming or chalking and claying frequently absorb 10 or 15 pounds per acre of tenant's capital. On my farm, which requires plenty of manure and deep cultivation, I cannot prosper with less than £16 per acre, invested as follows:—

	£	s.	d.
Live stock,	6	0	0
Farm horses,	1	0	0
Tillages, &c.	3	15	0
Implements and machinery	2	10	0
Hay, corn, &c., unsold,	2	15	0
	16	0	0

If I diminish my quantum of live stock I diminish my supply of manure, and, consequently, get smaller crops and less profit. I could do better with £20 or more per acre. We hear a good deal about £10 per acre, but it is now quite insufficient in an arable district. You have a wealthy and judicious landlord, willing to aid in progressive improvement, it will answer your purpose to pay from 5 to 6 per cent. for drainage and extra buildings where required.

If you desire to be secure in your tenancy, buy the land, and mortgage it for a long period at 44 per cent.

As a farmer you should gain 10 per cent.; as a landowner you can only expect 4 per cent. Our system of separate land-owning and farming is far superior to wretched poverty-stricken peasant proprietorship.

If you come into a district previously unknown to you, your success may depend upon a change of crop and of practice suited to the soil and climate—if they differ from the one you have quitted. Scotch farmers from among the cloud-capped hills and rugged, bare mountains, where the crop is wheat, with certainty, must expect and prepare for a totally different arrangement in the dry, level, and cereal eastern counties, where spring-sown Wheats and early-sown Turnips are almost sure to fail, and where top-dressings in spring are not at all to be depended upon.

I have seen much capital wasted by laying down to grass land quite unsuited for it both in soil and climate. Our dense tenacious non-calcareous soils are like bird-life in winter, and dry like clay on summer, are quite unfit for permanent pasture; and yet by deep cultivation and frequent horse-hoeing, splendid crops of Mangel, Beans, and Wheat can be grown on them; also Tares and Clover.

Another mistake is to expect that great Lincoln or Cotswold sheep will thrive on such poor pastures. Short-horns want better food than that. Consider the season when you are leasing a farm. Beware of stiff undrained clay farms, in a hot, dry, exceptional season, like 1870. The crops, then, are exceptionally good and tempting. A very hot burning farm in a wet season is equally deceptive. When examining a farm in a district previously unknown to you, it is desirable to see the subsoil below the ploughed surface. Too often it will be found very different in appearance from the surface; a 4-feet cutting may enlighten and save you.

Many a farm has been secured by an immediate and personal interview with the proprietor. "First come, first served," has often taken place. Ascertain the custom of valuation in the district; they vary very much, and unless you do this you may be greatly deceived or disappointed.

Unless you have a sharp local man to value on your behalf, you may be extensively victimised. In the affairs of this world men are saved by faith, but rather by the want of it; therefore have every agreement or understanding clearly defined in black and white, on properly stamped documents. For want of this I have seen much misplaced confidence sadly abused, and great injury inflicted, and much heart-burning. There would be little difficulty in doing business in confidence if all men were true and honest; but we know that it is not, but that among the landowners and tenants there are some greedy, grasping, cunning, and dishonest persons, with other bad passions, which should be legally guarded against. There is a certain percentage of people who are almost sure to succeed under almost any circumstances—industrious, frugal, sharp-witted, and far-seeing, who always manage to find themselves in the right place; and I am sorry to say that there is also another too large percentage of exactly the opposite—weak, cunning, and deficient in business qualities. These are matters beyond human remedy or control.

How to Let a Farm.—The owner of naturally fertile soil has much less difficulty in letting than the owner of poor or middling land. Good tenants, like good landlords, are much sought for, and command a preference. There are certain tenants, known to have capital and taste, who can safely be trusted in their farms. These persons have the confidence and respect of land stewards, who naturally feel highly responsible to their employers in the matter of entrusting their land. It is easy to say, "I have bound the lessee to strict covenants as to cause of cropping," but that avails but little in many cases. A bad farmer will keep no fat stock, cultivate little and badly, hoe no weeds, buy no cake, but sell all his corn, bringing back no manure.

Unimprovements in the dairy, cows, or rearing lean stock for sale. On this system the land gets poorer every year, and at the end of a long lease can only be let at a great reduction of rent, or be taken into the landlord's hands to be put into condition. In fact, it is no uncommon thing to find such a farm dilapidated in soil, roads, buildings and fences, the ditches full, and the drains choked. I am frequently told by landowners that they have to take the farms and their own hands to get them into condition before they can let them at their proper value. It is, therefore, highly desirable, when you have a good and improving tenant, to keep him on the farm, to aid him in his improvements, and at the end of his lease make equitable arrangements, and not compel him to leave the farm by surcharging him on his own improvements. A fair system of out-going valuation of tenants' improvements would remove the temptation of demanding extortionate rents.

Some of our Scotch farmers get sadly punished at the end of their 19 years' lease, for I believe they have no claim for drainage or other permanent improvements, and farms are generally or frequently advertised to let to the highest bidder. As a natural consequence, many Scotch farmers are driven to the cheaper land of the South, while their improved farms fall into the hands of men who exhaust their improvements, impoverish themselves, and cannot, at the last, get any am glad to learn, from a competent authority, that many

Scotch leases are pre-arranged four years before the termination of the old lease. This is to be commended, for it prevents exhaustion of the soil, injury to the tenant, and damage to the general welfare.

There is no fear of any one coveting the farm of a bad tenant, while there are plenty anxious to take and exhaust the farm after a good one. Therefore, too often, the bad farmer has a much more secure tenure than the good one. The slow growth of many farms is managed so admirably that no concurrent benefit accrues to the landowner, tenant, and labourer. What a happy thing it would be for this country if such bright examples were availed of and multiplied.

Low rents and bad farming generally go hand in hand, for the obvious reason that non-improvement impoverishes the land and diminishes its rent. I think that where a tenant understands his business, and invests £14 to £20 per acre capital on the farm, he should not be restricted as to cropping or selling hay, straw, or roots, excepting for the four years preceding the termination of his lease. With such a capital there must be plenty of fat live stock, which is a certain guarantee for the fertility of the soil. He should of course be bound to consume on the farm a quantity of corn or cake equivalent in value to the straw, hay, and roots sold. The growth of best for sugar-making or distilling will necessitate high farming.

Stringent clauses in the lease should bind the tenant to keep the ditches and outlets of drains open and in good condition, to trim the fences annually, and keep the farm roads in order, providing they were in proper order when he hired the farm. Seeing how varied and varying is the human temper, it is not to be expected that everything will always go so smoothly, therefore it is desirable to have a clear and well defined understanding or agreement at the commencement, with a hope that all will prove harmonious and pleasant. A wise landowner will have his farms of various sizes, adapted to varying capitals. From the recent Board of Trade statistics, we learn that there are plenty of small farms in the United Kingdom. Industry, frugality, and talent are the parents of capital. I know many large farmers who thus created their present large money capital.

I am glad to agree with a farming friend of mine, who says that he never knew a young farmer to succeed who began with a money capital of £10,000. He says that his habits would be generally too expensive, and that he would depend too much upon others, instead of attending personally to his own affairs.

I am doing a good service to landowners by commenting on the system Mr. Alexander Jendett's system of farmers' and landowners' accounts. A wise landowner will, either himself, or by his agent, have a list of persons likely to prove desirable tenants.

In conclusion it is quite clear that the landowners of this kingdom have not the capital, or perhaps the skill to farm their own land, or even, in many cases, to make the necessary improvements; therefore every person who is desirous of being able to give to his tenants the best farming, his business and means of existence, by granting leases and proper valuation for tenants' improvements, also the right of sale or transfer.

The advantage of such a system finds its evidence and illustration in every British town and city—Belgravia and Tyburnia have been raised upon Cabbage gardens, not by the owners but by the lessees, who make their calculation of profit on a prolonged lease. Some results will follow in agriculture under similar conditions. Landowners might improve their rental, and get permanent improvements effected on his estate by granting to men of capital and enterprise leases, varying from 20 to 50 years, with powers of sale or transfer as in towns, and the sole right of sporting and freedom from political dictation. Were this done, the change would be almost magical—agricultural Belgravia and Tyburnia would soon present themselves; first-class houses, residences, and gentlemen's cottages would quickly supersede the present mean and shabby inefficient farm arrangements. Good roads, square fields, and good fences would come as a usual consequence; wet lands would become dry and sound by drainage. Unfortunately the laws of entail considerably bar the way, but must ultimately be modified. Where a landlord treats his land simply as a means of obtaining an income all this might be reasonably done. Of course there might be sacrifice of political influence and rights of sporting, but, practically, the relative influence of Whig or Tory would not be altered were the practice I have named to become general. Capital will never flow amply and freely into the agricultural channel until this is done, and then the meanness of British agriculture would disappear, just as in our great cities, where enormous outlays of capital under secure tenure and political freedom have superseded the mean buildings and residences of antiquity by comparative palaces.

Has not all this vast change been for the good of the country as well as the landowner? Has it not, by attracting and attaching capital, enormously employed and benefitted the industrious millions, from the miner and the bricklayer's labourer and their employers, to the conveyancer and architect?

It has given immensely increased profit to owners of coal, and multiplied the consumers and users of its produce. Our clays and limestones have been con-

verted into bricks and mortar. Let us then throw aside our ancient prejudices, and take as business-like a view of agriculture as of commerce, trade, and manufactures. Let us look upon the soil as the raw material to be worked up by skill and capital, and rendered a more available means of employing and feeding more abundantly and cheaply the people of Britain.

The co-existence of an overflowing capital, finding employment abroad, with a superabundant unemployed population at home, is a dangerous anomaly, threatening in its continuance ruin to our country. Agricultural improvement would absorb much of that vast increase of rural population, which can now only find or seek for employment in our already too amply populated towns and cities. No population can be too numerous if they are all profitably employed.

We know from unerring statistics (witness the cotton famine and Irish Potato failure) that marriages and population are dependent upon, and influenced by, prosperity or adversity arising from employment or non-employment; therefore, when improvements cease or permanently diminish in this country, farewell to its wealth, tranquillity, dignity, and power. May that melancholy and humiliating period be long deferred.

Farm Memoranda.

ISLE OF ELM: April 22.—After the breaking-up of the winter frosts we have had continuance of dry weather, very favourable for farming operations, but less so for vegetation. Some days in March were bright and warm, without much frost of a night. The present month brought with it some similar days, but with widely different nights. On the morning of Good Friday we had thick ice. This was continued for the next four mornings. Pumps in exposed situations were frozen, and we need scarcely say much injury was done to the growing crops. After the winter frosts the appearance of the Wheat plant was most unsatisfactory, and instead of improving, as was hoped, during the last month and the early part of this, it continued gradually to get thinner and weaker, and the frosts and hot suns just referred to made it look deplorably bad. During the last ten days we have had copious rains, which have tended in some measure to repair the damage, and to restore verdure to the fields, but we have an unmisgiving bad plant of Wheat. Some have been ploughed up. Many acres have been re-sown with spring corn amongst the thin Wheat; and many fields are very thin and poor, and cannot possibly make anything approximating to a good crop. A few fields on the gravelly soils look strong and well, but these are quite the exception. Upon the whole, we regard the Wheat crop as one of the most unpromising we have yet seen for many years. A single genial season, with alternating sunshine and shower, may do much to help the weak poor crops, but without these they must be poor indeed. The spring crops are more hopeful, and generally show a good plant, and where unhurt by the frosts of the last fortnight look vigorous and healthy, and where injured are rapidly regaining a healthy hue. The wireworm has not done them any serious mischief at present, and a continuance of growing weather may do much to secure them against their enemies. All spring tillage is forward; a large acreage of Potatoes has been planted, Carrots and root crops are many of them in, and some up-grass is forward and plentiful; the price of all grazing animals is high, and the demand brisk. If we get showery weather we shall doubtless have a good grass season, as the land produced so little last year. Meat continues high, but as the summer advances may probably be cheaper. The corn trade is slow, but lower prices are not very probable, and with a return of quiet in France a demand may speedily arise which will tend to advance prices. *Your Fen Reporter.*

Miscellaneous.

DOUBLE-PLOUGHING IN THE FENS.—(1.) *April 12.* An important trial of double ploughing was held last week at Chatteris, to prove these implements, which are becoming so generally used in other parts of the kingdom, were applicable there; and, if so, which make was the best suited to this large and fertile district. Messrs. Ransome, of Ipswich, and Messrs. Howard, of Bedford, were appointed to attend, and judges were appointed to decide on the merits of the work. The Bedford firm was represented by their champion ploughmen, Brown and Curtis, and Messrs. Ransome by their man Powell. The ploughing was closely scrutinised, and the draughts of the several implements carefully taken by the dynamometer; and, at the conclusion of the trials, the judges gave their decision in favour of Messrs. Ransome's plough on all points—viz. best work, lightest draught, simplicity of construction, ease of management, and as being the best suited to the locality. This award gave the greater satisfaction from the fact that the plough used by Messrs. Ransome's man was an ordinary one, which had been sent down to a customer some weeks before; whereas the Bedford men competed with their best prize implements. At the fifteen matches at which the Howards and Ransomes have met this year, ten have been won by Messrs. Ransome, and the double ploughs have taken more first prizes than any others,

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HOME-GROWN
FARM SEEDS,
CARRIAGE FREE.

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(Improved),

THE HARDEST SWEDE,
THE HEAVIEST SWEDE,
THE BEST KEEPING SWEDE,

IN CULTIVATION.



Suttons' Improved Champion Swede,

The best in cultivation, as shown by the following unsolicited Testimonials:—

From JAMES PAXTON, Esq., *Bicester.*

Feb. 11, 1871.—“I have won a dozen cups and other prizes for roots, but I never grew anything but your Champion Swede, which resisted in a most remarkable way the effects of a frost, which on several nights during last winter winter was 10 or 12 deg. below zero of Fahrenheit.”

From JAMES LAING, Esq., M.D., *Wantage.*

April 10, 1871.—“None of my friends here have been able to compete with me in the weight or hardness of the Champion Swede, which resisted in a most remarkable way the effects of a frost, which on several nights during last winter winter was 10 or 12 deg. below zero of Fahrenheit.”

From Mr. GEO. TACH, *Elmstead Brook.*

Dec. 10, 1870.—“I have a first-rate piece of Champion Swedes, the best piece in Wivenhoe Parish; they are as round as balls, and as sound as rocks.”

From Mr. A. GUNTON, *Kentish Lane Farm.*

May 10, 1870.—“The Champion Swede is certainly the best I ever grew. I kept them perfectly sound and good until the middle of April this year.”

Suttons' Improved Champion Swede,
Price 1s. per lb.; cheaper by the cwt. or bushel.

Other sorts of Swedes from 9d. per lb.

Yellow and White-fleshed Turnips from 10d.
per lb., as see

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All Goods Carriage Free, except very small parcels.

Five per cent. allowed for cash payments.

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SEEDSMEN TO THE QUEEN, READING, BERKS.

WINDOW GLASS, SHEET LEAD, PAINTS, &c.

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IMPORTERS AND MANUFACTURERS.

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PORTABLE ENGINES, from 4 to 30-Horse Power.
THRESHING MACHINES, SINGLE, DOUBLE and TREBLE BLAST,
With Patent Rolled Steel Ribbed Beater Plates, and all other recent Improvements.

PATENT ROLLED STEEL RIBBED BEATER PLATES (Gray's Patent).

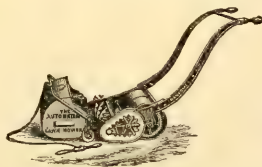


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These Plates have been thoroughly tested, and are found to wear more than three times as long as the Malleable Iron Plates previously in use. C. AND S. are prepared to supply Threshing Machine Owners and the Trade in any quantity; and they would caution purchasers against spurious imitations in Cast-steel, which, from their brittleness, are exceedingly dangerous to use. CAUTION.—Infringers of this Patent, whether makers or users, will be immediately prosecuted. CATALOGUES sent Free by Post on application to

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THE BEST, SIMPLEST, AND MOST DURABLE MACHINES.



They leave no ribs in the Grass, and are unsurpassed for keeping a Lawn or Croquet Ground in first-rate order.

They will either Collect the Cut Grass in the box according to the approved English method, or leave it on the lawn, by taking the box off.

They are fitted with the best wheel gearing, the best steel-edged knives, and hardened steel pivots and bearings.

5000 are now in use.

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HORTICULTURAL ENGINEERS,

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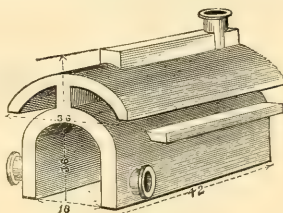
OF EVERY DESCRIPTION, FOR

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The great advantages of these Boilers are:—

The fire acting directly under the flow pipe, the water begins to circulate immediately.

The Flues all being formed by a continuous water-way, the fire and all the hot gases are brought in direct contact with the heat-absorbing surface of the Boiler, thereby



PATENT DOUBLE-ARCH BOILER.

TESTIMONIALS.

“DEAR SIR,—After using your Patent Double-Arch Boiler for the past 12 months, enables me to speak with a practical knowledge of its merits; and I have no hesitation in saying, out of many Boilers, of all sorts of construction, we have in use, it is the most efficient, and I believe it to be the best Boiler extant; neither do I think there is another that exposes so much surface to the direct action of the fire. Its efficiency, economy in fuel, and the minimum of attention, renders this Boiler a valuable improvement in Horticulture, and it reflects great credit on your good sense in designing it. I shall be glad to show the one I have in use to any person calling at Chatsworth. I remain, dear Sir, yours truly,
“THOMAS SEED.”

“DEAR SIR,—Your Patent Double-Arch Boiler, that you have put down for us lately, to heat the whole of our houses, answers admirably. Its heating surface exceeds all others which I am acquainted with. The small amount of fuel required, the way it is set, and the arrangement of soot-doors, renders it the most complete and economical Boiler I have had to do with.—Believe me, Sir, yours truly,
“W. H. RICE.”

“Mr. Ellis, Norfolk Foundry, Sheffield.

“The Gardens, Chatsworth, January 19, 1871.

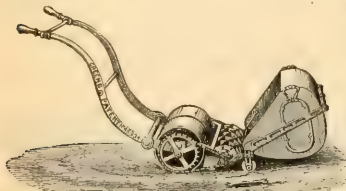
“Westbourne Gardens, Sheffield, October 27, 1870.

“W. H. RICE.”

Great Reduction in Prices for 1871,
OF
GREEN'S
PATENT SILENS MESSORS

OR
NOISELESS LAWN MOWING, ROLLING
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During the last few years our Machines have been submitted to numerous practical tests, and found to possess all the advantages in working and keeping a Lawn in the greatest possible state of perfection. We therefore have no alterations to report, as they are unnecessary.



The above Machines have carried off every Prize that has been given in all cases of competition.

They are warranted to be superior to any others. We guarantee them to give entire satisfaction, otherwise they can be returned, free of cost to the purchaser. With the increased facilities we possess for the Manufacture of Lawn Mowers, we are enabled to Sell them at a reduced rate on former years, as will be seen from the following Scale of Prices:—

To cut 8 inches ..	Price £2 10 0	
" 10 .. ..	.. 3 0 0	Can be worked
" 12 .. ..	.. 4 0 0	by one person.
" 14 .. ..	.. 5 0 0	
" 16 .. ..	.. 6 0 0	This can be worked
" 18 .. ..	.. 7 0 0	by one person on an
" 20 .. ..	.. 7 10 0	even Lawn
" 22 .. ..	.. 8 0 0	By Man and Boy
" 24 .. ..	.. 8 10 0	"

T. GREEN & SON have pleasure in announcing that the demand for their Lawn Mowers this season far exceeds all previous ones, and from this fact they are led to believe that the machines of their manufacture are held higher in the estimation of the public than ever.

Prices of HORSE, PONY, and DONKEY MACHINES on application.

Repairs executed with efficiency and despatch, both at Leeds and London Establishments.

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CRICKET FIELDS, and GRAVEL PATHS,
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PRICES OF HAND ROLLERS.

diameter.	Length.	L s d	Diameter.	Length.	L s d
0 in.	32 in.	7 10 0	20 in.	22 in.	3 10 0
4 in.	26 in.	4 10 0	16 in.	17 in.	2 15 0

PRICES OF ROLLERS, fitted with Shafts,
Suitable for Pony or Horse-power.

Diameter.	Length.	L s d	Diameter.	Length.	L s d
30 in.	32 in.	10 0 0	30 in.	60 in.	15 10 0
30 in.	36 in.	10 15 0	30 in.	72 in.	17 10 0
30 in.	42 in.	11 15 0	30 in.	84 in.	19 10 0
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These ROLLERS possess many advantages over all others; they are made in two parts, and are free to revolve on the axis, affording greater facility for turning, and the outer edges are rounded off, or turned inwards, thus avoiding the unsightly marks left by other Rollers. They are manufactures of the best materials, and are got up in a manner surpassing any ever yet brought out.

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PRICES.

24 inches by 26 inches	£4 0 0
20 .. 22	3 2 6
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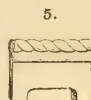
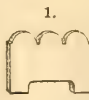
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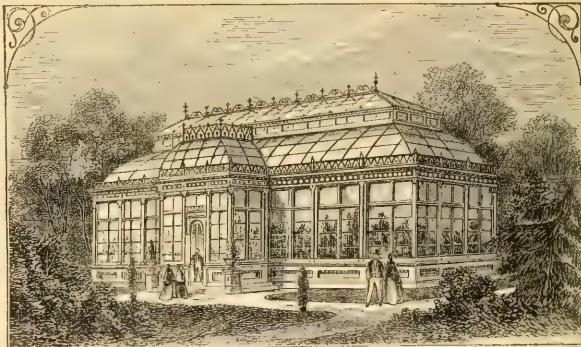
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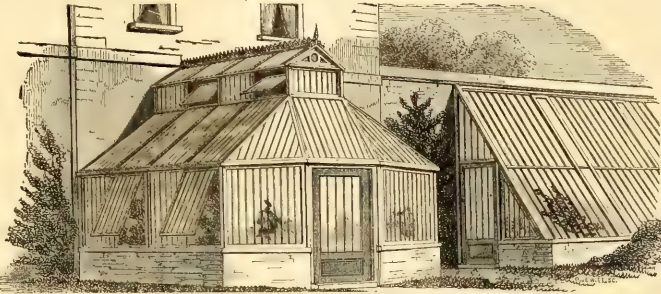
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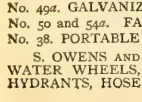
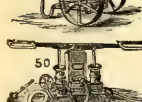
2½ inches	..	£1 9 0
3	1 18 0
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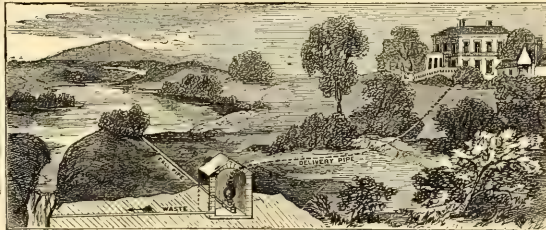
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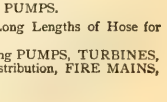
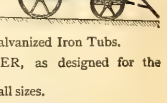
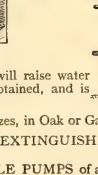
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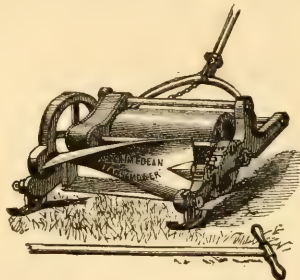
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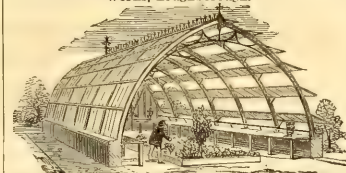
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907-inch, 908-inch, 909-inch, 910-inch, 911-inch, 912-inch, 913-inch, 914-inch, 915-inch, 916-inch, 917-inch, 918-inch, 919-inch, 920-inch, 921-inch, 922-inch, 923-inch, 924-inch, 925-inch, 926-inch, 927-inch, 928-inch, 929-inch, 930-inch, 931-inch, 932-inch, 933-inch, 934-inch, 935-inch, 936-inch, 937-inch, 938-inch, 939-inch, 940-inch, 941-inch, 942-inch, 943-inch, 944-inch, 945-inch, 946-inch, 947-inch, 948-inch, 949-inch, 950-inch, 951-inch, 952-inch, 953-inch, 954-inch, 955-inch, 956-inch, 957-inch, 958-inch, 959-inch, 960-inch, 961-inch, 962-inch, 963-inch, 964-inch, 965-inch, 966-inch, 967-inch, 968-inch, 969-inch, 970-inch, 971-inch, 972-inch, 973-inch, 974-inch, 975-inch, 976-inch, 977-inch, 978-inch, 979-inch, 980-inch, 981-inch, 982-inch, 983-inch, 984-inch, 985-inch, 986-inch, 987-inch, 988-inch, 989-inch, 990-inch, 991-inch, 992-inch, 993-inch, 994-inch, 995-inch, 996-inch, 997-inch, 998-inch, 999-inch, 1000-inch, 1001-inch, 1002-inch, 1003-inch, 1004-inch, 1005-inch, 1006-inch, 1007-inch, 1008-inch, 1009-inch, 1010-inch, 1011-inch, 1012-inch, 1013-inch, 1014-inch, 1015-inch, 1016-inch, 1017-inch, 1018-inch, 1019-inch, 1020-inch, 1021-inch, 1022-inch, 1023-inch, 1024-inch, 1025-inch, 1026-inch, 1027-inch, 1028-inch, 1029-inch, 1030-inch, 1031-inch, 1032-inch, 1033-inch, 1034-inch, 1035-inch, 1036-inch, 1037-inch, 1038-inch, 1039-inch, 1040-inch, 1041-inch, 1042-inch, 1043-inch, 1044-inch, 1045-inch, 1046-inch, 1047-inch, 1048-inch, 1049-inch, 1050-inch, 1051-inch, 1052-inch, 1053-inch, 1054-inch, 1055-inch, 1056-inch, 1057-inch, 1058-inch, 1059-inch, 1060-inch, 1061-inch, 1062-inch, 1063-inch, 1064-inch, 1065-inch, 1066-inch, 1067-inch, 1068-inch, 1069-inch, 1070-inch, 1071-inch, 1072-inch, 1073-inch, 1074-inch, 1075-inch, 1076-inch, 1077-inch, 1078-inch, 1079-inch, 1080-inch, 1081-inch, 1082-inch, 1083-inch, 1084-inch, 1085-inch, 1086-inch, 1087-inch, 1088-inch, 1089-inch, 1090-inch, 1091-inch, 1092-inch, 1093-inch, 1094-inch, 1095-inch, 1096-inch, 1097-inch, 1098-inch, 1099-inch, 1100-inch, 1101-inch, 1102-inch, 1103-inch, 1104-inch, 1105-inch, 1106-inch, 1107-inch, 1108-inch, 1109-inch, 1110-inch, 1111-inch, 1112-inch, 1113-inch, 1114-inch, 1115-inch, 1116-inch, 1117-inch, 1118-inch, 1119-inch, 1120-inch, 1121-inch, 1122-inch, 1123-inch, 1124-inch, 1125-inch, 1126-inch, 1127-inch, 1128-inch, 1129-inch, 1130-inch, 1131-inch, 1132-inch, 1133-inch, 1134-inch, 1135-inch, 1136-inch, 1137-inch, 1138-inch, 1139-inch, 1140-inch, 1141-inch, 1142-inch, 1143-inch, 1144-inch, 1145-inch, 1146-inch, 1147-inch, 1148-inch, 1149-inch, 1150-inch, 1151-inch, 1152-inch, 1153-inch, 1154-inch, 1155-inch, 1156-inch, 1157-inch, 1158-inch, 1159-inch, 1160-inch, 1161-inch, 1162-inch, 1163-inch, 1164-inch, 1165-inch, 1166-inch, 1167-inch, 1168-inch, 1169-inch, 1170-inch, 1171-inch, 1172-inch, 1173-inch, 1174-inch, 1175-inch, 1176-inch, 1177-inch, 1178-inch, 1179-inch, 1180-inch, 1181-inch, 1182-inch, 1183-inch, 1184-inch, 1185-inch, 1186-inch, 1187-inch, 1188-inch, 1189-inch, 1190

A Great Reduction in Price.

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PETUNIA PRINCESS LOUISE.—A magnificent new double Petunia, of a soft crimson colour, blotched with purest white, giving it a most striking and attractive appearance. Double, Zonale and Nonpareil; Colours: Versicolor, Golden, and Heliotropes, Lobelia, Pyrethrum (Golden), Iresines, &c., all in single pots, handed out, package free. A LIST, with prices, free on application to the Trade.

H. BADMAN, Egham Road Nursery, Lee, S.E.

STRONG BEDDING PLANTS, by the dozen, 100, or 1000.—Golden Tricolors, Gold and Bronze, Silver Variegated, Double, Zonale and Nonpareil; Colours: Versicolor, Golden, Heliotropes, Lobelia, Pyrethrum (Golden), Iresines, &c., all in single pots, handed out, package free. A LIST, with prices, free on application to the Trade.

W. POTTEN, Seedman and Florist, Sissinghurst, Staplehurst, Kent.



Carter's Bedding Plants.

JAMES CARTER AND CO.'S LIST of BEDDING and other PLANTS is now ready, and may be had gratis and post free on application to **JAMES CARTER AND CO.**, Seed Growers and Nurserymen, 27 and 28, High Holborn, London, W.C.

CALCEOLARIA (Herbaceous), strong blooming plants in 12, and 5 inch pots, at 6 to 10 sh. per dozen. **Bicolors**, **Tricolors**, **Golden**, **White**, **Princess**, **Orange**, **Shirley**, **Spur**, **Sultan**, **Superb**, **Golden**, **King**, **Sarflina**. Plants established and from cuttings, pots from 10 to 12 sh. 6d. according to the quantity and sort wanted.

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VERBENA—Purple, White, Scarlet, Rose, Crimson, &c., at 6 sh. per 100, 60 sh. per 1000, in single pots, 12 sh. per 100.

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New Californian Plants.

DELPHINIUM NUBICATUM.—Splendid new Scarlet-flowered

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Yellow-flowered species.

W. THOMPSON, SEEDSMAN, Tavern Street, Ipswich, respectfully announces that he is now sending out

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Mr. J. Chater, Cambridge. Messrs. A. Henderson & Son, Edgware Road, N. W.

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HAVE THE PLEASURE TO ANNOUNCE THAT THEIR

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For the present season, comprising a LIST of the BEST NOVELTIES, as well as a selection of the most approved kinds in general cultivation, IS NOW READY, and will be sent Post Free on application.

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First-class Certificate, Special Certificate, and Extra Prizes.

In fact, all the honours New Plants can receive at the hands of

THE ROYAL HORTICULTURAL SOCIETY.

ALBERT VICTOR, 10s. 6d.; LADY LONDESBOURGH, 10s. 6d.;

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The Three for 31s. 6d.

For robust constitution, exquisite shape, size, texture, freedom of flowering, and colour they are unequalled. Coloured Plates of the Set, 1s. 6d.

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CRIPPS' PERPETUAL BLOOMING HARDY HYBRID CLEMATISES.

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A new hardy tree, with immense leaves of a rich golden hue, invaluable for landscape or subtropical purposes. 21s. each.

LOBELIA PURITY.

A large-flowered snow-white variety, possessing every quality necessary for bedding-out or edging. 3s. 6d. each.

For further descriptions of the above Novelty, Testimonials, &c., vide page Advertisement in Number for April 29.

Coloured Drawings of the Catalpa or either of the Clematises, with Descriptive Lists, may be had by post for 12 stamps of THOMAS CRIPPS AND SON, NURSERYMEN, TUNBRIDGE WELLS.

NEW INTRODUCTIONS FOR 1871.

J. LINDEN

BEGS TO ANNOUNCE THAT

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Stove Plants.		Greenhouse Plants.	
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SPHEROCYNE IMPERIALIS	10 12 0		
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One Plant over if three are ordered.

The NEW GENERAL CATALOGUE, with full descriptions of these plants, can be had on application to J. L. AGENTS IN LONDON—MESSRS. R. SILBERRAD AND SON, 5, HARP LANE, GREAT TOWER STREET.

J. LINDEN, ESTABLISHMENTS for the INTRODUCTION of NEW PLANTS, at BRUSSELS, and GHENT, BELGIUM.

We look upon *Pinus insignis* and the *Laurustinus* as a sort of vegetable thermometer, revealing to us, by unmistakable signs, the severity or otherwise of the preceding winter. The result of many years' observation is to the effect, that neither of them can endure more cold than from 20° to 25° Fahr. Let the thermometer touch zero, and, unless well protected, away they go. Hence the former is severely crippled and browned, if not killed outright, and the latter has been killed to the ground, this winter. It was the same in the winter of 1859-60.

Even loose straw jackets, while they have saved the life of *P. insignis*, have not proved sufficient to prevent its grass-green leaves from being browned, as with the breath of fire. In regard to the *Laurustinus*, the fact that the nearer the ground the greater the injury, is seen everywhere. Young plants, as a rule, are dead to the ground line. We have seen many large old plants that have escaped with the petrification of their opening flowers into withered buds; and others, slightly overshadowed with taller shrubs, blooming as usual.

We have also heard of a good many *Rhododendrons*, with scarlet blood in their veins, not only losing their early flowers, which is a common occurrence, but their leaves likewise—the latter, looking and feeling as if they had been seared with a hot iron.

We invite our readers to record their observations and experience on these and other cognate subjects. To increase the usefulness of their information, each observer should state the country or county he hails from, and such general facts concerning the conditions surrounding the plants as have already been indicated. Thus failures with certain trees and shrubs, and the measure of success with others, would furnish useful data to all future planters, instructing them by the best of all teachers—example, what to choose and avoid in different localities.

The value of such practical notes would be further increased if the extent and modes of protection adopted to carry such tender subjects as *Pinus insignis* through the winter in cold localities, were also given.

— In the permanent horticultural exhibition, in connection with the International Exhibition at South Kensington, there is but little change to note this week. Visitors will find that Messrs. CARTER & CO.'s large case of seeds is now complete. Beside the seeds, which, in all cases, excellent samples are shown, properly labelled—they have also a good collection of dried grasses, useful as illustrating the growth and character of the different kinds. Amongst the horticulturists proper there is nothing particularly new to remark, the Indian court is not yet removed from the entrance, but as a fresh site has been selected in the spare ground adjoining, it will no doubt find a suitable resting-place in a few days. The flowering plants are kept very fresh, considering the positions in which they are staged, and the efforts which the competing nurserymen are making to give character to this feature does them great credit. It may be worth while pointing out a plant which will be in full flower next week in the collection from Messrs. STANDISH & CO., and which will we think be heard of to greater advantage on a future occasion. It is a hybrid *Rhododendron*, between *Thomsonae* and *Blandyanum*, the latter being a seed-bearing parent. It is held to produce a better tree than both of its parents, and its flowers are probably of the deepest shade of crimson-scarlet of any variety at present in cultivation.

— The following extra prizes are offered at the Autumn Show of THE METROPOLITAN FLORAL SOCIETY, to be held at the Crystal Palace on August 29 and 30:—

By Mr. JOHN KEYNES, Salisbury, for the best 12 Blooms of Dahlias (distinct), sown sent out by him in 1870 and 1871, 1st prize, 25s.; 2d, 10s.; and 3d, 5s.
By the Rev. F. HAVARD, Nottingham Rectory, for the best seedling Hollyhock (1 bloom), 1st prize, 10s.; 2d, 7s.; 3d, 5s. The same variety can only take one prize.

— THE SPRING FLOWERS at the Hale Farm Nurseries, Tottenham, are just now in great beauty, the great bulk of this class of plants being in full flower. Those who are commencing to get together a collection of these hardy gems, either for their individual intrinsic merits, or for decorating the spring garden by using them in large quantities, should not miss this grand opportunity for taking and comparing notes, as it is only by these means that successful contrasts are obtained. The following, amongst many others, which we saw a few days ago, are real gems of their kind, and should find a place in every garden where there is any pretension to completeness in this respect.—*Ornithogalum umbellatum*, which grows about 8 inches high, produces large umbels of white flowers, and makes a fine bed; *Scilla hyacinthoides*, a grand plant for massing, with flowers of a pleasing soft blue colour; its full beauty is not obtained, however, until it has thoroughly established itself; *Lithospermum*

prostratum is another deep blue flowering plant, which produces a great profusion of blooms when planted out, but it is very difficult to grow well in pots; *Arenaria grandiflora*, sometimes called *montana*, is one of the very best white-flowered rock plants; when thoroughly established its blooms are as large as a florin; *Cortusa Matthioli*, red, is much like a *Primula*, and is very showy in a shady spot, in which position it should always be planted; *Alyssum orientale* is one of the finest of its class, very dwarf and free flowering, the blooms being large and of a bright yellow colour; *Iberis conifolia* stands next in importance to *I. Gibraltarica*, its flowers are very large and pure white. Of *Phlox frondosa*, P. Nelsoni, and P. stolonifera we never saw such sheets of bloom, their compact habit and the density of their exquisite flowers arresting the eye a long distance off. Another plant which we observed here, and which we think is worth calling attention to, is *Genista precox*, also known as G. sulphurea. The plant is hardy, makes nice bushy specimens in pots for greenhouse work, and at this season becomes literally covered with yellow leguminous flowers.

— Some short time since we received from Dr. BENNETT of Sydney a drawing of a TREE FERN, *Alsophila excelsa*, with a BRANCHING CROWN, which drawing we now reproduce. As Ferns do not produce axillary buds, we can only attribute the present case to a forking of the growing point, or to the development of an adventitious bud,—the consequence, as it would seem, of an injury during growth.



FIG. 122.—ALSOPHILA EXCELSA

— A course of eight lectures upon ECONOMIC BOTANY, with especial reference to Vegetable Substances used for Food, will be delivered by Professor BENLEY, in the Museum in the ROYAL BOTANIC SOCIETY'S Gardens, Regent's Park, commencing on Friday, May 12. They will be open to Fellows and Members of the Society, and to bearers of ivory tickets, or the ordinary orders of admission to the gardens.

— In the last number of the *Floral and Pomologist* we find the following description of *Coccol Weddelliana*, (the beautiful Palm figured in our volume for 1870, p. 494, under the name of *Leopoldina pulchra*), by Mr. WENDELL, of Herrenhausen, who further observes—"This beautiful Palm was discovered by Dr. WEDDELL in 1831, on the southern slopes of the Sierra dos Organos, in Brazil, and subsequently by RIEDEL in 1832, in woods near Macaé. I have seen specimens gathered by both travellers. It was introduced to the Belgian gardens in the beginning of the last decennium, by M. LOUIS VAN HOUTTE, of Ghent, and some years afterwards was imported by M. LINDEEN, of Brussels, and distributed under the name of *Leopoldina pulchra*, a genus with which it has nothing whatever to do. At a still later date it appeared under the name of *Glazioua elegantissima*. I am informed that MARTIUS considered it as constituting a new genus, and that to him the name of *Glazioua* is to be referred, but I can see no difference between it and *Coccol*. Mr. WENDELL's description is as follows:—"*Coccol Weddelliana*, Wendl. MS.—Plant 6'—10'; trunk very slender, 4'—6'; leaves 3'—4', covered with blackish-brown scales; the segments or pinnae 50—60 on each side, very narrow linear, obliquely pointed

dark green, silvery beneath, 8" long, 4" broad. Spadices 2'—3', erect, with two sheaths, the outer one 6' long, the inner one 2'—3'; peduncle of spadix compressed upwards, 30—50 branched, the branches patent, several inches long, very slender. ♀ flowers 6—10 on the lower half of each branch, ♂ in the upper part germinate, or one on each side of the ♀, but these shortly pedicelled. ♂ calyx, very small, almost triphyllous; sepals lanceolate 4" long, petals three, stamens six. ♀ calyx, very small, almost triphyllous; sepals much alike, the latter larger, apically-acuminate (like a spur); annulus of stamens, very short; ovary ovoid; stigmas three-parted. Fruits unknown to me. Nuts (if correctly referred here), nearly globular, small, three-celled."

— In relation to the NOTTINGHAM EXHIBITION we learn that a memorial, circulated by Messrs. BELL & THORPE, is to be addressed to the Exhibitors' Committee of the Royal Horticultural Society, protesting against the published arrangements for the forthcoming show, so far as regards the inclusion of two Sundays in the time of exhibition; "it being impossible for the exhibitors in the larger classes to unpack and stage, repack and return, without necessitating a great amount of work on both the days before-mentioned." It is urged that some concession, by which *emphases* may be relieved from labour on one of the two Sundays, should be made; and it is suggested that Saturday, July 1, might be struck off, so that the show should close on the Friday night. No doubt the committee will give so important a matter due and impartial consideration.

— We have received from Messrs. CRIPPS & SON, of Tunbridge Wells, some beautiful illustrations of their HARDY HYBRID CLEMATIS, which were introduced to public notice as far back as August, 1866, and which, they state, commence blooming towards the end of May, and continue in flower until the buds are destroyed by frost. They consist of the varieties named Lady Caroline Nevill, which has fine well-formed, languiosus-like flowers, from 6 to 7 inches in diameter, of a delicate lavender, with a broad purplish lilac longitudinal band in the centre of each petal, and the foliage and growth of *languiosa*; Star of India, which has flowers 4 to 5 inches in diameter, of a rich violet-purple, with a rosy-purple band in the centre of each petal, and the foliage and growth of C. Jackmanii; and Tunbridgensis, which has flowers 4 to 6 inches in diameter, of the most perfect form, dark blue, shaded with purple, the midrib dark purple; this is also said to be of the Jackmanii class, and a very abundant bloomer. They are all very fine flowers. With them also came an illustration of *Catalpa syriacifolia*, a hardy ornamental-foliaged tree, with the same robust growth and habit as its parent, but with foliage of rich glossy yellow—not a pale sickly straw colour, but a deep golden yellow, suffused with green near the principal veins, as in the *Pyrethrum Golden Feather*. Planted in the fall sun, the leaves turn a beautiful yellow, which becomes far more satisfactorily developed than in a shady situation, and the leaves will neither curl nor burn, as is the case with many yellow-leaved and variegated plants. It is a seedling, which originated on the Continent three years ago, and has remained quite true. As we have already remarked, should it permanently retain this golden hue, it will, from its free growth, and the broad surface of its leaves, make a grand pictorial tree in landscape scenery.

— That the DISASTERS which have befallen FRANCE are in a great measure the consequence of the abstention of the best intellects of the country from participation in political affairs for some years past, is an opinion held by many on this side of the Channel. Lately, according to *Nature*, M. HENRI SAINT-CLAIRE DEVILLE has addressed a communication to the Academy of Sciences of Paris, in which he attributes the recent successes of the Germans to their more thorough pursuit of science as compared with the French. "Aussi dit on de tous côtés, et avec raison, que c'est par la science que nous avons été vaincus." The remedy proposed by M. SAINT-CLAIRE DEVILLE is that all questions concerning the advancement of science or its tuition should be discussed in the Academy apart from all questions of administration, politics, or finance, which latter he fears the free development of science, and act like "red tape" in strangling it. We fully agree that the best intellects, whatever be their special faculties, should be devoted to the service of their country.

— Some years since we received from Cornwall, through Mr. PHILLIPPS, some tubercle bodies which were found in abundance in a Mushroom bed. The tubers evidently belonged to the spurious genus *Sclerotium*, and as we were anxious to ascertain of what Fungus it was the resting form, Mr. CURREY kindly undertook to watch their development. They were accordingly planted in December in damp sand and covered with a bell-glass, and by the end of March the receptacles appeared above the sand and perfected their fruit. A figure was published in the 24th volume of the *Linnean Transactions*, under the name of *Xylaria voparia*, Berk. Mr. HENRY MILLS has now forwarded us a perfect specimen of the plant figured in this journal (p. 482) under the name of *XYLARIA PEDUNCULATA*, and it is, as we suspected, Mr. CURREY's plant. A comparison of his figure of the fruit, which precisely

As regards land improvement, as in other matters like produces like, poor land will make but a poor garden, farm, or plantation; therefore, in order to garden, farm, or plant with profit, the first consideration must be to have the soil in good tilth by draining and working it well, so as to render it capable of being benefited by the introduction of air, water, and manure. Deep culture is now the order of the day, steam-power, in the case of farm land, effecting this most satisfac-

torily, and deepening the soil to a greater extent than ever was done before.

Under this mode of breaking up the earth's crust, together with draining and manuring, the efforts of Nature to produce good crops are greatly assisted, plant food being generated in greater abundance than it otherwise would have been, and owing to the complete pulverisation of the soil through perfect tillage, it becomes an efficient deodoriser, acting in this respect in a manner similar to the pounded clay and ashes which the Rev. Mr. Moule employs in his patent earth closets. Town refuse may thus be converted into valuable plant food, and the value of the operation, in a sanitary point of view, can scarcely be over-rated. Unproductive land might thus be rendered fertile, as when properly broken up and drained, sewage water would pass through it freely, the useful particles in it being retained, while that which is useless would be carried off by the drains.

Soil having been thus brought into good condition, a little skill can induce it to produce anything suitable to our climate, whether it be grass, corn, timber, flowers, or fruit. But, as we have already stated, the foundation of good and permanent cultivation is labour, in order to bring to the surface earth's hidden treasures for the purpose of supplying our wants. Land neglected becomes a waste, rendering the district in which it occurs unhealthy and unfruitful. Without care, even rich land may become poor, wet, and cold, and thus rendered unfit for vegetation.

Cheap ground work may in all cases be termed bad cultivation. The Fens of Lincolnshire were at one time little better than a waste, unattractive and unhealthy; now, by means of drainage and proper cultivation, they have been converted into some of the best corn and meat-producing districts in England. In them the harvest is now nearly a month earlier than it used to be, showing the value of deep tillage for allowing sun and air to act upon the land, converting its once dormant elements into food. This is an instance in which land once good for nothing has been brought into the highest possible state of cultivation. Other examples in the same direction might be adduced, and in every case improvement might be traced to the same principles of action, viz., deep drainage and deep working of the soil. The way is thus prepared for the better growth of plants, and the soil being heightened in temperature, the productions of even warmer climes are thus so acclimatised, so to speak, as to be quite at home, while under less favourable conditions they would have perished. Labour, then, is capable of improving even naturally bad lands, and it is said that if a man can make two blades of grass grow where only one grew before, he is a benefactor to his country. If the elements of plant food lie from 18 inches to 2 feet below the surface, should we be right in cultivating only 6 inches in depth? Assuredly not. Would the miners who dig for gold, silver, or copper rest contented with merely turning over the surface if it yielded nothing? They would persevere until the strata in which the precious metals were reached. In like manner should cultivators of the garden as well as of the farm proceed, going deeper and deeper with each succeeding till, until all is yielded by the land which it is capable of producing. In poor lands our landscapes are destitute of fine trees; nearly everything, in short, which is beautiful in a country in the way of vegetation depends on the improvement of the soil by means of human skill. The thin beds of mould the more manure may be applied to them without waste, and if well drained, the more rain that quickly passes through the better, inasmuch as in that way the deposition of plant food will be sure to be the result. Opposite conditions, as a matter of course, produce contrary results. Waterlogged land will neither admit air nor solar warmth.

Time was when earth, air, fire, and water were considered to be the only elements in Nature. Now their number is known to be upwards of half a hundred, and to unearth these, or some of them, for the maintenance of plant life, and again to replace them, requires all the skill of which cultivators are possessed. It is this skill, or the want of it, which makes good gardeners and farmers, or bad ones. One man may farm and garden to the same extent as another, employ the same amount of labour, and pay the same rent, yet be poor, while his neighbours get rich; a result which wholly depends on the comparative amounts of cultural knowledge brought to bear on the matter. Good cultivation, therefore, wholly depends on well-directed labour. *Joseph Newton, 74, Oxford Terrace, Hyde Park.*

NEW CROTONS.

OUR illustration (fig. 123), for which we have to thank Messrs. Veitch, represents one of the beautiful varieties of Croton (Codicium) variegatum, so many of which were introduced by the late Mr. J. G. Veitch. Some time ago we gave a monograph of these varieties, referring

ground with bearing wood, and the fruit hanging like ropes of Onions, which may be easily imagined from well-cultivated trees.

Some few years ago this estate changed hands, and those once fine fruitful trees were entirely neglected, and ran wild. The leading shoots ran up to a great height, and became utterly unfruitful—reminding one of the old by-word of planting Pears for your heirs—reaching the ground on all sides. The exuberant growth of the leading shoots soon drew away all the support from the lower parts of the trees, causing them to become barren and unhealthy. The proper situation for them in this runaway state would have been an orchard instead of a kitchen garden, where in course of time they could, with a little attention to thinning, expand their growth, and ultimately become fruitful.

Nicely-trained trees, connected with a garden, give the whole a dressed and ornamental appearance, although upon the whole they seldom give off the quantity of fruit in proportion to that borne by fruit trees in a well-managed orchard in our fruit counties. But to return to the subject in question. The Pear trees, which had run rampant and wild, were again, in the course of time, brought back to a state of subjection, by heading them down to their pristine form, with the assistance of mechanical aid; but the same force mechanically applied could not bring back all at once the fine bearing spurs which were at one time the then superintendent's pride and study; but now, under the circumstances, to get them into their previous state of fruitfulness is only a question of time and practical skill. The trees were headed down about ten years previous to their coming under my management. Apparently, from the appearance of the pruning, they bore better crops of breast-wood than fruit. These trees were in the utmost vigour, with shoots in abundance to work upon. After due consideration, I could only see two courses which I could pursue with the said trees to bring them again to their former state of fruit-bearing—either to adopt root-pruning, or to introduce some of the young and healthy shoots amongst the barren spurs. As to commencing root-pruning at once, I did not consider the trees were in a proper state to do so.

Root-pruning such trees often throws them into ill-health, and it is some time before they get over it; at all events, in the first place I made up my mind to furnish the trees with a fresh stock of young shoots, and afterwards, if I found that was likely to fail in bringing the trees into a state of fruitfulness, I could then adopt root-pruning as a last resort, when I had got the trees well arranged with young wood.

In the meantime, it being the month of July, knife in hand I went carefully over the trees, thinning them, cutting away all useless and unnecessary wood, reserving the best-situated shoots for winter training, and by so doing I admitted the daylight better into the trees, which is in itself of the utmost importance in connection with fruit cultivation. Again, when the leaves were gone, with the winter pruning I thinned the trees still farther, to get them prepared for training, by cutting neatly away all snags and superabundant shoots, leaving the after-born well-placed shoots for tying down. By the original training of the trees no stakes nor ironwork was required; the old or first tied-down shoots served as the framework to fasten the new fleece of young shoots, with some strong thin string tied tight to the extreme ends of the shoots, pulling them down into position, and fastening them in a ship-shape order all round the trees, until each and all of the trees had a fresh lot of young wood tied in from top to bottom.

Now, as to the result of this pruning and bending down of shoots some will be apt to say, it will pay for all this trouble and expense, &c. ? why not root them out and get fresh ones? I answer, No; as they are all of good and useful kinds, in a state of robust health, all



FIG. 123.—CROTON ANGUSTISSIMUS.

them as far as possible to the already published types. The present variety, *C. angustissimus*, is one of the most elegant, from its very long narrow drooping leaves, giving the plant the appearance of a cascade of molten gold. We have called it *angustissimus*, as having the narrowest leaf of any that we are acquainted with. In some establishments it, or one extremely similar, is called *C. angustifolium*, but the true *C. angustifolium* has considerably broader leaves, but of the same drooping habit.

HOW TO BRING NEGLECTED PEAR TREES TO A FRUITFUL STATE.

WHEN I took charge of these gardens about seven years ago, I found a quantity of unfruitful standard Pear trees round the borders of the cropping quarters, which were planted upwards of 40 years ago. For some time after they were planted, great pains apparently had been bestowed on the training of them upon the tying-down system. While the trees were young and properly attended to, I am told by those who have seen them in full fruit that they were an object of great admiration, for their systematic training—grown to the height of 9 feet or 10 feet, with about 7 feet diameter, well furnished from the crown down to the

they require is a proper system of cultivation. Young trees might have been planted, and after a few years neglect they would be found to be in the same position of unfruitfulness as those I have had to contend with. During their first season's growth a few of the trees made little or no wood, only forming a mass of newly laid-in shoots, with a good sprinkling of fruit buds at or near the points of the tied-down shoots, which gave us to understand that we had been working in the right direction upon those trees. By the second season we had the pleasure of witnessing a nice sprinkling of clean, healthy fruit, which, by the way, was some recompense for our pains, instead of the previous bareness. By the third season the trees were in a full state of fruitfulness, and I have been the beneficiary no less ever since, and, instead of being obliged to root-prune, as I once imagined, two years ago I gave each tree about three barrowfuls of well-rotted cow manure, which had a marked effect both on foliage and fruit during the last season. And now at this time, after being pruned and regulated, from the plumpness of the fruit buds they show well for a good crop next autumn, if all off with frost in the autumn, and the best way of protection from frost, I have hitherto tied them all over with the common Laurel boughs, and allow them to remain until I think the frost has gone for the season. In a general way, all that the trees require now is a proper system of summer pinching, by keeping down all rampant growths, and plenty of good fruit is the return for the extra cultivation.

To show you how well my tying-in of the young wood has acted upon the old barren trees, I send you an old barren branch or two, with two or three of the young shoots in full flower, for your examination. *J. Miller, Workshop Manor, in the "Field."*

BOTANY FOR BEGINNERS.—VI.

THE Lilac (*Syringa*) is so common and so beautiful an ornament of our gardens at this season of the year, that the beginner will have no difficulty in procuring a specimen wherewith to follow our description. For our present purpose it matters not which species or variety be chosen. It is a curious circumstance that the native country of our common Lilac is not known with certainty, but Hungary, Central Asia, and the Napalese Himalaya, are known to be the sources of the older and less common kinds. Quaint old Parkinson tells us that the "Blew Pipe tree grows in Arabia," and Matthioli thinketh, that had it from Constantinople. Judging from what we know of the climate of Arabia, it would seem very unlikely that so hot and dry a country should be the source of our hardy "Lilac." We question, also, whether any one now-a-days would know what the Pipe tree was, though in Parkinson's time it was called "of all in English the blew pipe tree." It is also," says he, "called *Syringa* from the Greek *syngre*, a pipe," because it cometh nearest unto those woods which from their pithy substance were made hollow into pipes."

Probably the trumpet-like form of the blossoms furnishes a better explanation of the name. The Lilacs are all shrubs or bushes, not making one main trunk like a tree, but having several, all of about the same dimensions, proceeding from near the root. Number here compensates for size, and as we would constantly wish principles to be borne in mind in reading these papers, so we take the opportunity, *en passant*, to point out to the beginner the universality of this principle of compensation throughout creation, and in accordance with which if one part be large another is small, to preserve the balance, and so forth. The Lilacs, too, have the habit of sending up suckers from the root, or from those portions of the stem below the surface. These suckers differ in no material manner from other adventitious buds, except in their production below the ground. It is worth while also to note the rapidity with which the shoots of the Lilac are developed. A week or two ago and the buds were hardly unfolded, now shoots 5 or 6 inches long are to be met with. The observer will find that the principal growth, in length at any rate, of the shoots of our tree and bush, is in the early spring, and within a comparatively short space of time, as if the tree made haste to "make its growth," as a gardener would say, in order that the tender shoots might be well consolidated or "ripened" by the summer's sun and light. For this ripening of the wood the French use the significant word *aouté*, the heat and sun of August (*Août*) being especially favourable for these shoots.

If the beginner will examine these now rapidly growing shoots, he will have no difficulty in seeing that the growth in length of the shoots takes place mainly at their points. The shoots lengthen in consequence of the activity of the *growing point*, which forms, in this case, the apex or tip of the shoot. Then he can hardly fail to notice the regularity with which the stalks or leaves come off in pairs, one leaf of each pair *opposite* to the other, as before explained. Moreover, he will remark that the successive pairs of leaves cross one another at right angles, for instance, if the leaves in the lowest pair are directed to the right and to the left hand, the leaves of the pair next above are fore and aft. It is worth while attending to this easily observed fact, because precisely the same crossing or *decussation* takes place in the parts of the flower, where, however, it is less easily observed.

This *opposite* and *decussate* arrangement is, however, obvious enough in the inflorescence. The flower-cluster is made up of a great number of flowers, placed in pairs, the successive pairs crossing one another like the leaves.

The larger branches of the inflorescence have each a small leaf or bract at their base, but the smaller flower-stalks which immediately bear the flower have usually no bract at their base, or if present it is very minute. The flower of the Lilac is *complete*, with an inconspicuous *thalamus* and a double *perianth*, the outer or *calyx* consisting of four sepals *separate* at their tips, but *inseparate* below, and thus forming a shallow cup-shaped or bell-like tube; the inner *perianth* or *corolla* is four or five times as large as the calyx, lilac (or white) and sweetly scented. It is made up of four *petals*, *inseparate* below, and there forming a long tube or pipe (pipe-tree) *separate* above, and there forming a four-pointed star, whose rays when expanded are bent nearly at a right angle to the direction of the tube. This four-pointed star is the *limb* of the corolla, and with a little attention the pupil will see that its four segments *decussate* with those of the calyx just as the pairs of leaves do. Taking a single flower between finger and thumb of the left hand, let the pupil insert the point of his needle or pen-knife into the lower part of the corolla-tube, and with a rapid upward movement slit it up. By thus opening the flower (as at B, fig. 124) he will be enabled to see two stamens *inseparate* from the corolla-tube except as to their anthers. In consequence of this want of separation

of Mr. Worthington Smith's excellent illustrations, wherein the differences consist between the two plants.

The leaves are *opposite* and *decussate* in the Lilac; so they are in the Ash, though different in form. The flowers are arranged in a similar manner; the stamens are two in the Lilac, so they are in the Ash; the carpels are two in both, and the stamens and carpels are at right angles one to the other in both. True, in the common Ash there is no calyx and no corolla, but in another kind of Ash, both calyx and corolla are present, and arranged crosswise just as in the Lilac. Moreover, in the internal and in the more minute parts of the flower, the two plants differ by reasons so important to the life of the plant we call *essential*, such as the ovules or young seeds, the identity is complete.

The moral to be deduced from this is, don't trust to superficial appearances. There is no great resemblance superficially between the Lilac and the Ash, but essentially there is a close approximation. The showy corolla, in spite of all its beauty, is a less essential part of the organization than the other less gaily adorned parts, but on which the very life and perpetuity of the race depends. No uncommon case this in other organisms besides Lilacs and Ash trees. It may be added, in conclusion, that both Lilac and Ash belong to the same group of that of which the Olive forms the type, viz., Oleaceæ.

Home Correspondence.

Reversion of Mrs. Pollock Pelargonium.—It seems rather singular that in places so far apart as Kilkenny Castle, in Ireland, and Hardwicke, in Suffolk, the same symptoms of reversion have been so strongly marked this season. We rest on the chalk, and the water is strongly impregnated with lime, so much so that we dare not syringe Grapes nor other fruit, nor Camellia foliage, except at the risk of having them shelled over with a film of lime. We have also another characteristic in common with that specified by my old friend, Mr. John Douglas, viz., that many variegated plants hark back to the green hue. Hitherto, however, Mrs. Pollock has kept very true. This season the stock exhibited a large percentage of green plants. Perhaps my friend and neighbour, Mr. Grieve, the father of Mrs. Pollock, will inform us whether his stock has been equally inclined to retrograde this season. I have observed a similar unusual retrogression among Golden Chain—a variety pre-eminently distinguished in times past for its constancy. The late Chief Baron Pollock, who was a most zealous collector of variegated hardy plants, believed that the soil of his garden was particularly favourable to the production and perpetuation of variegation. [From personal experience in the same neighbourhood, and with similar soil, we greatly doubt this. Eds.] It is certain that several of these sports transferred to the gardens here, speedily ran back to their normal green. The influence of earth and manure on the production and perpetuity of variegation has not received the attention it deserves. Possibly Dr. Voelcker or some other eminent chemist might be able to throw new light on this most interesting subject. Mr. Grieve's great successes have been reached by a skilful commingling of blood of different coloured plants. As far as I am aware, he attributes no importance to soil, excepting so far as to agree with all cultivators, that an exceedingly rich soil or stimulating culture would be likely to send the colours back to their green. Other parents of green plants, however, are subject to variegation, though not so common, do, as we all know, happen; and we owe some of our best varieties to this power of sporting high colours. It would perhaps be impossible to grow a hundred plants of "Stella" without a variegated branch. Again, some sports cannot be perpetuated; last season I had some beautiful sports of the dwarf Argemone, which rooted and then died. And a year since a rich gold sport of the Cineraria maritima served me in the same tantalising way. The former was too white, the latter too richly golden to live, I presume. And yet why should not a golden Cineraria maritima thrive as well as a golden Fewer, or a silver Cineraria either, for that matter? Will some of our wise men, or my old schoolfellow, Mr. John Douglas, try to give the reason why? D. F. Fish.

Dinner-Table Decoration.—Under this heading (at p. 550) I feel some remarks from a correspondent to whom I feel that I ought to apologise for unwittingly using initials to which he has a prior claim. It is very polite of him to offer to subscribe himself "The Original W. T." I would, however, suggest that, as he is one of your veteran contributors, his initials should in future be printed in "wooden type," while mine might as appropriately appear in "bourgeois rustic." Meanwhile my obligations are due to "The Original" for lending a helping pen to a subject which seems to engage the attention of many besides ourselves, and I hope he will favour your readers with other notes and suggestions for the decoration of dinner and drawing room tables with flowers and foliage, naturally and artistically arranged in suitable vessels. He is evidently competent to give competent advice, and I trust he will not scruple to point out



FIG. 124.—INFLORESCENCE AND BRACTS OF LILAC.

A, Corolla seen from above; B, Longitudinal section through the flower; C, Transverse section through the corolla showing the attachment of the stamens and the 2-celled pistil (diagrammatic).

between the stamens and the corolla, when the one is pulled off the others go with it. This is a practical point worth attending to. In the Apple, which formed the subject of the last paper, the petals may be removed one by one without detaching the stamens. In the Lilac, moreover, the stamens are fewer in number than the segments of the calyx or corolla, not a very common occurrence. With the aid of his magnifying-glass, if his unassisted eye be as yet unable to discern it, the beginner will see the pistil in the bottom of the calyx-tube, and more readily if he will first pull off the corolla. The small oblong greenish body is the ovary, which tapers above into a long thread or style, which again ends in two yellowish divisions—the *stigmas*. The fact that there are two of these stigmas, indicates that the pistil is made of two carpels *inseparate* throughout their whole length, except the stigmas. A cross cut through the pistil will also show two cavities separated by a central partition, and the seed-vessel when ripe will split into two somewhat woody pieces.

Now, it is hardly likely that the beginner will see very much resemblance between the Lilac and the Ash (see p. 480, figs. 91-93); nevertheless, botanists put them in the same order. It may be well to point out some of the conspicuous points of resemblance between them, and the pupil will do well to find out for himself by comparison of actual specimens, or from an exam-

* The explanation of these terms has been given in former articles.

errors and mistakes in opinions and in practice whenever the occasion offers. The only glass baskets that I have used have handles, and are made of opal glass, and of the form now commonly seen inverted on the heads of ladies and generally designated "Gipsy Hats," the brim being turned up at the sides and curved down in front and behind. These I find very useful for fruit. Flowers, also, look well in them when arranged as explained by "The Original W. T.," but in less artistic hands they are (like the well-known March flower-glasses) very liable to result in a bungle and a mess. I should be glad to know where other forms and sizes of glass-baskets can be bought: Buyers must be careful to avoid those made of blue, yellow, or green glass: opal, ruby, and flint (which are the technical terms for white, red, and clear glasses respectively), are the best colours for floral arrangements. *W. T.*

A Bee-catching Bat.—As I was busily employed in the garden, a few days ago, my attention was drawn to a bird (as I thought) catching flies, near a flowering shrub. I watched it for some time, and, thinking that it was an uncommon bird, I approached it to see what it really was. It proved to be a bat, busily catching and eating bees resembling wasps—I believe they are called nomade bees. This was in the middle of the day, with the sun shining brightly. I stood a few feet from it, and saw it catch several and eat them, by clinging to the trunk of a tree close by. I never remember hearing of anything of the kind before. Have you any recollection of this? There are a great number of the queen wasps this season? I frequently kill three or four in a day in a warm plant-house. I never remember seeing so many, and I have no doubt we shall have to keep a sharp look-out for the late Grapes. *O. Orzet.*

Heating with a Single Pipe.—Where there are a flow and a return current going on in the same tube, it appears probable that these currents will be active or feeble—*ceteris paribus*—in the ratio of the volume of water to the extent of the friction (if the term be admissible) of the surfaces of the opposing currents. If my theory be sound, an oval tube 4 inches by 6 inches, if placed with its longer diameter vertical, would work better than a 4-inch circular pipe; while if the shorter diameter be placed vertical, the circulation in the circular pipe would be more feeble than in the circular pipe. *W. T.*

Stauntonia latifolia.—In the *Gardeners' Chronicle* of April 15, we notice a question about *Stauntonia latifolia*. We possess a *Stauntonia hexaphylla*. Can this plant be like *S. latifolia*? We enclose a leaf of it. It is a climber, with flowers (according to description), large, drooping, and bell-shaped, like those of *Capanuea lanceolata*, of a dark violet colour spotted with white. These are succeeded by oval fruits as large as an egg, violet spotted with white. It is figured in "Flora Japonica," l. p. 76. It is a plant from Japan, and is said to be hardy, but we have not yet received it. *W. H. Oatland, Esq., F.R.S., Holland.* [The *Stauntonia latifolia* of Wallich is the *Hobollia latifolia* of the Bot. Reg. 1846, t. 49, a triphyllous, half-hardy shrub, with green (white, teste Wallich), sweet-scented flowers, succeeded by ovate, fragile, sweetish, edible fruits. The leaf sent by Messrs. Ottolander is quite different. Eds.]

The State of Vegetation.—I have been running through eight or ten counties within the last few days, and cannot help admiring the wonderful progress and development of every kind of vegetation, such as has rarely been seen in the time in the course of many years. No doubt the last three dry summers and sharpish touch of winter, which had so pulverised, sweetened, and renewed the soil, may to a great extent be regarded as the cause of such extraordinary progress, aided, as these have been, by the successional bountiful rains, with sunshine between, and wind to waft about, expand, unroll, open, and shake off the outside covering of the buds, and to wash off the dust and other accumulations. Taking all things into account, it is an early spring. I saw on April 20 in various places the early variety of *Hedera Chestnut* in full flower, also the red purple and white *Lilac*, the varieties of *Siberian Crab* and *Laburnums*, with some of the upper flowers quite expanded. On April 24 I gathered from a hedge a branch of *Whitehorn* quite expanded. The *Elm*, *Sycamore*, and *Lime* were fully in leaf some days previously, and on that day the *Beech* and many other kinds of trees were noticed in full leaf. Since then all the varieties of *Lilac*, the *Wistaria sinensis*, *Laburnum*, several varieties of *Crataegus*, and the *Apple trees*, which I have seen not a few of—have come into full bloom; whether or not there has been too much wet for the fruit to fully and kindly set, will be seen in the future by the crop produced. One thing has always been considered by most observers of Nature's ways, and that is, that the tree fruits have always set well in dryish, sunny, and partially brisk windy seasons, though the weather may have been cold; while if there has been moist, dark, quiet weather at the blooming time, poorish, uneven crops of fruit have been the result. So far, there is a prospect of a good crop of Apples, for there has been rain, sunshine, and wind; the blossoms generally have expanded vigorously, being large,

and of a fine rosy colour; the bloom is also falling off very nicely, not at all clogged or shrivelled—a good sign for the future. How the Cherries, Plums, and Pears, have stood the early April frosty mornings, I have not been able to ascertain, as I could not get much amongst them to observe; the rain, wind, and sunshine, will, however, very soon convince us as to what may be expected and grown. Our native birds and migrants have sung merrily with all their might and power in every direction, causing great cheerfulness on balmy days, and enhancing the numerous beauties of beautiful Nature. *James Barnes, late of Bicton.* [We shall be glad to hear about the *Araucarias*. Eds.]

Town Trees.—The communications of your correspondent, Mr. Newton, are always interesting, and this alone is sufficient to induce me to object when he makes, as it appears to me, a wrong statement. In remarking upon the kinds of fastigate trees which will do well, and which will not do well in towns (p. 548), he refers to *Arbor-vitae* (amongst other Conifers) as "town trees," which will not do well "at least within 15 miles of Charing Cross." And again, speaking of the Conifers, he says, "None of them are the least of any great use, and I must have employed anywhere in a smoky town." Mr. Newton need not go half as far as Charing Cross for evidence that he is wrong, as far as *Arbor-vitae* are concerned. At Dickson's nursery-ground in Acre Lane, Brixton, he may see about 100 fine plants of *Biota orientalis*, varying from 8 to 11 feet high. At Dancer's nursery-ground, Fulham, he will find 30 or 40 beautiful plants of *Biota orientalis aurea*, from 3 to 5 feet in diameter. None of these look like the small trees in the smoky atmosphere in which they are planted. Indeed, I feel so strongly that they will grow in such situations, with proper attention, that I have just had large specimens of these *Arbor-vitae* placed in a triangular area of about 500 square feet, surrounded by buildings 70 feet high, within a stone's throw of the Royal Exchange. Each plant is in a strong wooden tub, 3 feet square and 2 feet 6 inches deep, well drained and supported at small balls to the angles. The tubs were sent to the nurseries, so that the roots were not exposed to the air for more than a few minutes. About 1 foot deep of crocks was put in, and then about 6 inches of mould, upon which the tree was planted high up, the jolting of the cart bringing it down to its proper level by the time it reached its destination. [Rather loose potting this. Eds.] Very nothing has been fitted over the surface of the soil to keep cats and sloping birds are ready for use to prevent the saturation of the earth when the branches are being syringed. In due course you shall have a report upon them. *W. T.* [No doubt frequent and careful syringing will be very beneficial, but we cannot report very favourably on *Arbor-vitae* grown in London, and receiving only the ordinary routine attention. Eds.]

"Baillon's Natural History of Plants."—A few words of explanation in exoneration of some of your strictures (p. 586) are due to the translator of the above work, who, though yet but little known in the botanical world, is an ardent student of botany, and whose observations on the flowering of the *Hazel* attracted your own attention, and that of others, with varying result. M. Baillon himself had undertaken the revision of the proofs, but after the first few sheets, our communications with him were cut off by the unfortunate siege of Paris, and thus a greater responsibility rested upon the translator than was originally intended. With the last proof from M. Baillon, however, we were gratified to receive unsolicited his approval of the translation, as far as it had gone, in the following terms, addressed to his unknown translator:—"Je vous félicite et je vous remercie de la façon dont vous traduisez mon livre. Le sens en est, à mon avis, admirablement rendu." Relative to the "patch" which you affirm has been so faithfully reproduced, permit us to say that though unfortunately there is a small patch still, it is not quite identical. Of the 15 "additions and corrections" of the French edition, nine have been incorporated, five were inadvertently overlooked, for which the translator is responsible. The five which were so overlooked, we have, as a general reference to the "Flora of Tropical Africa," since published, could not be incorporated. Besides this, some few errors, not in the list, have been detected and corrected, and a few references added. That such a work should be absolutely free from further error is more than we can venture to hope, and we shall feel obliged to any reader who will communicate to us any that he may meet with. *L. Reeve & Co.* [Our correspondents have surely misread our reviewer's article, which contained no strictures, but rather a commendation on the author's faithful rendering of the original. The translation is, all things considered, singularly free from errors. Eds.]

Vine Growing at Heckfeld.—When your correspondent, A. D., called here, three or four weeks ago, and pointed out the vine-vinery, alluded to by him on p. 583, I had not the slightest idea that he intended to say anything about it in the *Gardeners' Chronicle*, or I would have asked him to have been more particular in his notes. As it is, he has quite forgotten to mention the bottom-heat, to which I attribute no small part of

the success attained. As stated by "A. D.," the house was originally built for Melons, and has two 4-inch pipes running through each bed from bottom-heat, with separate valves. Being somewhat sceptical in regard to heated Vine borders, I determined to try it on a small scale, and thus far am more than satisfied with the result, for the Grapes are of a coloring well, and though the berries are rather small, they are a good red in bunch for one year old Vines. I shall have much pleasure in forwarding you a sample of both fruit and wood as soon as the Grapes are ripe, for your opinion thereon, when I may also have something to say respecting heated Vine borders. *Wm. Wildsmith, Heckfeld, May 8.*

Heating by Hot Water.—There is an old saying and a very true one, "There is nothing new under the sun." The arrangement of hot-water pipes as described in your article at page 578 is as old as I can remember anything about hot-water pipes. I allude to the system of converting what is usually the return pipe into a flow pipe. Anyone at all conversant with hot-water work is aware of the fact that when heated is to ascend, and the shorter the distance to travel the more rapid is the circulation. Then why continue to use the old system? For instance, a column of water (having an inlet and outlet to the boiler) rising perpendicularly, say 30 feet, will heat quicker than the same length of pipe lying horizontally. I remember some five or six years ago erecting an apparatus with the under pipe work is aware of the fact that when heated is to ascend, and the shorter the distance to travel the more rapid is the circulation. Then why continue to use the old system? 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which the overland traveller frequently experiences when passing the Red Sea,—it dries up every pore of his skin, and causes him to rush to the medicine chest to produce perspiration. In this case I prefer the most state, and do not fear the fine spring, or gentle rain, which a moderate temperature and clear weather. I should like to know what is the best method of bunch-grafting. I understand it is performed as soon as the berries are set. *George Donaldson, Keich Hall, [We should be glad of information on this latter point. Eds.]*

House Sewage as a Manure.—This is undoubtedly a very valuable ingredient for light soils such as I have to work upon. This place suffers more from drought than any other I am acquainted with. Friends calling from other parts of the country say they never see shrubs suffer so much as they do here in dry weather. Conifers in their young state succumb to it, but not to such an extent as American plants. These plants, as well as most other garden shrubs, suffered terribly last summer, as also in 1868; in fact the large proportion of which we had then, and their present existence to the water supplied them by hand. The grass dries up so that the mowing-machine and scythe are laid by for the month at a time. Kitchen garden crops suffer equally with other things, and at times it is very difficult to keep the table supplied with vegetables. There is here very good drainage to the house, and properly constructed tanks, built like those recommended by Mr. Morgan at p. 553, but then the least smell detected by the family is a source of much annoyance, and very justly so; for what is worse than foul smells? I have therefore to be cautious when I apply it, and for disinfecting purposes I have used a great deal of chloride of lime, but carbolic acid has with me superseded the lime, and for this purpose every gardener ought to possess himself with a shilling canister of this excellent article. It is so powerful that a very small quantity is required to be dusted about near manure heaps, cesspools, and especially large accumulations of mown grass, as well as other decaying refuse, which sometimes throw off a fearful stench. This powder sprinkled about is very efficacious, and I prefer it to the liquid sold for the same purpose. *T. Wynne, The Gardens, Holbrook Rectory, Suffolk.*

Recollections.—I regret to hear of the death of Mr. W. B. Page, of Southampton. I can endorse what was said with respect to his establishment, which led out of the High Street, Southampton. When that was at its height, perhaps few could equal it for the very choice collection of plants, particularly herbaceous plants, which Mr. Page grew extensively. His Camellia-house, which possessed good and healthy plants, was worth to be despised. Indeed, at the time, it was worth a visit any day. The tree nursery, at Hill, contained a collection of choice trees and shrubs, which could scarcely then be equalled. "Page's Prodrum," which contained all the plants grown by him, was very useful in its day; and not many weeks ago did I refer to it for information which I could not obtain from any other work in my possession. I am indebted to Mr. Page for several names of plants which I have never forgotten. The title of his distinct classification, which he gave them as an educated man. Mr. Page was a pattern when in the prime of life for his energy, business habits, and his botanical skill. Many of your readers who are on the shady side, gained much from the Southampton Botanic Gardens. Among the useful and showy plants that were then at this botanic garden, were the *Potentilla Hopwoodiana*, *Cnethora macrocarpa*, *Ceropepis lanceolata*, the *minima*, &c., which are useful, but are now seldom seen. *Ulmus*.

Protection of Wall Fruits.—As evidence of the marked influence of an artificially-heated wall for the forwarding and protecting of Apricots from early spring frosts, I forward for your inspection fruits gathered from a tree growing against the wall of a bakehouse, over and attached to a water-fowl mill, situate in a low-lying spot in this neighbourhood, and which tree is laden with an abundant crop of equally large fruit, secured without the aid of other artificial protection, although on the mornings of the 7th and 8th ult. 10° and 12° of frost were registered. [A fine sample. Eds.] I believe an equally good crop was secured last season under similar conditions, and the above may not be an isolated case. I do not doubt; in fact, I am just reminded of an analogous case at a neighbouring nobleman's garden, in the shape of an Apricot tree bearing a heavy crop of fruit as large as those specified above, and which tree is growing against an old but still good conditioned flued wall at the back of the gardener's house, and against which wall is the kitchen fire-range, the direct heat and smoke of which, however, do not pass into the wall face, hence heating the latter merely by contact with the kitchen chimney, and therefore not affording so great a degree of warmth as that derivable from the bakehouse oven; this, however, was in a great measure compensated for by the use of a sheet of Frigi Domo during inclement weather. It may not be uninteresting to remark, that the flues of this wall, of which there are several, have not been in use have never been in use for so far as I am cognisant, for the last half century, if not, indeed, for a longer period; justifying suggesting the idea that a

owner considered the system too expensive, as compared with any derivable advantage. It has, however, often occurred to me what useful auxiliaries it could be made to connect with a "Trentman" case of glass for the preservation and earlier maturation of the fruit when required, thereby rendering the cultivator independent of the weather incidental to our insular climate. Accompanying the fruits specified are fruit-laden Apricot shoots, illustrative of the general way in which they have again set in the gardens here, and, as usual, by the aid of the almost indispensable Frigi Domo, and, but for the command of which it is producing further to say, I have not found them, and tributing such specimens of fertile fruit. [Most profuse. Eds.] I was pleased to observe (at p. 550) Mr. Lumsden's testimony to the valuable aid he has for so long a series of years derived from the use of Frigi Domo in the protection of his wall fruits; and I agree with him as to the comparative inefficiency, as a protective medium, of old fish nets, tiffany, &c. For instance, this season, by way of experiment, I covered a Peach tree with four-fold netting, which signally failed to preserve the blossom from the effects of the sharp frosts during Good Friday week. In conclusion, I may be excused for observing that correspondents' reports upon the condition of their wall fruits are infinitely more instructive when accompanied by information as to whether or not an especial plan has been afforded regarding adverse weather. *William Gardiner, The Gardens, Lower Ealingdon Park.*

Horizontal Boilers.—Doubtless your readers will say, it is the pot calling the kettle black, when they thus condemn the same kind of plan, as I have done. My reply, and my last upon the subject, will be very brief. Give us exact dimensions of the boiler shown in the first instance (p. 379), i. e., fire space, waterway, and size of opening of the nine flues. By-the-by has any of your numerous correspondents ever attempted to construct a flue nine times diverted, with a length of 2 feet 3 inches, and an ordinary chimney-shaft of some 6 or 7 feet? I believe it is correct when I say that I do not get the greatest heat in the middle of the night, for from close observation here at all hours, I have found, during the past winter, the severest frosts to be early in the night or at daybreak. Messrs. Negretti's registering thermometers are first-rate tell-tales of both heat and cold, and the plants themselves now show that the treatment suited them. The boiler I have used during the past eight months is an 18-inch horizontal well-saddle with water bars, there are 170 feet of 3-inch pipe and 140 feet of 2-inch pipe connected, all of which it heats most satisfactorily, the fire very often not being attended to for eight hours. I do not intentionally make erroneous statements, but simply give my opinion backed by experience or ocular demonstration. I hope shortly to avail myself of Mr. Cannell's invitation given at p. 583, and again, in a letter addressed by him to me through the post, and, for which I beg to thank him. *R. S. Dunbar, Wimbledon.*

Orchid Cultivation.—Your correspondent, "Ex-Cantab," says (I think) I have misunderstood the intention of his letter, and (at p. 515) assures me that his only desire was to ask me to explain what appeared to be two contradictory statements. I am quite ready to accept such a declaration, and regret that I should have come to the conclusion that he was only exercising his ingenuity in contrasting parts of my letters that had no relation to each other. Any one who, like myself, seeks information through your pages, must be willing to take on the usual terms. I grant him these terms, and answer his questions, so long as he replies to mine. In my last letter I answered the two first questions, I think to his satisfaction, and proved they did not, as at the first glance, contain a contradiction. I will now try to throw a little light on the two last—"that I considered mine to be cool treatment, and" "that I did not consider it to be cool treatment." In the letter quoted at p. 97, I gave my practice, and do now honestly think, as I then said, that a range of temperatures equal to the climate of Madrid should not be called cool treatment; because to call it so, without giving any thermometer figures, would be likely to mislead all beginners in Orchid cultivation, and misleading in such a case means the risk of losing valuable plants. But the letter at p. 310 was not, like the one at p. 76, dealing in thermometer figures and comparisons of climate; it was simply a reply to a letter that appeared in your pages, and the quotation given was a challenge. If "Ex-Cantab" will read it again, I think he will acknowledge that this is its strict meaning. You have given me what you call the practice of two gentlemen as an example of cool treatment, but I submit that we have not their practice before us, that is, as you say, information is incomplete. I have previously asked them questions about their treatment that remain unanswered, till you complete the explanation I shall maintain that my plan is, for Odontoglossums, to all intents and purposes a cool treatment; I added, I am prepared to maintain that it is. "Ex-Cantab" closed his first letter in this manner—"This statement will, I hope, convince you, &c. H." That statement is not to be driven out of the field as easily as he imagines." Will he take up the cause

that "Scrutator" modestly left to take care of itself, and tell us what this cool treatment really consists of? Before he answers it, let me refer him to M. Von Volkem's letter at p. 419: "Then just above Susagusa, I should say at an elevation of about 5500 feet, I found *Odontoglossum Alexandrarum*, and other species in their full glory, in the month of April. On the plain of Susagusa, some 500 feet lower down, are to be found plentifully all the splendid varieties of *Cattleya Mossiae*." Upon the question of the manifold difficulties of Orchid growing I have nothing further to say; I have not found them, and therefore have never fully realised the depth of the discovery we owe to our Scientific Committee of the Royal Horticultural Society, as to the cause and origin of spot and other kindred complaints upon Orchids. By-the-by, in passing, I have an idea that if a little more notice was taken of the doings of these Committees, though we might not end in producing another Dr. Lindley, we yet might end in curing them in their labours. We have now had about five weeks' use of a new Orchid-house, put up on my plan of supplying food and moisture, and the plants really look as if they intended to give us no trouble. We shall grow them upon the "all-the-year-round treatment," as your correspondent is pleased to call it. The subject of resting Orchids, and which of them require a rest in the autumn, is a subject too large to treat. I think, is too long a subject to go into now; but I will take an early opportunity of giving my experience, as I shall be glad of a reciprocity upon it. Are there not two branches—the rest required by Nature, and the rest enforced by gardeners for their own purposes and ends? Rest means that growth is stopped, which stoppage may occur frequently during the year, at certain regular stages, and should not be confined to deciduous arboreum, which all Orchids do not require, though they may obtain rest all the same; then again, some rest from heat and some from cold, and withholding water after the growth is made, will induce others to rest when aided either by heat or cold. *G. H.*

Foreign Correspondence.

ALLAHABAD: February 3.—Culture of Orchids in India.—Vanda teres var. alba: The existence of the white variety of Vanda teres was first mentioned to me by late Dr. Anderson, who was in the Tehri valley, near Darjeeling, and secured a single plant for the Botanic Gardens, Calcutta; but if I remember right, it perished without flowering. I shortly afterwards purchased a small plant from one of the Cinchona assistants who accompanied Dr. Anderson in his exploration, and I am assured that it is the genuine white Vanda. I sent the whole plant to England in excellent order, and I just received it. It is right, and will prove true. I also sent one of Dr. Anderson's new *Phalaenopsis*, from the same locality. I do not know if it has yet been named, as I am quite out of the way of hearing botanical news now, although I have practically more to do with horticulture now than ever. The Lieutenant-Governor here, Sir W. Muir, asked me to take the management of the public gardens in Allahabad, and, on condition that I was left quite unfettered, and well supplied with funds, I agreed to do so. It was a terrible wilderness 18 months ago, but now it is a very handsome garden, and the show of flowers is really very good. I have magnificent *Roses* and large beds of *Geraniums* and *Fuchsias*; the latter were in full flower a fortnight ago, and are now making strong growth. When I first came here I was told that it would be hopeless to attempt keeping Orchids, so I only brought up a few; these, however, did very well, and a year ago I had up my whole collection, and all through the hot weather and rains they did far better than in Calcutta. The cold weather is a great trial for them, and the leaves turn yellow and drop off. The species of *Phalaenopsis* seem to do best of all. I flowered all mine abundantly last May, and some came well into bloom again in October—*P. Schilleriana*, *amabilis*, *grandiflora* aurea, *rosea*, *Corru-Cervi*, and *viridifolia*. I think I shall have about 20 species this year. Just now the new *Anectochilus Ordianus* is in bloom with me.

I do not succeed with the *American Orchids* as I could wish, they grow well, with strong new bulbs, but never flower; the *Cattleyas* all look well, but I have never yet seen a flower. *Oncidium*s are the only American Orchids which may be considered decidedly successful here.

I am rather out of the way now for making fresh collections; but I have received some valuable contributions from Java, Borneo, and Manila—amongst the rest I got the splendid *Vanda Lowii*, alive, after six or eight failures. I would not risk bringing it up here, so gave it to the Botanical Gardens; also *Vanda Batemanii*. *Samuel Jennings.*

Societies.

EDINBURGH BOTANICAL: March 9.—Alex. Buchan, M.A., President, in the chair. The following communications were read:—

1. *Report on the Effects of Cutting Down of Forests on the Climate and on the State of the Mountains.* H. Rogers, M.R.C.P. Lond., and Senior Assistant Surgeon,

Notices of Books.

The Plain Path to Good Gardening; or, How to Grow Vegetables, Fruits, and Flowers Successfully. By Samuel Wood, Author of "Gardening for the Cottage." London: G. T. Goodwin.

This is emphatically a plain book; there is no fine language nor hard words to puzzle the ignorant, but just a direct, straightforward, homely explanation of the common-sense views of the writer on the treatment of the different crops to be grown in a garden of limited dimensions. Writing of Coleworts, the author writes, "This is undoubtedly one of the most useful branches of Cabbage growing. Nothing says better, or is more useful to all classes. So either of the above [Athens' Matchless or Rosette] from June 12 to 20; the 10th or 12th in the northern counties, and the 20th to the 30th in the warmer counties of the south and west. As soon as they are fit to plant out, which will be about the middle of August, or a little before, prepare some of the early Potato in Peat ground, by adding a moderate dressing of dung. If the land is poor, fork it over, make it moderately fine, and put the plants in rows 1 foot by 9 inches apart; that will be about 350 per square rod, and fetch about 10r. What can pay better than this? This crop is on the land a short time only, and the Coleworts are fit for use from November till after Christmas; in other words, they are all fit to clear off by the end of November; that is, the whole time occupied by the crop is not more than 12 or 14 weeks; and these Coleworts are far better than Savoy, Kale, &c., and do not impoverish the land half so much." This extract fairly illustrates both the style and the substance of the book. We shall not do wrong in recommending it to the amateur who needs directions which he can understand, but we must add a word of caution, since the writer is a strict orthodox, as, for example, when he questions whether mildew is a plant. His practical remedy is better than his theory, that mildew is a disease generated by impure air. Pure water and a rapid circulation of the surrounding air are sure preventives, he tells us, though sulphur may also be had recourse to. One form of application is by means of sulphurated water, made by pouring 10 gallons of boiling water on three or four pounds of sulphur, and using this for syringing after it has stood 24 hours, and become cold and clear; this may be repeated with the same brimstone three or four times. Another plan is, to sprinkle flowers of sulphur over some deep pans containing about a pound of quicklime, and set them in the house, a small quantity sufficing for constant daily use.

A short chapter is devoted to each of the principal garden crops, and to some of the most popular flowers; and there are also remarks on the formation of various kinds of gardens—Rose gardens, American gardens, and wilderness gardens among the number, and on various topics of general interest. Here is Mr. Wood's recipe for ensuring a supply of double Stocks:—"To be sure of seed that will produce double flowers in the next growth, sow the Ten-week English Stocks in March in pans or pots; and, when large enough to handle, plant them out into beds, consisting of good virgin loam and some lime rubbed in, or raised old lime. I noticed many years since the marked effect of this on some scarlet Ten-week Stocks. When the Stocks flower, if they are all single never mind; look for what five or six-petaled flowers you can find, and cut all the four-petaled flowers off with a pair of scissors; and as soon as the seed-pods appear feed the Stocks with some guano and water, 1 oz. to 1 gallon. Give this twice during the seedling, once as soon as the petals fall, and once again when the pods are half-grown; and you may depend upon a generation of double Stocks next season. This is applicable to all Stocks."

The book forms a neat little volume of 330 pages, nicely printed, but it might have received more attention at the hands of the printer's reader; and we cannot look on the coloured frontispiece as any embellishment.

—The *Florist and Pomologist* for the present month has an excellent coloured plate of Lord Palmerston Peach, from admirable specimens grown by the Rev. W. F. Radclyffe, and, in addition, various communications of interest.—Among the more prominent of the articles in the *Villa Gardener* are papers on the kitchen garden, with notes and illustrations of some of the newer varieties of Pea, and on bouquets and bouquet making, in which latter the writer wisely advocates the breaking away from the excessive formality which has characterised these productions of late, and upholds the principles on which the Princess Louise's bridal bouquet (see p. 376) was constructed. We have before us three numbers, for October, November, and December, 1870, of *La Belle Horticole*. The delay in the publication is compensated for by the addition of a classified index to the twenty volumes published between 1851 and 1870. The only fault we have to find with the index is an amount of over-elaboration which renders it difficult to know where to look for any special article of which one may be in search. When will it become apparent that the strictly alphabetical form is the only

form of index which is of any use for ready reference?—A very sensible article on the water supply of gardens forms the introduction to the *Gardener* for the present month. The writer adverts to the waste of water, especially of rain water, which is allowed to take place in many establishments, and adds, "The waste simply of many gardens is simply ridiculous, and we know of nothing so much in need of improvement."—The young folk look out as eagerly as ever for *Aunt Judy's Magazine*, an excellent and high-class publication for elder children.—The ninth part of Mr. Wooster's *Alpine Flowers* (Bell & Daldy) contains illustrations of *Crocus nudiflorus*, *C. speciosus*, *Thymus azureus*, *Campanula garganica*, *Androsace dragona*, and *Androsace alba*. This is likely to be a popular book, now that the taste for this class of plants is reviving.—In the *People's Magazine* is an article on scarlet fever, urging more effective sanitary police regulations. Fully concurring with the writer, we yet fear there is no chance of his suggestions being carried out till the people are far more highly educated in common things, and the nature and action of their own bodies, than they are at present. The articles on America by a "London Parson," are continued. They are very good descriptive articles, but they remind one forcibly of the thin coat and wide-awake hat which the parson is wont to assume when very dissipated. The London parson doubts if artisans gain anything by emigrating from the old country to cities in the Union.—The April number of the *Popular Science Review* contains an article on the consequences and effects of grafting, by Dr. Masters, in which the effects of grafting on scion and on stock respectively are considered at some length.

—A Concise View of the Law connected with Letters Patent for Inventions, by J. Johnson, Barrister, and H. Johnson, Solicitor, (Pp. 52: Longmans.) Sufficiently explained by its title.—*Very Foster's Drawing Copy-Books* (London: Marcus Ward & Co.) We have already had occasion to speak in favourable terms of these cheap publications. Recent numbers are devoted to wild and garden flowers in water-colours. The coloured illustrations are somewhat wooden, but correct in outline and excellent for the cost.—Threeence.—A very simple and direct direction is added to the artists.—*A First Catechism of Botany*, by John Gibb, (Chelmsford, Dutton: pp. 39.) A small pamphlet, containing questions and answers on botanical subjects, beginning with, What is Botany? and What is a plant? As a companion to some elementary text-book, the catechism might be useful. Though much more correct than the average of such publications, it is difficult to see how any useful knowledge of botany could be obtained from it *per se*.—*A Sketch Romance of Motion, &c.*, by Alec Lee (Longmans). The "&c." here represents something too abstruse for our columns, and too vast to be treated in a pamphlet of 23 pages.

FOREIGN JOURNALS.

We have lying before us Nos. 5 to 12 of *L'Illustration Horticole*, in which of the following plants are figured:—*Sciadocalyx digitalifolia*, a beautiful Gesneriad, remarkable for its shaggy rosy-purple flowers, white and yellow, with a spreading green calyx dotted with purple; the plant is erect, grows, and the leaves ovate acuminate and hairy. *Acer palmatum reticulatum*, a fine Japanese Maple, with seven-lobed leaves, the lobes broad, serrated, and of a subtranslucent velvety emerald-green. *Polycynis lepidia*, an interesting Colombian Orchid, with brown spotted sepals, and a white lip. *Alternanthera amabilis tricolor*, a handsome plant, likely to be useful for carpet-bedding, the leaves being broadly ovate, green, with a centre of vivid rose traversed by purple veins, an irregular band of orange intervening. *Odontoglossum cristatum Argus*, with handsomely spotted brown and white flowers. *Fatima japonica auro-reticulata*, a variety of the plant commonly called *Aralia Sieboldii*, but more correctly *A. japonica*, in which the surface of the leaves is more or less distinctly reticulated with yellow. *Todea superba*, one of the handsomest of all the filmy Ferns. *Camellia Nansaii*, a handsome Italian variety with cupped petals, carmine, having a broad central white band on each petal; the flowers are about middle size. *Buddleia curviflora*, a hardy deciduous shrub, with quadrangular winged stems, largish ovate-lanceolate leaves, and a close spike of small rosy-violet flowers. *Peperomia resplendens*, a highly curvose plant, with bright red stem, green rosette-like ovate-lanceolate leaves, and fragrant white fleshy spikes, composed of numerous divaricate filiform clavate catkin-like spikes, collected into panicles. *Pogonia fragrantissima*, a grand hothouse shrub from Brazil, the great ovate-oblong leathery yellow-veined leaves, veined with the remarkable flowers, which are collected in subcorymbose panicles, and are white, with a slender tube 6 inches long, and a reflexed limb, and are white with a highly fragrant. *Tussock semilana*, another South American Gesneriad, this from Brazil, with something the aspect of *Gloxinia maculata*, with large broadly oval green leaves, and umbellately-arranged flowers, of which the calyx is truncate, cinnamon-red, and the corolla yellow, spotted with crimson-purple. *Cattleya maxima*, a large-flowered rosy-coloured species, with richly pencilled lip. *Aristochloa ciliiflora*, a Mexican hothouse climber, with cordate acuminate leaves, and immense flowers, almost equalling

those of *A. gigas*, with a deep brown throat, and mottled yellow and brown cordiform limb. *Helcia sanguinolenta*, a rare and pretty small growing Orchid. *Camellia Luisa Bartoloni*, an Italian seedling of imbricated form, bluish field with rose. *Thamnodes crinita*, a very pretty Vacciniaceae New Grenadan greenhouse shrub, of neat habit, with ovate leathery leaves, and axillary nodding, urceolate pentagonal scarlet flowers, whitish at the edge. *Oncidium aursum*, a Peruvian Orchid, producing a remarkably showy densely-branched panicle of deep orange-yellow flowers, marked with rich brown on the sepals and petals. *Cordyline lentiginosa*, New Zealand plant, about the habit of *C. australis*, and having reddish brown foliage. *Asala Mons. Warocup*, a large showy rosy-carmine variety, but disfigured by the small tuft of central petals or abortive stamens which spoil so many otherwise symmetrical flowers, while wanting sufficient development to constitute a well-marked double flower. *New Caladiums*: Henri Doucet, Etiole d'Argent, and Jules Putzeys, the last in the style of bicolor, the last in the style of Chaminis. The well-known *Todea barbachensis* under the more familiar name of *Todea africana*, a grand greenhouse Fern, but not particularly well depicted. *Odontoglossum odoratum latimaculatum*, a handsome New Grenadan Orchid, with bright yellow fragrant flowers, handsomely blotched with brown. *Aristolochia clypeata*, a climbing species from New Grenada, requiring hothouse culture, and having moderate sized, ovate, cordiform leaves, and handsomely blotched flowers, of a deep purplish-red on a white ground, the limb being elliptic in form. *Camellia Madame de Cannari d'Hanale*, a Belgian variety, with pretty, cup-petaled, delicate flesh-coloured flowers. *Masdevallia Lindeni*, a charming Orchid belonging to a rare and popular genus, with much the habit and inflorescence of *M. coccinea*, but with ruby-coloured flowers. *Acer palmatum crispum*, a green-leaved Japanese Maple, with red petioles, and so far as the figure shows, one of the least interesting among them, the edges of the leaf-segments being rolled inwards (marginate convoluta). *Quercus striata*, a beautiful Japanese Oak, represented to have ovate-lanceolate undulated and serrated leaves, regularly marked throughout by a rich golden band between the primary veins. *Odontoglossum nevadense*, a very distinct-looking Orchid, from New Grenada, remarkable for its rich chocolate sepals, and its narrow yellow edge, and for its large, white, fringed lip, which is blotched with chocolate on the disk; the flowers are green, edged with brown on the outer surface. There are various scraps of miscellaneous information.

The Apiary.

"ENDOSMOSIS;" OR, FEEDING THE BEE LARVE.
—You were good enough to admit the above subject at p. 520, under the head of Apiary. I beg to add an explanation of the term endosmosis as applied to the bee larve. I remember that when I was a boy, among the other "big words," "parthenogenesis," the gardener, one of the old school, who had often cracked his jaw over Greek and Latin compound words, found a happy expression, saying: "Well, sir, as 'path of genius,' it is too much for such folk as we;" so we confined ourselves to the first word; and, looking it up in a cyclopædia, we read "endosmosis" is the attraction through an animal or vegetable membrane of thin fluid by denser fluid. When Mr. M. Dutroch's theory was more fully read, we learned that when the swimming-bladder of a carp was filled with thin muciage, and placed in water, the bladder gained weight by attracting water through its sides; and further, "that if the bladder were filled with water, and placed in thin muciage, it lost weight, its contents being partially attracted through its sides into the muciage." This last process was called "exosmosis." Besides explaining the word, Dutroch says, "that water thickened with sugar, in the proportion of one part sugar to two parts water, was productive of a power of 'endosmosis.' When the gardener exclaimed, 'That will do, sir: we put pans of water' (to make the fruits larger) 'just under them.' I leave the question thus for the scientific naturalist; that the term 'endosmosis' may be wrongly applied, as the bee larve are fed." Now, I must add an extract from an early teaching in "History of Insects," 30 years ago. "The honey-bee: The workers' eggs hatch in a few days, and produce little white maggots, which immediately open their mouths to be fed; these the workers attend to with untiring assiduity." Now, I do not wish to quote Kirby and Spence, or "Apum Angliæ," nor "Classification of Hymenoptera," beyond alluding to the "metamorphosis," in the third class, of the larve (or fibres) bearing no resemblance to the imago ("metamorphosis"). But I must not use these long words, and conclude with Reaumur and Huber's observations: "The maggot of the bee, like most of the apode larve of hymenoptera, do not moult but merely gradually grow larger," and the wasp or "vespites" larva is an obese, inactive maggot, inhabiting a cell, made of material composed like whit-brown paper (the cells of trees and fibres) and composed of cells arranged horizontally in several tiers, whilst the honey-bee has cells horizontally, but the cells hang vertically, and are made of wax. W. A. Munro.

Garden Memoranda.

FERNIEHURST.—Some time ago I paid a visit to this place, the residence of E. Salt, Esq., whose extensive collection of Orchids has frequently been noticed in these pages. My object was more particularly to see a plant of the now well-known *Odontoglossum macranthum*, with a spike 12 feet long bearing 44 flowers! This plant had five bulbs, and was at that time making a fine young growth, the spike itself being produced from the base of the latest formed bulb, which was 7 inches long and nearly as much in circumference, surmounted by a pair of fresh green leaves 18 inches long. Besides this specimen there were 12 or 14 more plants of this species, making a most vigorous growth, and some half dozen of them were throwing up stout flower-spikes. I noticed that several of these were sending up spikes from their young growth, and were assuredly no bad sign of their robust health. As an example of the remarkable vigour displayed by these Orchids, I would mention that several were breaking strongly from the second back bulb; while one plant was breaking from each of the three last made bulbs, and this without any assistance in the way of partially severing the stem or rhizome. Alongside these *Oncids* stood about a dozen plants of *Odontoglossum nebulosum*, all making a vigorous growth, and one specimen bore two spikes, one of which was seven flowers; *Odontoglossum Uro-Skinneri*, growing luxuriantly half a dozen plants together; while one particular plant of *O. Alexandræ*, with but four old bulbs, was throwing up six vigorous breaks! Here were about 100 plants of this beautiful species, most of which were then (Feb. 5), making their growth along with its relative *O. Pescatorei*; nor must I forget half-a-dozen pans of *Disa grandiflora*, than which nothing could be more healthy.

A grand specimen plant of *Masdevallia Veitchii*, having about 50 leaves, was making leaves 9 inches long and about an inch broad, while a nice healthy piece of *M. torensensis* had just bloomed, bearing two spikes, on one of which was three flowers! A plant of *M. coccinea* was making leaves three times the size of those imported. What a pity it is that these mountain gems are so difficult to import from their cool homes on the New Grenada and the Peruvian Andes, where they grow at 70,000 or more feet above the sea-level. We have 10 or 50 species in books and herbaria, but scarcely a dozen in gardens as yet. Nearly all the plants mentioned were making their growth, fresh and vigorous, in a span-roof house about 60 feet long, 12 feet wide, and 7 feet 6 inches high (see fig. 125), this well-adapted structure being specially set apart for the cultivation of *Odontoglossum*, *Disa*, *Masdevallias*, and such of the *Oncidia* as will bear a "cool" temperature. The winter temperature of this house is a minimum of 40° and a maximum of 50° Fahr., or a mean winter temperature of 45°. During the summer no artificial heat is given, and air is freely admitted, not only in the day time, but also at night. At the time of my visit the thermometer stood at 42°, and this at 4 P.M., the house being covered up for the night. That the above temperature is amply sufficient for practical purposes is obvious, seeing that these plants are in all probability unsurpassed in the world in any of the countries; indeed, this much has already been stated by some of our best Orchid growers, who, having seen them, can speak to the fact.

These plants, at least many of them, have been grown in this house ever since they were imported, and consequently have never been subjected to a high temperature. Now this is a most important fact, for plants of any description rarely do well if suddenly transferred from a high to a low temperature, or *vice versa*, while at the same time they will, in all probability, adapt themselves to either with impunity, providing that it is tolerably regular, and other circumstances, such as air, moisture, soil, &c., are favourable. In order to give some idea of the moisture in this house, I may mention that the sphagnum moss on the surface of the pots was as moist, and growing as freely as in its native swamps, and in several places the common Liverwort was growing on the loose nodules of Cannel coal, with which the slate benches are covered. Some cultivators grow their *Odontoglossum* in a mean temperature of 70°, that is to say a maximum of 80° and a minimum of 60°, and their plants do well, but that they really do not require so high a temperature is very clearly proved by the plants at Ferniehurst, which were at the date above mentioned growing healthy and vigorous in a mean temperature of 25° lower than that above given. Now if *Odontoglossum* can be grown thus successfully in a cool place, why then, it is assuredly it must be the better system, since it saves both time, fuel, and labour; and these last are the particular points employers look at, seeing that they are equivalent to capital.

If we turn to the *Gardeners' Chronicle* of June 11, 1864, we shall find that Mr. Warner has tried this "cool" régime with good results for what he calls "cool vinery Orchids":—

"This is a low-span-roof house like the rest, covered with vines bearing a capital crop of Grapes, and the leaves are trained as usual to the side walls, with the aid of blinds. It is a fixed roof, with a few side ventilators, and the rule adopted, as we were told, is, 40° minimum in winter, and in summer as much natural heat as

the season affords, with ventilation. In this house *Lycaste Skinneri* was revealing, its leaves a yard long; *Odontoglossum* had formed pseudobulbs half as large again as those of imported plants; *Arrophylums* were in sturdy vigour, and *Pleione*, which had been flowering some time since, now presented a perfect picture of healthy foliage. Wonderful, most wonderful!"

Now a word of warning. It would be folly to take plants that have been growing in a high temperature, perhaps for years, and place them at once in a cool house, and as one of the immediate results, we should lose the young growth most probably by what is termed "damping off." This is not the case with plants that have been gradually and judiciously accustomed to a cool temperature since their first importation. No; but on the contrary the most healthy vigour is the result of "cool treatment."

There being a great diversity of opinion as to what really constitutes a "cool treatment," I would suggest that 50° for the maximum, and 40° for the minimum, winter temperature, is certainly "cool" enough for the most sceptical. If this temperature answers so well at Broomfield and at Ferniehurst, why not elsewhere?

In "Paxton's Flower Garden" we learn that *Cattleya labiata*, with its pallid variety, and *Zygopetalum Mackenzii* are found on the east side of Pedro Bonta Mountain, about 15 miles from Rio Janeiro, at an altitude of 3000 to 3500 feet. In May and June the mean temperature has been known as low as 32° just before daybreak, and the highest the collector saw it during the six months he was there was 84° at noon. The "Pescatoreas" informs us that a really beautiful *Orchid* was found in an Oak wood 800 feet above where the snow was 6 inches thick, and the thermometer registered 32° of frost. Messrs. Backhouse & Sons inform us that in their establishment "Cattleya Mossie and *Lælia purpurata* continued growing out-of-doors in a deep, shady recess for six weeks after the frost had cut off Kidney Bean tops, &c., in the adjacent ground, and were only taken in after the thermometer registered 28°. This temperature severely injured one of the young growths of *Cattleya Mossie*, but did not

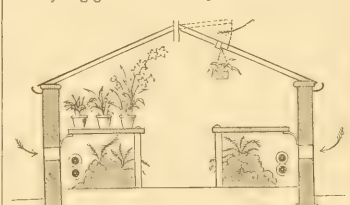


FIG. 125.—ODONTOGLOSSUM HOUSE AT FERNIEHURST.

hurt two others which had been formed almost entirely out-of-doors." 31° of frost did not injure in the slightest degree the glorious *Lælia superbiens* growing outside.

Mr. Bateman, speaking of the genus *Odontoglossum*, says: "Its species affect exclusively the mountain chains of Mexico, Central America, New Grenada, and Peru, not a single straggler having yet been discovered either in the West Indian Islands, or in the low and sultry latitudes of the South American continent." Now, all the *Odontoglossum* are amenable to this cool régime, if we except *O. citrosimum* and the delicate little *O. Krameri*, the latter especially requiring a warm sheltered position. To the *Odontoglossum* may be added such genera as *Arrophylum*, *Ada*, *Barkeria*, *Sophronites*, *Pleione*, many *Oncidia*, *Cattleya citrina*, and many of the *Cypripedium*, and winter flowering *Lælias*.

It must be borne in mind that though the temperature here recommended is below that of most greenhouses, still to keep the plants fresh and healthy a much greater amount of moisture will be required than is in general given to plants growing in a low temperature. Not only is this atmospheric moisture required during the summer, but also in winter, more especially during sharp, frosty weather, for then the air is drier than at most other seasons—as a glance at the hygrometer will prove—and also because the atmosphere of the house is rendered still more arid by the dry heat from the pipes; hence more moisture must be employed to counteract both, or the plants will be sufferers.

Most of the "cool Orchids," or those that come from elevated habitats, may be deluged with water when making their growth, and should never be allowed to become thoroughly dry. We should not forget that these plants, and many others beside Orchids, coming as they do from elevated positions, often at a great distance from the sea, are naturally subject to a great rainfall, and heavy dews or moisture rising from the earth. They are frequently discovered in close proximity to rivers, waterfalls, or mountain streams, and some, as *Eriopsis biloba* for example, frequently send their thick roots into the water itself. Again, when in their comparatively cool mountain habitat they are constantly surrounded by a free circulation of fresh air. I am glad to record that at Ferniehurst Mr. E. Culley, who will be remembered by many

as the curator of the once famous Bullerian collection, has by skilful management reduced the many disadvantages of artificial treatment to a minimum, and the excellent results of "cool treatment," as shown by the healthy vigour of the plants themselves, are the best proofs I can offer as to the advantages of this practicable system. F. W. B.

Obituary.

WE regret to have to announce the death of Mr. JAMES YATES, M.A., F.R.S., which took place at his residence, Lauderdale House, Highgate, on the 7th inst. Although better known of late years as the chief and liberal promoter of the International Association for the introduction of the Metric System of Weights and Measures into this country, he was distinguished by his classical and scientific attainments. His learning was not only very extensive, but profound and accurate, and he contributed largely to several classical and archaeological works. Although naturally modest and unassuming, he was at all times accessible and ready to impart information to others from his varied stores of knowledge. He always took an active interest in the proceedings of the Royal Society. He was also an influential member of the Geological Society, and of other learned and scientific bodies, by whom, as well as by a large circle of friends, his loss will be much regretted. Among horticulturists Mr. Yates was best known for his splendid collection of Cycads.

—Died, on the 5th inst., CHARLES ERNEST HENDERSON, third son of Arthur Henderson, Pine Apple Place, Malda Vale, of erysipelas.

THE WEATHER.

STATE OF THE WEATHER AT BLACKHEATH, LONDON, FOR THE WEEK ENDING WEDNESDAY, MAY 10, 1871.

At 9 A.M.									
1871. MONTH AND DAY.	Reading of			Hygrometric Deduction from Glaisher's Tables, 5th edition.			WIND.		
	Barometer reduced to 32 Fahr.	Dry Thermometer.	Wet Thermometer.	Dew Point.	Degree Humidity.	Weight of Vapour in a cubic foot of Air.	Direction.	Force.	RAIN.
May.	Inch.	Deg.	Deg.	Deg.	Per Cent.	Grains.		Miles	
4. Thurs.	29.72	50.7	41.1	50.0	63	0.6	W.	200	0.00
5. Friday.	29.68	52.4	40.0	50.0	69	0.8	W.	200	0.00
6. Satur.	29.97	61.1	52.9	55.0	75	1.0	N.W.	170	0.00
7. Sunday.	29.92	59.9	50.0	55.0	72	0.9	W.	200	0.00
8. Monday.	29.99	59.8	51.0	54.0	78	1.0	N.E.	200	0.13
9. Tues.	29.97	58.0	48.0	51.0	70	0.8	N.E.	200	0.00
10. Wednes.	30.05	49.8	41.1	39.3	50	0.5	N.E.	250	0.00
TEMPERATURE OF THE AIR.									
1871. MONTH AND DAY.	Highest.	Lowest.	Range in Day.	Mean.	Departure from Mean of 50 Years.	Direction.	Force.	Direction.	Force.
May.	Deg.	Deg.	Deg.	Deg.	Deg.				
4. Thurs.	58.8	36.0	22.8	46.1	1.1	W.	200	0.00	0.00
5. Friday.	61.1	39.1	22.0	50.0	4.0	N.W.	170	0.00	0.00
6. Satur.	69.0	47.6	21.3	58.3	4.8	W.	170	0.00	0.00
7. Sunday.	59.1	38.1	21.0	48.5	3.2	W.	200	0.00	0.00
8. Monday.	72.0	45.0	27.0	53.1	1.4	N.E.	200	0.13	0.13
9. Tues.	54.5	41.5	13.0	47.2	1.0	N.E.	200	0.00	0.00
10. Wednes.	58.2	38.2	20.0	48.2	0.2	N.E.	250	0.00	0.00
May 4—Very variable throughout, but very fine. Lunar corona. 5—Light clouds prevalent. A fine day. 6—Cloudy till night; then clear. Fine. 7—Generally cloudless throughout. 8—Very variable. A violent thunderstorm raged between 4 and 5 P.M. Very frequent and vivid lightning and heavy rain. 9—Generally cloudy till night. A little rain fell occasionally. 10—The sky was generally covered with cloud throughout the day. A dull bleak day.									

TEMPERATURE OF THE AIR AND FALL OF RAIN AT DIFFERENT STATIONS.

DURING THE WEEK ENDING SATURDAY, MAY 6, 1871.

TEMPERATURE OF THE AIR.									
NAMES OF STATIONS.	Highest.	Lowest.	Range of Week.	Mean of all Highest.	Mean of all Lowest.	Mean Daily Range.	Mean.	Mean.	FALL OF RAIN.
	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	In.
Portsmouth	70.2	30.4	39.8	50.3	40.1	10.2	49.7	49.7	0.20
Blackheath	69.9	30.1	39.8	50.3	40.1	10.2	49.7	49.7	0.20
Bristol	69.9	30.1	39.8	50.3	40.1	10.2	49.7	49.7	0.20
Leamington	70.3	30.4	39.9	50.4	40.2	10.2	49.8	49.8	0.20
Wolverhampton	70.3	30.4	39.9	50.4	40.2	10.2	49.8	49.8	0.20
London	70.3	30.4	39.9	50.4	40.2	10.2	49.8	49.8	0.20
Nottingham	68.6	28.5	40.1	48.5	38.4	10.1	48.4	48.4	0.57
Sheffield	68.6	28.5	40.1	48.5	38.4	10.1	48.4	48.4	0.57
Liverpool	61.0	40.7	20.3	53.3	43.0	10.3	48.1	48.1	0.23
Manchester	61.0	40.7	20.3	53.3	43.0	10.3	48.1	48.1	0.23
Salford	61.0	40.7	20.3	53.3	43.0	10.3	48.1	48.1	0.23
Bradford	61.0	40.7	20.3	53.3	43.0	10.3	48.1	48.1	0.23
Leeds	61.0	40.7	20.3	53.3	43.0	10.3	48.1	48.1	0.23
Hull	61.0	40.7	20.3	53.3	43.0	10.3	48.1	48.1	0.23
Newcastle	61.0	40.7	20.3	53.3	43.0	10.3	48.1	48.1	0.23
Edinburgh	67.5	35.0	32.5	51.2	41.0	10.2	46.1	46.1	0.40
Glasgow	67.5	35.0	32.5	51.2	41.0	10.2	46.1	46.1	0.40
Dundee	67.5	35.0	32.5	51.2	41.0	10.2	46.1	46.1	0.40
Aberdeen	67.5	35.0	32.5	51.2	41.0	10.2	46.1	46.1	0.40
Paisley	67.5	35.0	32.5	51.2	41.0	10.2	46.1	46.1	0.40
Gretnock	67.5	35.0	32.5	51.2	41.0	10.2	46.1	46.1	0.40
Leith	67.5	35.0	32.5	51.2	41.0	10.2	46.1	46.1	0.40
Perth	67.5	35.0	32.5	51.2	41.0	10.2	46.1	46.1	0.40
Dublin	65.4	32.0	33.4	48.7	38.7	10.0	43.7	43.7	0.18

JAMES GLAISHER.

Miscellaneous.

TO PROPAGATE DOUBLE STOCKS.—The following method is a very old one, although perhaps not generally known. It was practised by my father nearly 40 years since, and was published in one of the garden periodicals of that day. I have extracted the following memorandum from his MSS. :—"I have practised two methods of taking cuttings from double Stocks, and with equal success in striking them; but I much prefer the one to the other, as I find the two methods produce very different plants. The one I consider the best, is to take cuttings from the plant which will bloom. On the side shoots producing the flowers beneath the existing blossom, another, and frequently two other shoots, are produced. Take off those shoots at the lower joint before they show flower, and with a sharp knife cut off the two lower leaves; insert the cuttings in pots filled with any light rich compost, and treat them as other soft-wooded cuttings. When well rooted, pot them off in pots of sizes proportionate with the progress they have made, and they will make plants equal in symmetrical beauty to any raised from seed, and will flower more abundantly." This method of propagating stocks from cuttings may, at first sight, appear tedious, but it will not be found so in practice. Besides, there are some advantages to be derived from it, which are not so strictly within our reach when propagating from seed, viz., the certainty of commanding groups of the lovely flowers, all double, and of the equal certainty of perpetuating any favourite or peculiar variety. This is surely a boon to us in these days of ribbon borders and self-coloured beds, and should be practised, especially with the East Lothian varieties, in order to keep the colours distinct, and to ensure double flowers. *Edward Bennett*, in "*Florist and Poinsettist*."

THE INK PLANT OF NEW GRENADA.—There is a plant in New Grenada which, if our ink makers could only grow in sufficient quantity in this country, would be a great boon to them. The plant is called *Hydrophyllum* it is commonly known as the Inkplant, and it is simply the juice that is used, without any preparation. Its properties seem, according to a tradition in the country, to have been discovered during the Spanish administration. A number of written documents destined for the mother country were embarked in a vessel, and transmitted round the Cape; the voyage was unusually tempestuous, and the documents got wetted with salt-water. Those written in common ink became illegible, whereas those written with "chanci" (the name of the juice) remained unaltered. A decree was therefore issued that all Government communications should in future be written with the vegetable juice. The ink is of a reddish colour when freshly written, becoming perfectly black after a few hours, and it has the recommendation of not corroding a steel pen so readily as ordinary ink. *Nature*.

Garden Operations.

(FOR THE ENSUING WEEK.)

PLANT HOUSES.

THE Victoria Lily (Victoria regia) and the *Nymphaea* generally should now in properly ordered autumn be making good progress in the matter of growth. To insure this to the utmost extent, it is of great importance that the tank in which they grow should be kept clear of the various slimy formations, and that the water should be sweet and wholesome. To effect this frequent scrubbing of the internal surface will be necessary, as well as an almost constant supply of fresh water, even if the latter is only afforded in very small quantities, as there is no small amount of water within the tank, or in such a position as to afford a periodical watering over of the surface of the leaves, these should be syringed as frequently as practicable. *Camellias* which have nearly finished growing, in so far as actual enlargement or leaf formation is concerned, must be watered with far greater caution than when the roots were supposed to be in the heyday of the growth. The same remark applies with equal force to the *Indian Asplenium*, as such a forward stage of development. *Cape Palmaris* in the act of expanding their first blooms should have a plentiful supply of air, though to induce finely finished blooms it may be as well to shut up somewhat early, giving them a nice damping overhead with the syringe, until the bloom is so far advanced that it might be injured thereby. Do not, however, if the plants are weak, give them water, which is of much importance to them at this stage. Push on and encourage *Euphorbias*, bulbous *Generas*, *Eranthemums*, &c., to make all the growth possible preparatory to winter flowering. Regulate the growth of all *Climbing Plants* frequently, for to neglect them at this time will be to risk the loss of all their beauty at the blooming season, so apt are they to become irremediably entangled, and that quality. Should now the *Zonal Pelargoniums* should now be shifted into larger pots, to come on for display in conservatories, &c., during the incoming summer months. Pinch back the young shoots upon old plants of *Fuchsias* as frequently as they form, so that they in their turn may throw out young shoots in succession. Pot on also for conservatory and similar decorative

purposes, the stiffest young plants of each variety of *Colours* to hand. The early flowering *Ericas*, now that growth has actually commenced, may receive a tolerably liberal shift. Rich peaty soil should alone be used, with a liberal supply of silver sand. Each plant must be potted firmly by ramming the soil round the roots, and the old soil &c. As the plants give them such a watering will insure the moistness of every part of the ball alike. Remove them subsequently to a cool pit or house, where they can be shaded from the full force of the sun. Give every attention to the stock of plants which are being grown on for flowering in the coming autumn and winter by potting on, and by pinching back the young growing shoots as required, to form bushy plants. Encourage *Indian Aspleniums*, which are flowering in a like manner, and by affording heat and moisture freely.

FORCING HOUSES.

The *Earliest Vineries* will now with many be at such a stage as to need the operation of thinning the berries. This, as I have frequently suggested, should be commenced, and finished where practicable, by anticipation rather than by permitting them to swell until they call out their help, and then cutting each bunch cut them away with moderate freedom at the extreme ends of each. This often induces the berries to swell better upon the rest of the bunch. Be very careful in using the syringe after thinning, in all instances where the local water contains sedimentary matters of any form, as this, by attaching itself to the berries, is likely to destroy their colour and appearance when fully ripe. In such cases therefore the berries must not be syringed when swelling freely, though it will be necessary to constantly afford as much humidity as possible, in connection with a sufficiency of fresh air, as the external elements will allow. In those early houses where the fruit is colouring let every young growth upon each Vine be carefully pinched back; at the same time taking every possible care not to in any way injure the more matured leaves, which are so essentially necessary to carry the crop successfully through this final stage. Carefully shade those *Pines* which have been recently potted, without fail, during the hottest part of the day; by so doing they will be greatly assisted through a very trying period. Give water to these with great caution for a few weeks; this, with a moderate supply of fresh air, and an abundance of humidity, will tend to give them a good start. Keep up besides a nice bristly bottom-heat, and cut off running lateral shoots, causing an excess. In *Peach* and *Nectarine* house, wherein the fruit is swelling off finally, give all the air possible. Withhold both root-watering and syringing from *Figs*, the fruit of which is ripening. In instances, however, where the first crop is gathered, revert to the free use of both. Pinch back the young growing shoots upon such as are at an earlier stage, and stop the further enlargement of the branches by pinching out the terminal bud when five or at most six young leaves are formed. *Cherry trees* should again be watered freely after the crop is gathered, to aid the trees in forming better developed wood for the ensuing year. Sow seeds of both *Cucumbers* and *Melons*, to come on for planting in those pits or frames which are now used to forward bedding plants, so soon as they are emptied. Pinch back the points of the young lateral shoots upon all plants, and in late autumn, in all instances where a display of fruit-bearing flowers exists at one leaf beyond the one at the axils of which they are situated, and of all others wherever it may seem desirable in connection with the extent of the pits or frames, or their relation to the other branches, &c.

HARDY FRUIT GARDEN.

Here effectually amongst *Strawberry plantations*, and subsequently give them a good mulching with short litter, or, if this is not procurable, what is better still, mulch them in another week or two with sweet wheaten straw, which will not only prevent excessive radiation, and consequently loss of moisture in dry weather, but will be ready for the fruit to rest upon when swelling and ripening. Thin out excessive crops on *Peach* and *Nectarine* trees, and continue to disbud the *Worms* becomes necessary. Thin out the young growths at the base of *Raspberry canes* to three or four of the strongest only. This will not only tend to give strength to the bearing canes, but also to increase the vigour of such as are saved to produce next season's crop. All *Grafts* should now be looked over, and such ties as appear at all tight should be loosened a little, to allow the stock and graft to swell naturally. When the vines are however, take the precaution to secure the graft that it may not be broken off by the wind.

HARDY FLOWER GARDEN.

Reverting to my own practice, and the suggestion which I invariably make at this season, I would warn all against "bedding out" before the 20th of the current month. If in one year many degrees of frost were experienced upon May 18, it is possible the experience may be repeated, hence the safe side should be held to. Give *Roses* which are practised in a good top-dressing with rotten manure. Divide and transplant *Polyanthuses* into nice rich soil, and if cool so much the better. Take up with despatch all early bulbs required to be removed to make way for summer bedding plants. Tie up *Paeonies* as they require it, as

also *Pinks*, *Carnations*, &c., which now spindle apace.

KITCHEN GARDEN.

It is of the utmost importance that the hoe should be kept going regularly amongst seedling crops so long as there are any weeds, and especially after heavy rains, to loosen the soil and encourage growth. *Vegetable Marrows* may now be planted in rows, and the prepared beds, provided that some kind of protection, such as handlights, can be made use of for their benefit. Thin out seedling crops of *Beet*, *Carrots*, *Parsnips*, &c., which may be sufficiently advanced in growth to allow of this being done. It is often of much benefit to *Savoy* stools to thin out the young and more weakly shoots in instances when too many push out, and which it is surmised cannot form efficient crowns. Four or five good shoots are ample for forcing under ordinary-sized Kale-pots. Where, however, it is grown in rows, for the purpose of taking up and forcing, it is far better to thin out any superfluity than to allow them to remain. Take out one or two trenches, and manure the bottoms heavily for the first row, which may then be got out soon. Curled *Endive* should now be sown in a moderate quantity for an early crop. Sow also, for succession, *Spinach*, *Leeks*, *Wintergreens*, *Cattail's* *Eclipses* and *Williams' Alexandras Broccoli*. The two latter are excellent late varieties. Transplant a few *Leeks* for early use. Sow a small quantity of *Cauliflower* to succeed those last sown, and transplant permanently all *Coleworts*, early *Broccoli*, *Savoy*, or *Brussels Sprouts*, seedling plants of which are sufficiently forward for the purpose. *W. E.*

TOWN GARDENING.

The following *Hardy Annuals* will all succeed well if sown at once; they must, however, be frequently sprinkled during their growth, should dry weather set in.—*Lupins*, *Candytuft*, *Nemophila*, *Collinsia*, and *dwarf Nasturtium*. After the 20th of the month plant out *Dahlias* in the open borders; for these, holes should be dug about 2 feet wide and 18 inches deep; a quantity of rotten dung well incorporated with the soil should then be placed in them, and trod down tolerably firm, after which the plants may be put in, and have a stake driven in close to the root, so that they may not be injured when they begin to grow. The beds intended for *Pelargoniums* and other *Bedding Plants* should now be forked over, adding a portion of leaf-mould and sand; level the ground, mark out the rows 9 inches apart, and put in the plants 9 inches ridges diagonally in the row. The *Nosegay* class of *Pelargoniums* I have found to do the best in town, and also the following *Calceolarias*—*aurea floribunda*, *Kayii*, and *Prince of Orange*; and *Lobelia speciosa* and the *Golden Pyrethrum* for front rows. *Carnations* and *Picotees*, now commencing to show their flower-buds, should have their stems neatly tied as they advance in growth; all lateral buds should be removed if the flowers are to be secured, leaving only the terminal bud on each stem. The *Pompon* *Chrysanthemums* should now be topped, and if the cuttings are put in in a shady border, they will make nice plants to remove into the beds after the bedding plants are done. Ivy should have all dead leaves removed, be closely nailed, and planted where required, preferring for this purpose those plants which have grown in pots. Window boxes should now be planted with autumn-flowering *Mignonette* and *Intermediate Stocks*, which will thrive well if the boxes have a piece of board fixed on each end sloping from the wall to the front of the box, which will in a great measure prevent the cutting winds from injuring them. The *Cobaea scandens* or *Convolvulus major*, if planted at the ends of the box, and trained round the window, make a pretty display as creepers. Deciduous hedges and shrubs, such as *Privet*, *Lilacs*, &c., which have made strong growths, should now be trimmed in, otherwise they will drop after rain and injure many plants in the borders. *J. D.*

Notices to Correspondents.

BEETLES ON LARCH: *J. Coker*. *Otiorynchus Notatus*.

Hand-picking is the best treatment that has been suggested, but it requires to be done promptly on their appearance, and before they have become very numerous and a fresh host of larvae will by-and-by appear. *A. M.*

BOOKS: *Pinus*. Hoopes' "Book on Evergreens," an American book, to be had of Trübner & Co., will suit you; price a few shillings.—*G. E. Hentrey's* "Elementary Course of Botany," 2d edition, Van Nostrand.

CUCUMBER DISEASES: *J. M.* I am strongly suspect that you have a victim of the notorious *Cucumber disease*, for which no one as yet has been able to provide a remedy.

EXCRESCENCES ON VINE LEAVES: *A. B.* The excrescences on your Vine leaves are a mere overgrowth of the cellular tissue, and are not of any material consequence. We believe that they are due to an effort of Nature to utilize superabundant nutriment. *M. J. B.*—There is no *Oidium Tuckeri* on the Vine leaves from Australia. The appearance is, we believe, entirely due to an unusual rainfall. Sulphurates would be useless, as would any other employment of sulphur. It is possible that the *Oidium* may exist, but this was not the case in the specimens we examined. *M. J. B.*

GRAPE DAMPING OFF: *Uva*. It is the effect of cold,—a sudden chill, or something of that sort.

INSECTS: *C. R.* The white substance on Beech is the

Journal. A first hurried perusal of his Scottish Farm Reports, which have recently appeared, led to the impression that such a task as has been there performed by a very clever man, would have been better done by one of larger and longer agricultural experience. It would no doubt be an agricultural misfortune if a lively pen, which has such graphic powers as that of Mr. JENKINS, should cease to instruct and interest the large constituency which, as Editor of the Agricultural Society's Journal, he addresses. But there is even greater need that his pages be trustworthy than that they be readable and lively; and the disparaging tone in which "the lease" of land in Scotland is spoken of by the Secretary and Editor of the Royal Agricultural Society of England does, in our opinion, sufficiently justify our criticism.

We are writing in full view of the great change which, virtually by the lease, has been produced in East Lothian. The whole district appears, as our train is passing through it, dotted almost equidistantly with compact homesteads, each furnished with steam-power. It is divided rectangularly into fields, surrounded by hedges trimmed like walls; with the last straight row of the growing grain crop as parallel and close to this perfect fence as if it were all garden ground. The fallow land is ribbed up ready for the Turnip sowing, or the Potatoes are all planted—a last field or two, with its well-arranged band of horses, carts, ploughs, and planters, being on the point of completion. The whole result, to an agricultural eye, leaves nothing to be desired. There is nothing better, nothing even equal to it, agriculturally, in the island. And whatever evils may have arisen in East Lothian and elsewhere out of excessive game preservation—out of the landlord's privilege of hypothec—or from the folly of leaving the re-arrangement of a renewed holding till the expiry of the term, this perfect agriculture may be described as the effect of leasehold occupation. Certainly the enormous rental and the immense produce of East Lothian farms are a wonderful illustration of the power for agricultural improvement possessed by the lease.

If, then, any one has had his confidence in leasing land for a term of years, as an agent of the highest agricultural importance, shaken by the Scottish reports in the Journal of the English Agricultural Society, we recommend him to hold fast to the experienced "Mr. HOPE, of Fenton Bass—a vigorous advocate for the lease system"—even though he should have to shake off Mr. JENKINS. Or if he must have English authority on the whole subject of the relation of Landlord and Tenant, let him read the speeches in another page by Mr. EVAN DAVIES, of Shropshire; Mr. HORSELL, of Wiltshire; and Mr. C. S. READ, M.P., of Norfolk.

The rapid rise in the value of land at the commencement of the present century, and the formation of great estates by the merchants and financiers of 60 years since, inaugurated a new era in the HISTORY OF ENGLISH AGRICULTURE. But although this is the latest, it is not by any means the first, agricultural and rural revolution which the country has experienced.

The breaking up of the feudal system, and of the estates of the great nobles, was followed by that somewhat jovial period of mediæval history which yet lives in picturesque costume in the poetry of CHAUCER, and survives in the prose descriptions of Chief Justice FORTESCUE. The latter tells us, "there is no where else so great a number of landowners as in England." And the number of knights, esquires, franklins, freeholders, yeomen, and landed men "abounding in England," and themselves abounding in comforts, and good cheer too, has excited admiration and envy to this day. According to some writers England has never been so happy before or since. Unfortunately the golden ages seldom last long, especially in an island where the acreage is limited, and the families are large, and increasing in alarming and geometric proportions. Accordingly our golden age lasted less than a century. Different authors have narrated its decline in very different terms. The "advanced thinker" deprecates the increase of wealth unequally distributed, and points to the large farming of the Roman aristocracy which preceded the decline of the Empire. The "moderate conservative," on the contrary, declares that "when the half-starved proprietors of 10 or 20 acres had parted with his land to his richer neighbour, agriculture began to improve."

The houses of the little corn growers of the 14th and 15th centuries were now no longer required, and in spite of the Act of 1488, which prohibited the pulling down of any farmhouse having 20 acres of land attached to it, the superfluous tenements continued to be pulled down. A writer in the time of HENRY VIII. complains that in some instances 18 or 19 houses were "shrunk into one." Wool had become the staple trade of the country, and the result was, pasture and sheep farming was greatly stimulated, and some rural districts were sadly depopulated. Even the Lord Chancellor of the day, sitting upon a woollack, complained that "sheep, mild and tractable, may now be said to devour men, and unpeopled towns and villages." An Act of HENRY VIII., after reciting that some flockmasters kept 20,000 or 24,000 sheep, prohibited the keeping of more than 2000 by any one person.

Similar restraining enactments were frequent during the economical revolution that was in progress, but they were nugatory. A reaction, however, in favour of arable farming was gradually induced by the growth of the population, and it was fostered by a bounty paid on corn exported.

These brief historical reminiscences show that the size of farms had been continually increasing for 300 years, but the progress of the revolution had been exceedingly slow compared with what has happened during the last 70 years. A hundred years ago, tenants for unoccupied farms were not too easily found, and rents were so low and land of such small value comparatively, that if holdings were a little too big for the occupiers they sometimes let the least desirable fields lie in waste for a time. Corn was regularly exported under the encouragement of a bounty for the benefit of English agriculture.

The rapid increase of commerce and of population has changed all this. A series of indifferent crops, and a great European war, put a sudden end to our corn exporting, and in a few years—between 1800 and 1815—the value of rents was doubled. During this period the formation of the large estates, which COBBETT and others watched with so much jealousy, was commenced; the yeomen, who were so numerous in the last century, began rapidly to disappear, and the modern system of capitalist, farmer, and great proprietor was established. In most cases the yeomen proprietors sold the estates on which they had previously subsisted, rather than flourished, in order to hire more land, and not from any necessity to sell, and we could point to a score of instances in our own experience where yeomen, possessed with a spirit of progress, abandoned ownership and amassed large fortunes as tenant-farmers.

The movement which has attracted so much notice, and some amount of apprehension, was, in fact, induced by the material prosperity of the country. In this chapter of our history extreme politicians have fancied they discovered the traces of much evil design and injustice. Nevertheless agriculture has thriven and still thrives under the patronage of the great proprietors, though it must be admitted that the relation referred to is opposed to the rules of political economy, and is in singular contrast to the commercial advancement of the country in every other department. It reminds one of that early stage of society when all industry depended on the patronage of the great, and found security in a personal tie with the possessors of power. Formerly trade could exist only under the immediate protection of a feudal lord; and in the ruins of the ancient castle in picturesque proximity to many of our older towns, revived perhaps by modern sources of wealth, we see evidences of the shelter under which a little corporation of industrious burghers formerly managed to exist. The primitive relations of rural life are in many respects interesting and attractive, and no doubt they have nurtured many virtues, but those who dread the subversion of a recent institution, or rather a modification of the usage of the present century, will find comfort in the reflection that all such changes are natural and inevitable. Customs are not entirely stable; they are constantly changing and adapting themselves to the circumstances of the times. They come to an end like the life of old people, who pass away when their work is done, respected and regretted by the generation that is destined to succeed them. It cannot be overlooked, even by the admirers of feudal customs, that the districts which have taken the lead and advanced further in agricul-

tural improvement are those counties where leases, or some form of adequate tenant-protection, have been customary. And all recent discussion on the subject of land tenure tends to show that the security for investment which seals and signatures can alone give is one of the growing wants of agriculture, which must therefore be gradually substituted for the less definite bond implied by the existence of a cordial understanding; and nothing more, between landlord and tenant.

—WHEAT advanced 1s. per quarter in Mark Lane on Monday, and on Wednesday, although business was on a limited scale, prices were firm at Monday's quotations. —In the Metropolitan Cattle Market on Monday there was a large supply, and black trade. Prices were on the average, lower. A short supply on Thursday cleared readily at higher prices for cattle. Mutton and lamb, however, were in excess of the demand. —There is an active demand, accompanied by high prices, in the Wool Market.

—On Monday evening the Bills relating to the subject of local rating were withdrawn by Mr. GLADSTONE, there being no chance of proceeding with them this Session. —On the suggestion of Mr. HUNT, the Home Secretary expressed his willingness to refer all the Game Law Bills to a Committee of the House.

—MR. ROMAINE lately described before the Society of Arts a plan for DESICCATING VEGETABLES at a low temperature—the advantages claimed for it being that the aroma of the fresh vegetable was retained. His paper was illustrated by the following tabular statement of the quantity of useless water present in ordinary garden and farm plants:—

QUANTITY OF MOISTURE LOST BY VEGETABLES AND HERBS PREPARED BY THE DRY GILD DRAIN PROCESS.

Name.	Order.	Proportion.		Water.
		Dry	Fresh	
		Oz.	Oz.	Per cent.
Onion	Lilyworts ..	1	6.78	85.95
Leek	"	1	10.40	90.37
Vegetable Marrow ..	Cucurbits ..	1	12.57	92.24
Watercress	Crucifers ..	1	13.41	92.54
Cauliflower	"	1	9.24	89.17
Savoy	"	1	9.58	89.36
Brussels Sprouts ..	"	1	11.45	90.86
Broccoli Sprouts ..	"	1	6.23	84.94
Turnip tops, stripped ..	"	1	7.58	85.71
"	"	1	6.95	89.95
Seakale	"	1	13.14	92.30
Khubarb	Buckwheats ..	1	23.65	95.82
Burd	"	1	18.77	94.67
Beet, garden	Chenopods ..	1	5.47	81.78
Mangel	"	1	8.5	88.23
Spinach	"	1	7.93	87.38
Green Pea	Legumes ..	1	3.94	74.08
Broad Bean	"	1	4.60	85.54
Apple	Appleworts ..	1	6.1	83.6
Potato	Nightshades ..	1	3.58	69.51
Tomato	"	1	6.65	86.05
Basil	Labiates ..	1	8.4	88.09
Mint	"	1	4.75	78.94
Sage	"	1	7.25	85.61
Tarragon	Composites ..	1	2.67	62.54
Jerusalem Artichoke ..	"	1	4.89	79.55
Lettuce, Cos	"	1	17.5	94.68
Celery	Umbellifers ..	1	11.13	91.01
Parsnip	"	1	3.58	72.06
Carrot	"	1	6.16	81.6
Parsley	"	1	9.48	81.75
Chervil	"	1	6.66	84.98
Mushroom	Fungi	1	12.28	91.85

Many people have a vague idea that the food they eat is made up, in a large measure, of water naturally contained in it, but the actual quantity is amongst the things not generally known. To learn of a certainty that in a bunch of hard Carrots and Turnips, weighing together 10 lb., when scraped and pared for cooking, there are seven pints of water to 1 lb. of aliment, may well call forth an exclamation of surprise like that of Prince Hal's, "How monstrous! But one half-pennyworth of bread to this intolerable deal of sack." To the farmer and market-gardener the Table forms a valuable index, showing how little he has to return to the earth, in the shape of fertilisers, to make it reproductive, and how much is supplied to form his crop by the gifts of rain that waters and dew that moistens his fields. Here we read another of Nature's lessons, teaching the intimate connection and dependence upon each other of works of drainage and irrigation, the necessity of collecting and distributing the fruitful showers as well as of drawing off the superfluous moisture, and of arranging these processes so as to be successful. It was quite clear that there was no parasitic growth on them to which the disease could be attributed, and the root-stock showed specially the same

—We have lately received some ROOTS of CLOVER from a field where the plant was already thin, but which seemed likely as the season advanced to become still thinner, as several individuals were in a dying state, the crown being withered or far advanced in decay. The roots were examined, and to find there was any worm or noxious insect about them, but was found, and the specimens above-mentioned were accordingly transmitted to us for further examination. It was quite clear that there was no parasitic growth on them to which the disease could be attributed, and the root-stock showed specially the same

— Since we last noticed the Kingscote herd there have been seven births, four heifers and three bulls, some of which are valuable additions to the herd. *Archduchess* by DUKE OF WHARFDALE (19,648), has a beautiful roan cow calf, by 3D DUKE OF CLARENCE (23,727). *Clare* by DUKE OF WHARFDALE (19,648), has a red cow calf by 3D DUKE OF

judge from the number engaged either in the production or in the sale of it. Go to any county town in the south of England on market day, and you will find more sellers of artificial manure than farmers selling grain. To the appearance they live on the best, have well appointed traps, good horses, and are well dressed. Many of them, now seemingly well off, a year or two ago were reported to have been unfortunate in the callings in which they were brought up. Their most valuable stock-in-trade is their tongues. Their wares are in general rubbish; in some cases they manufacture for themselves, in others they represent themselves as selling for some or one of the well-known manure manufacturers. A fortnight ago, attending market in one of the towns in Hampshire, no less than four different persons represented themselves as sellers of Mr. Lawes' manures; whether the whole or what portion of the manures they sold were manures really manufactured by Mr. Lawes, is best known to themselves. A few months ago a very plausible gentleman came the round of the farms in the neighbourhood in which I live. According to his own account he was offering manure containing not less than 20 per cent. ammonia, a fair dose of superphosphates, &c., at £8 a ton, with twelve months' credit, or £7 10s. cash. The bait, however, did not tempt me, nor yet a neighbour farming extensively and highly; some of the farmers in the neighbourhood swallowed the bait greedily, and purchased extensively. About three weeks ago there were some ugly whispers about the visits of carts and waggons at midnight to a sand pit rather too close to the manure manufactory, and these whispers were topped by a dissatisfied agent of the manufacturer splitting on his principal and letting the cat out of the bag. Two or three of the purchasers sent samples to the analytical chemist, and to London and Glasgow. I give you here under the analysis of one batch, made by a celebrated Glasgow chemist:—

Biphosphate of lime	1.28
Insoluble phosphates	1.79
Sulphate of lime	6.23
Sand	56.48
Alkaline salts	8.59
Organic matter	23.20

Ammonia, total, .40= sulphate of ammonia, 1.54.

The purchase of an article like the above will not result in propping up the tottering faith of farmers in artificial manures. It will result in consequences most disastrous to a number of respectable artificial manure manufacturers, who will be looked on as tarred with the same brush as the vendor of the article, the analysis of which is given above. Is there any wonder, then, Mr. Editor, that farmers should in self-defence form themselves into co-operative societies in order to protect themselves against fraud, or that the less educated among them should look at all manure manufacturers as belonging to one caste? My first year's expenditure of £90 in rubbish led me last year to go to a respectable man acting as agent for Mr. Lawes. I asked what guarantee as to quality he would give. "None at all," was his answer. "The only guarantee I give is that the goods are the same as I get from Mr. Lawes—in no way tampered with." I was satisfied with the results for 1870 on a total purchase amounting to nearly £120, and although a shareholder in a co-operative society, I have gone to the same agent for 1871; and I trust, if I cannot make a cheap manure through the bodies of my stock, I shall at all events have purchased not a dear artificial manure. Why a well known man like Mr. Spooner, whose honour no one doubts, should take up the cudgels for those of his cloth, whom if he does not know as actually doing it, he must strongly suspect of selling a vicious article, no one can except on the principle of *Quem deus vult perdere, &c.* The style of his letters will do more harm to his own lot than even the publication of the analysis of the vicious articles that appear from time to time in the columns of the *Agricultural Gazette*, or in the *Journal of the Royal Agricultural Society*. Farmers who have been victimised by the black sheep of the artificial manure trade will be much more ready to believe that even the respectable part of the artificial manure trade is tarred with the same brush as the disreputable portion, than that gentlemen, such as Cowper Temple, Hughes, and Vansittart, and others, are legged in a grand conspiracy to destroy trade by ruining honest tradesmen. The co-operative system can only exist on an existing system of fraud in vogue among too many of the tradesmen of the day. The public at large, as Babbage pointed out, must pay for verification of price, and the co-operative system has

only arisen from the public having had to pay for verification of price without getting a verification in reality. Scientific writers like Liebig, Lawes, Voelcker, Gilbert, Way, and Sibson, have pointed out how the shortcomings of the foylady may be supplemented by chemical produce in the shape of ammonia, phosphates, alkaline and other salts, and a catholic (not a religious) press has disseminated their labours through the length and breadth of the land; and slow as the agricultural mind is in being moved, there are always one or two pushing individuals in every rural district who can run and read and point out that ammoniacal salts costing about 7d. per lb. for ammonia, and bones, coprolites, and sulphuric acid, can be had at such prices as to make it worth the attention of farmers to do for themselves what some of these

128). Some cottages, in accordance with these plans and elevation, have been recently erected upon the Henlow Grange estate, in Bedfordshire, the property of the Rev. Henry Addington.

They are designed in compliance with the rules and requirements of the Inclosure Commissioners, and present a few features of convenience to which especial attention may be directed. Thus, it should be observed, that the front entrance, facing the road or village street, opens into a porch or lobby, from which the staircase springs, by which means much privacy is secured within the dwelling; then, it will be seen that the resident can pass directly from the living-room into the scullery, an arrangement of great convenience; and lastly, it will be found that the bedrooms, which are as large as the space within the cottages will allow, and are all provided with small fireplaces, open directly on a well ventilated staircase.

The cubical space contained within the cottages is as follows:—Living-room, 1200 feet; scullery, 688 feet; pantry, 224 feet; fuel store, 146 feet; staircase and landing, 820 feet; 1st bed-room F, 846 feet; 2nd ditto, G, 688 feet; 3rd ditto, H, 638 feet; which together make a total of 5248 feet cube.

The outside and party walls would, under most circumstances, be of brick 9 inches thick, and the roofs be covered with Bangor Countess slates laid to a 24-inch lap.

The cost of these cottages will be about £265 per pair, exclusive of drainage and water supply; but exclusive of the out-buildings, the character and extent of which are so dependent on circumstances that no price can be quoted for them.

An alternative elevation (fig. 128), adapted to the same plan, and applicable to situations where more ornamental appearance is desired, as, for instance, at the entrance to a park or on a site near the mansion, is given herewith.

The first cost of such a structure will of course be somewhat in excess of that of the plainer building, but under special circumstances, as those just alluded to, it will doubtless be considered that the superior appearance obtained will amply compensate for the extra expense incurred.

THE CABBAGE PLANT.

[The following discussion ensued upon Mr. Cadde's paper on this subject before the London Farmers' Club.]

MR. G. MATSON (Mersea, Colchester) started with the reader of the paper that Cabbage growing had not received the attention it deserved from the farmers of England. He believed that in a few years it would be everywhere recognised that cabbage was one of the most invaluable products within the farmer's reach. Although he had been engaged in farming operations for 14 years, he must confess he never grew Cabbage till last year, when he was induced to plant some upon half an acre of land beside the road. The result he did on June 4. On January 16 he found that the ordinary green food which he required for 150 Hampshire lambs failed, and he turned to the Cabbage. For weeks he might say the animals lived upon nothing, besides corn and cake, but the Cabbage leaves stripped from underneath the plant. In his latest crop of Cabbage was grown in July, and fed off in October, but he had some seed from Sutton, of Reading, sown in October, which he fancied would produce an immense quantity of food. On heavy land the autumn-sown Cabbage was not what was most suitable. It was in that case necessary to transplant in the summer to consume in the autumn.

Mr. McCut had been a Cabbage grower for many years. He always grew plants in the spring, to come in during the late summer months. At harvest-time, for instance, they were exceedingly useful. As they always should keep cattle stall-feeding in the summer, as well as winter, the value of Cabbage, it would be seen, was immense when other food was scarce, and this generally happened in July, August, or part of September. At that time he invariably planted about six acres of Cabbage after winter Tares. He generally got a good crop of winter Tares mixed with winter Oats and some Wheat, which was of course cut and consumed. As the land was cleared he manured it with 20 loads of rich manure; then double ploughed it, one plough going on the top, and another, drawn by four horses, going underneath. What applied to many other crops applied also to Cabbage—it wanted deep cultivation and plenty of manure. The land being so manured and rolled down, he watched the opportunity for a good thunder shower, which was a very uncertain affair. Last year he had



FIG. 126.—LABOURERS' COTTAGES—ELEVATION.

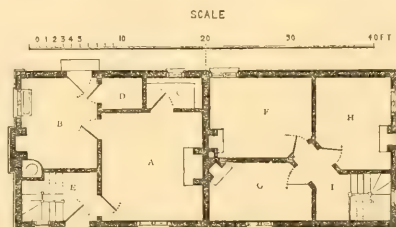


FIG. 127.—PLAN OF COTTAGES.

REFERENCES: Ground Plan (A to I)—A, Living room; B, Scullery; C, Poultry; D, Fuel; E, Stairs. Chamber Plan (F to I)—F, G, H, Bedrooms; I, Stairs.



FIG. 128.—ALTERNATIVE ELEVATION.

fraudulent manure-makers profess to do for them, but never do. Even without co-operative societies the cultivators of the soil need not pay anything like £8 a ton, even with 12 months' credit, for a manure containing 56 per cent. of sand and .40 of ammonia. Before I finish I have only to add, that if farmers would co-operate in forming a society for protection, the same as the London tradesmen have done, they might soon weed out all the fraudulent dealers in either feeding stuff, seeds, or manures. *Rhoda Bux.*

LABOURERS' COTTAGES.

WE propose, during the next few weeks, to give a series of illustrations of cottages which have been erected in different parts of the country.

The first example selected is that of the pair of cottages designed by Messrs. Bailey Denton, Son & North, of 22, Whitehall Place, Westminster, represented in the accompanying woodcuts (figs. 126, 127,

to wait an unusually long while, but the moment the opportunity arrived he got every person in the neighbourhood upon whom hands could be laid. The cabbage was taken from the beds and on one put into the ground, the marks being of course made with the drill. He recommended every farmer to have always a bed of Cabbage plants; the same with Kohl Rabi, else just as the plants were wanted, a difficulty might be experienced in getting them, because even if there were any near, which was not very often the case, they were in general demand. In his case they applied the jet to the Cabbage bed, and the consequence was the plants pulled up easily with plenty of mud around the roots, and were much more likely to grow than under any other circumstances. Although last year was so unfavourable to planting out, the Cabbages were planted out. Then came the unfortunate winter, when he expected every Cabbage would have been killed, but they had, on the contrary, proved to be of the utmost value during the present spring for the lambs. Of so much value were they that a neighbour of his had bid him £15 for a single acre for his sheep and lambs; but he declined to part with them. In feeding bullocks, he passed the Cabbages through a pulper worked by steam-power, and it was astonishing how useful they were mixed with the other food. Kohl Rabi was very much the same kind of thing as Cabbage; it transplanted admirably, and it might be grown from seed, and in growing from seed it had better be treated as in the case of Mangels. There was one point to which he would wish to draw the attention of the public at large, especially the inhabitants of towns, namely, the application of town sewage for the growth of Kohl Rabi and Cabbage. He once grew 12 acres, when he kept a quantity of pigs, and applied sewage with the jets, and the Club could have no idea of the enormous production. On one occasion there was a small leakage from the sewage pipe, and along the line where it ran the Cabbages were almost as big as bushel measures over and above the rest of the field. An examination of any of the sewage farms would show the enormous rapidity with which the Cabbage crops were grown. The plants were always healthy, because they were always kept moist. Cabbages put into sewage ground in 10 weeks produced a crop of £25; they got on well in the open ground, the result of a tropical climate by the summer application of sewage.

Mr. H. TRETREW (Silsoe) had adopted the system of the late Mr. Fisher Hobbs, whose name was known to most persons in the room. His plan was to sow in August, strike the Cabbage out in November, plant them out in February, and about July or August they came into crop, and went on from that time till Christmas; and every year he had had Cabbages from about June and July till Christmas. Mr. Cadle had alluded to the value of Cabbage in May, but in May with him they were not wanted so much, as they had generally good grass at that time. With him the short time for grass was July and August, and then the Cabbages came in useful; but in the grazing counties of Leicester and Northampton the grass lasted longer than there, the dry season being less common, and less necessary. In planting the Cabbages he sometimes planted on the ridge, and sometimes at every third furrow; and he found it a good plan after drawing the plants from the beds to drop them in liquid manure, and had succeeded very well in that way. The gentleman who grew the most Cabbages, and who did it the best in his neighbourhood, was Mr. Charles Howard, who also went in for spring Cabbages that sometimes came to a second crop, but in his case they were not so good from a second crop which came too late in the season. The next point was, that when they had found a good sort to keep it up. As soon as the Cabbages were formed he usually went round with a man, who took some sticks and stuck them into the selected Cabbages. He went in for purples in the first place, then for a good flat-formed and close-grained Cabbage. All these were kept for seed. He did not grow the seed himself, but he selected two or three cottagers who did not keep bees, and he gave them the Cabbages to grow for seeds. He had improved his Cabbages in that way. Reference had been made as to the exhaustive nature of the crop. If he understood Mr. Cadle's argument, it was that the Cabbage crop was an exhaustive crop, and that was just the drawback to it, because it was difficult to know what to do with the land afterwards. The man who got Turnips afterwards and manure the land, but there was always a bad crop after Cabbages. Mr. Cadle had very properly united with the Cabbage the Kohl Rabi, which was comparatively a new plant, and was one of the greatest boons they had had for a long time. In the neighbourhood in which he resided they could grow Swedes and Turnips, Kohl Rabi and Angel Wurzel, and they got very good crops indeed. The Kohl Rabi was sown on the stiff clays, and on the hottest sands. He had seen it grow on both, and instead of growing out of the ground, as it used to do when he first saw it (when it was a great plant, and about six inches up), it was now, through cultivation, as pure as a Swede, and quite as heavy, and a great deal more nutritious. The Kohl Rabi was sown in the middle of April, and on until June, and the sheep were put on to it in September. He saw some excellent sheep feeding upon

it in September last year, and doing remarkably well. They all knew that Kohl Rabi stood the winter well. The past severe winter had killed some, but still they had stood it well, and they could at all events say that it was a quite good substitute for Swedes. He did not quite agree about transplanting them, because he saw no necessity for it. They might save a little in seed, but they would lose more in labour. He generally allowed 6 or 8 or 10 tons of farmyard manure, supplemented by artificial manure; and if he wanted early feeding he began in April, and if late feeding in June. The early sown would not stand the winter so well as the late sown.

Mr. J. TRASK (Northington, Alresford) said he did not think Cabbage was an exhaustive crop. Mr. Cadle had quoted a letter from Mr. Saunders, of Watercombe who stated that from 10 years' experience it was not an exhaustive crop. He believed that all crops from which a heavy amount per acre was expected must exhaust the manure put into the ground. He believed with Mr. Mechi (though he was not one of his disciples) that the more exhaustive a crop was the better it paid. Mr. Cadle had quoted a letter from Mr. Stratton, in which he said he had grown Cabbage and had used it as an autumn crop, feeding his lambs with it, and that he had sold them at about six months old at £3 a-piece. In Hampshire they did not pretend to be clever fellows, and did not stick to the old-fashioned ways, but they were not exploded. If they wanted Cabbage, they put in as much manure as the ground would carry, and then they could grow them. He did not agree with Mr. Cadle that the winter planted Cabbage was the best; at all events he did not find it so. What Mr. Saunders had said about growing plants from the seed in sheltered corners, then transplanting them after the Swede crop, and letting them come in the autumn for food, was the plan he had found to be the best, because if they were not well manured they would turn out a pretty good crop.

Mr. H. NEILD (Lancashire) said this subject of Cabbage crops was one of importance throughout England. He came from the North, and there were two points of view from which the question might be looked at; viz., 1st, the very important one of the consumption by their stock, which was the primary consideration of all farmers; 2dly, if the farmer resided at a large town, the consumption by the population in towns, especially when Potatoes were scarce. In the North they were led to consider the growth of Cabbages in consequence of the hundreds of tons of Cabbages brought into the markets of Manchester, and other towns in Lancashire, from Worcestershire and Warwickshire, and other more favoured districts of England.

Mr. J. HORLEY (Leamington) said what he knew of Cabbage cultivation he learnt from Mr. Randell, of Worcestershire, one of the best Cabbage growers, on heavy land, he ever knew. It was very important, as Mr. Cadle had said, to have a good stock; and Mr. Trethewy had given them a good lesson in selecting the seed by having it grown under their own superintendence. He believed the best plants in the world were to be got from Scotland. For deep cultivation in the autumn he had found that the best was to get the rolling, he did not agree with Mr. Cadle, for if the land was in good tilth it was better than rolling, and the plant was better without it. As to the quantity of manure to be used, he thought Mr. Cadle in putting it at £2 an acre had not bestowed sufficient attention to the subject. He did not manure heavily, but he should never put less than 15 tons per acre; and he disagreed with the artificial manure in the autumn. There was a saving in doing so. Perhaps the best way to apply it was during the winter, when the plants were beginning to grow; but as it is now almost impossible to obtain good guano, it is important that whatever artificial manure is used should contain a good percentage of ammonia. In the winter the Cabbage did not require more sustenance than it obtained from the soil. No doubt Cabbages were gross feeders, and too much manure could not be applied, when the plants began to grow. It was desirable, he thought, to have a succession of kinds of Cabbage to feed each other. They could not expect to get them often before June, unless in soil of very high condition. They might then be grown in succession in small relays, so as to have them entirely through the winter. His practice was to plant out a portion in the third week in October, but the ground must be entirely free from game and rabbits, or be protected by a net. The ground must be good and the cultivation, and the state of the land. There was one point which should not be lost sight of, that Cabbages were a healthy food for young stock. There was nothing on which lambs could be fed better; but there was a limit to it, because as soon as the Cabbages began to vegetate in the spring they became bitter, and ewes and lambs then eat them only when positively compelled to do so. He believed they were a useful crop. They took a good deal out of the land, and at the same time a good deal put in; but they were like Mangel—and if they had a good produce from it they could afford to put something in return. No one was better able than Mr. Trethewy to speak of the Kohl Rabi. Bedfordshire was a good county for it; and anybody passing through that county must see the amazing extent to which it was being grown. He believed one gentleman had grown 40 acres of seed in that county.

Mr. GLENNY (Barking) said that if a good crop of

Cabbage was wanted, manure must be put on, not to the extent of £2 an acre only, but to the extent of £8 to £10 an acre. It had been said that Cabbages had been sold at 25 each, but he had been glad to see them sold to King's Cross to be forwarded to Manchester for 6d. per dozen. In planting them he had two men to do it, and that cost 5s. to 6s. per acre, without counting the labour of boys. Two men with lines to guide them would do an acre per diem easily. The plants were placed about two feet square, and were planted out about Michaelmas-day, the seed being sown in August. This had reference to the smaller sorts. At the Lodge Farm, Barking, they were planted about 16 or 18 inches apart; and a friend of his offered £35 an acre for them, and could not get them; but that must not be taken as the average price. With regard to sewage, he believed it was valuable for all green crops, and a most useful help. It had been applied to Onions on Britton Farm, and they had sold for £40 per acre. The Cabbage seed should be sown, and then the plant transplanted. They should never be sown where they were meant to be planted.

Mr. R. LEEDS (Brandon, Norfolk) said this was the first year he had grown Cabbages, and he wished to give a little advice how not to grow them (laughter). He had a friend who understood how to grow the seed, and to transplant the plants in autumn. He sent for them in November, and he planted out 35,000 plants, which were now growing, with the exception that he had the 25,000 had run 25,000 had run away (laughter). Therefore he advised Cabbage growers to be a little more particular than he had been in planting them out. He was told that his seed was sown a little too early, and that they came a little too forward for the season. He was sorry to say his four acres of Cabbage were little or no good.

Mr. MASEN (Wolverhampton) had been in the habit of growing Cabbages for the last six or seven years, and he was surprised to find that the Cabbages, say they were not one of the most valuable of our esculents. He did not, in fact, know the month in the year when Cabbages were not valuable on a farm. As far as he could judge he believed the smaller kinds of Cabbage were the most valuable. They came early, and, if carefully cut off, there would be a second crop, which would come in very advantageously. His principal reason for rising was to explain the difference between the plants which he had seen in the room, and the ones he had grown himself. He had had 15,000 within the last week from Scotland. Some of his own were selected on the same principle as had been explained by Mr. Trethewy; but the difference between the two was as great as the difference in the width of the shoulders of the smallest and the largest man in that room. He should like to know how this difference arose, because he was much struck with it. He was also much surprised at the difference in the weight. He had had equal loads of the two kinds weighed, and one was only 9 cwt. and the other 16 cwt. This was a very startling difference, and he was at a loss for any explanation. One gentleman had spoken of the desirability of dipping the plants in a little liquid manure. He had a tub in which he put liquid manure, and he saturated the plants before putting them into the ground, and it had an excellent effect, particularly in dry season, and prevented the loss of thousands of plants.

Mr. CADLE believed the end of May was one of the most critical times, at all events for farmers on light lands, because they had to keep their meadows for mowing, and hence a difficulty arose in feeding the stock. If they had a stock of Cabbage at that time it would be useful, but it did not follow that they would be obliged to use it if there was plenty of other food. As to the exhaustive nature of the crop, anyone who grew 60 tons an acre of roots or any large crop must find it would be exhaustive, because the larger the crop, if taken off, the greater the exhaustion of the soil. They wanted to grow exhaustive crops. That was just the point. It was the last 10 bushels of corn, or the last 10 tons of roots, that brought the profit. With regard to the season for culture, his experience had been that the Cabbages were wanted in May or June, because in the autumn they had got Turnips and other things, and did not want Cabbage so much.

RELATION OF LANDLORD AND TENANT.

[We quote recent speeches by three experienced and trustworthy men.]

(1). At a recent meeting in Shropshire, Mr. EVAN DAVIES said:—

We hear of war and rumours of war of a magnitude which throws into the shade the records of history, and it is not unlikely we may have a finger in the pie, for we appear to be on the eve of every body, and every day, men arrive when we shall be that up our island home wholly dependent on our home supply for feeding our people. I am old enough to remember when it was so, when wheat sold at 32s. per bushel, and beef and mutton at 1s. per lb., and that too at a time when our population was little more than one-third what it is now; and what has been may be again. It therefore behoves all connected with this question to inquire what steps there are in the way to prevent the full capabilities of the soil being brought into

action, and I, as an old farmer, am bound to say there are many. Let me therefore, my lords and gentlemen, beg of you to see to it; remodel your system of letting your farms; remove all restrictions on the energy of your tenants; annihilate the vermin which now destroy and afflict their crops; give them a good and liberal scheme of compensation for unexhausted improvements, and do away with the obnoxious system of six months' notice to quit; don't let your farms to men you have no confidence in, and when you have made the selection give them free liberty of action; if they are worth having they will best know how to cultivate them. I was formerly struck the other day in reading a letter in the public prints from a Scotchman of Fife, and, as it was addressed to the chairman and members of Chambers of Agriculture, it is the common property of us all; it was on the home-grown food. The writer goes on to show that all we produced last year, with all we imported, fell short one-third of a health-supporting supply, supposing the food had been equally distributed to all; and he also showed that the farms of Great Britain might not only become independent of a foreign supply, but also make provision for an increase of 3,000,000 to our present population. I will not weary you by repeating all the statistics by which this writer arrives at his conclusions. I will mention two of them. He says, by a better system of cropping an increase of home-grown food in money value, amounting to £183,100,000, might be obtained, and by the abolition of the Game-laws £10,000,000; and Mr. Mechi, in his admirable essay on the undeveloped resources of dry land, says that the home supply might be doubled, and I am not at all disposed to doubt the assertions of these gentlemen. I daily look upon a large estate in front of my house that is a complete wilderness of waste, which does not produce a sufficiency of food for the people that live or ought to live upon it. Upon another large estate in my neighbourhood, which is become in bad odour from farming being overdone with ground game, and the exaction of excessive rents, that not only hand-to-mouth tenants will seek occupation upon it, its cultivation is miserable, and I have no hesitation in saying that three farms of 400 and 500 acres, adjoining these estates, produce more food for the people than four times the acreage of these impoverished estates; and it is this to be tolerated with our fast increasing population? Are we to continue to send our best labourers abroad to enhance the power of the foreigner, to increase his supply of labour, and thus to ruin our market, instead of employing these labourers at home, and thereby increase our own supply? Are we to continue to send our gold abroad to enrich the foreign farmer, instead of ramifying that gold through our own labourers, and thereby enrich ourselves?

No doubt the owners of these impoverished estates say they have a right to do as they like with their own. Government has thought so recently in Ireland, and if our own supply should fail, we have no recourse to our population, and the foreign supply crippled by the gigantic war now raging and others looming in the distance, Government may take it into their mind to inquire if there are any obstacles to an increased home supply, and they will have ample evidence to prove that great obstacles do exist. The want of security checks the flow of capital, restrictions as to cropping incompatible with energetic action, the food of the people destroyed by vermin and the waste of the land, and down by an undue share of local and imperial taxation, these and numerous others will prove that the time has arrived for legislative interference, and the cry of doing as I like with my own will be no longer tenable.

I hope I have kept within the bounds of fair discussion. I can have no other object in view but that of creating a necessity for enlargement of your pockets as well as our own; but before I sit down I will give you a home illustration of the doing as I like with my own. Take a country for instance, with a large garden, which he refuses to cultivate, and allows it to be overrun with weeds, and contents himself by buying his vegetables and fruit from his neighbours. You remonstrate with this man; he tells you he has a right to act as he likes. Just so; but I think you would tell that man that he was not only unwise but unjust to his family, and if landlords forbid their tenants to plough within a yard of the hedge to have a cover for game; if they forbid the use of the reaping-machines in order to have a cover for partridges; if they neglect to carry out the permanent improvements on their land, and refuse to give their tenants security to do so, they may say they have a right to do as they like; but depend upon it the people will say what you said of the labourer, that such landlords are not only unwise, but unjust to their families and traitors to their country.

(2). At a recent meeting at Swindon, to hear Mr. Piper on the impediments to land improvement, Mr. H. HORRELL said:—

I think we all ought to feel grateful to Mr. Piper for his able paper on "Some of the hindrances to the development of agriculture." All farmers agree as to the unfairness of certain laws with regard to agricultural interests. But as to the remedy, I believe the main labour under a fatal delusion. The signing of petitions, and the discussions of Chambers of Agriculture, although useful in their way, will never in my opinion bring about the desired results. The great

arena for obtaining just and fair legislation is in the British House of Commons. All agricultural communities should send only as representatives to Parliament men who have a thorough knowledge of their duties, also the will and ability to make themselves heard. If we place authentic agricultural statistics in the hands of such persons, an almost immediate redress will, I believe, follow. Our present public position as tenant-farmers is a most ignoble one; after for years exclaiming about unfair treatment, we fail to use as a remedy that birthright which belongs to every Englishman who has the qualification—a freedom to vote for whom he pleases. We also fail to combine in that unity of action in which even the mechanics are leaving us behind. I feel quite certain there is no just or fair legislation but could be obtained if the farmers would only march shoulder by shoulder to the battle-field of organisation, and rally round the standard of justice to the agricultural interest. I should much like to see our Chamber the pioneer in forming a committee to inquire into the desirability of establishing a North Wales Farmers' Association for selecting members of Parliament, and also opening a fund to pay the expenses of any gentleman who may have the will and ability to fight for our interests, but not the means to contest an election. The time is come for action, and I appeal to all the members present to cast aside party distinctions and feelings, and to throw themselves heart and soul into the good work of rallying their brother farmers to a sense of the duty they owe to themselves, their families, and to posterity. No remarks have been made without intending to give offence to any one, and I trust the members present will fully criticise them, and if they do not approve of my plans, propose some more suitable for the removal of those obnoxious hindrances to the development of agriculture.

(3). At a recent meeting of the Central Chamber of Agriculture, Mr. C. S. READ, M.P., said:—

The last speaker has asked whether a man can do as he likes with his own land. I have said before, and I say again, that he cannot. The law of England is, I believe, founded on the good old maxim of the Roman law, "So use your own rights as not to injure those of another." As long as a man keeps his land in his own hands he can do what he likes with it; but when he wishes to let it to another, the Legislature may surely step in and say what he may do and what he shall not do (not if he makes a bad bargain). The Legislature may also step in with contracts, in the case of an agreement, you have not a proper seal, a proper stamp, a proper registration, or proper witnesses, the contract is null and void. The courts of common law frequently set aside a contract on some such ground as that its enforcement would tend to injure the public health, or the public revenue; while the courts of equity have frequently refused to ratify a contract in itself perfectly innocent on the ground that similar contracts might be prejudicial to the public interest. The court of Chancery is particularly jealous of exceptional privileges being possessed by people occupying responsible and influential positions, such as trustees, executors, solicitors, and doctors. If a needy landowner is compelled to raise money by a mortgage on his estate, however hard the money lender's bargain may be, the borrower cannot be deprived of the equity of redemption, and by the mortgagee's right of sale, the lender is enabled to get the debt whenever he likes. I will go a little further, and say that many contracts are controlled by Acts of Parliament in cases in which one of the parties is supposed to be placed at a disadvantage. Take the case of the conveyance of goods by railway. Railway companies are supposed to monopolise transit; but if they make contracts which are not reasonable, those contracts may be upset in a court of law. The monopoly of railway companies with regard to transit is the result of that of land. The right to land, the only difference being that, while the former has a monopoly of the carrying power, the latter has a monopoly in relation to the living of the farmer. In the case of parent and child, master and servant, solicitor and client, guardian and ward, cabman and traveller, mortgagee and mortgagor, buyer and seller, consignee and consignor, railway companies and the public—in all these cases, legislative interference, and therefore I say it is a mere bugbear to talk of the dreadful consequences which must result from interference of contract between landlord and tenant with regard to game. Let me come closer home with regard to what has been done in the way of interference already. Parliament does interfere between landlord and tenant. Since I became a farmer I have signed an agreement to the effect that all rates and taxes that had been imposed, or might be imposed, should be paid by me. Parliament passed a law declaring that such a contract should be null and void; it said that I should not pay the property-tax under Schedule A, and that no agreement to that effect should be valid. Another case of interference is the provision about to be enacted that half the amount of certain rates shall be paid by the landlord. I think such laws are very beneficial. When two people meet together to enter into a contract, they should be on an equal footing, and no one can say that a farmer, however intelligent he may be, or however independent in other matters, when he wants to hire a farm meets the landlord on fair terms.

Because the landlord has the monopoly of the land—because in all probability in that farm for which he is treading the farmer's living, and if he goes away from it he will find it extremely difficult to get a living in any other locality or in any other profession. I don't want to go into the exceptional case of the Land Bill passed for Ireland last year; but in that instance a few bad landlords in Ireland brought down upon the whole of the landlords certain objectionable legislation, and I believe that if the landlords of this country go on preserving ground game as they have done there will be no alternative but to sweep away the whole of the Game-laws. This Chamber passed a very mild resolution on this subject in 1869. It then said that the over-preservation of game is an unmitigated evil. I proposed the insertion of the word "unmitigated," and it was adopted. The next year we went a little further, and said that hares and rabbits should be excluded from the game list; but every man's hand would be against them but the tenants. I think we should now go a little further to kill, and say that there should be a joint right as between landlords and tenants of killing these four-footed vermin on the farm. It may be asked whether the law does not give the tenant a right to the game, and whether by what I suggest he would not be giving back part of what he possesses. The law does give him a right formally, but practically it is all given back, and therefore I want him to have half and stick to that half. If I am asked whether I would not allow the landlord to divest himself of his right to the game, I reply "No." I have known several instances in which the landlord, having given the tenant the whole of the game, the result has been that the tenant, being a sporting man, has taken to preserving hares and rabbits, and they have not only destroyed the underwood belonging to the landlord, but have actually killed half the growing trees. What I advocate would prevent that, and I think the effect would then be that hares and rabbits would only be preserved in moderation.

Mr. GEORGE ANDREW observed that Mr. Read's speech went to show the omnipotence of Parliament, but the real question was whether such an alteration of the law as was proposed would secure the object in view. Parliament might pass laws limiting contracts, but it could not enforce laws which were not obeyed. It might be evaded. It is impossible to show that landlords had a monopoly of land. Land was as freely bought and sold as Apples. (Loud cries of "No, no.") There was no more monopoly in the case of land than in that of fish, and a landlord would find some way to obtain his rights, and he would not be able to restrain him as to what he should do with his estate. It was an essential part of the first principles of civilisation that every man should have control over his property.]

Home Correspondence.

Notes on Steam Culture.—I do not understand your note at p. 530. You say, "He (Mr. Fowler) was not alone, but he was 'single-handed,' that is to say, the idea was his originally, and he had, we believe, carried it out." What had he carried out? Your paper, at p. 388, tells us that "in the autumn of 1845 he called at Whitfield Farm, near Berkeley, to explain his scheme of drawing draughts in behind a mule-plough by means of a steam-driven pulley." I thought this applied to the remark, "the idea was his originally." When did he carry this idea out? That is the question. He tried it for the first time publicly at Lincoln in 1854, and Mr. Dray was at Lincoln also with a steam training-plough. I saw them myself both in the field together, therefore how you can make it out that Fowler stood "single-handed" at that meeting I cannot understand, for Dray brought steam-power draining before the public as soon as Fowler did, and both modes of draining are now known to be failures. Draining by a plough was as good upon clay land 40 years ago, as a makeshift, as it is now—long before Fowler thought anything about draining at all, in fact before he was born. At that period an uncle of mine had a lot of land drained by a plough called a sough-draining plough, and that is the only kind of draining that can be "carried out" by Fowler's steam training-plough now, *i. e.*, as a makeshift. As a makeshift, however, it is a dead failure. If Fowler had not have been a follower of Smith (whom he laughed at) upon steam culture, he would have been out of date long ago. In justice to myself I must ask space for this—"G. A. H." says, "If Mr. Smith would not so obstinately shut his eyes he would see in Fowler & Co.'s implements the means of doing ploughing and harrowing, and drilling and rolling and clod-crushing with steam-power. His eyes were not shut upon the facts, for I know that they can all be done by any tackle; but I also know that they will not be paid either a contractor or private worker to do them by steam power. It is as a warning against such practice that I write, and the history of my own practice, published in your paper, is my main witness against it. I have been taking notes to get some evidence to show to 'W. B.' and Lord Dunmore that they have not got to do by steam-power. I have been waiting for some time, and as I am writing, I will give them it now instead of waiting another week; but before doing so let me ask 'G. A. H.' how he gets on with the Fiske plan that he talked so strongly about some time back?—and where is that engine of his that he was to

least the veterinary surgeon says so); I have looked around the field they were in, and find they have eaten a great deal of what we call Ragged Robin. Do you think that is poisonous? I find also that they have eaten some of the "Lords and Ladies," or Arums. I find by tasting one of the leaves they are very bitter and sharp. There is also a hedge black Willow, narrow-leaved Kedlock, and Filowort. Before the cows died they appeared to go quite mad. The inside of the stomach when opened shelled off. Do you think any of the above-mentioned herbs have been the cause? I am told there would be no danger in giving the flesh to dogs. *John Sherratt, London, Staffs.* [Ragged Robin is not poisonous; "Lords and Ladies" are, if enough be eaten. Of all the plants named, that is the one most likely to have produced the effect in question.]

Societies.

DORCHESTER.

Top-Dressing. At a recent monthly meeting, *FRANK BUCKMAN* gave an account on "Top-Dressing for various Crops, including Pasture Land."

The Professor said that since he had been requested to introduce this subject, he had asked the neighbours round him why they put manure upon their land, and he would no doubt astonish the meeting if he gave a quarter of the answers he received. One of the most general replies given was simply, "Because we can't grow plants without it." Now this was no reason at all; there was no principle involved in it; it was only the explanation of a fact. One said, "It is necessary to do it," and others replied in different ways, but the whole matter resolved itself into this: "We put manure upon our soil simply because it has been done, and all people do it." He wished now to point out to the meeting the principles that had guided his practice in this matter. With regard to sheep-feeding upon land, what did agriculturists do? As a general rule, sheep were placed upon pasture land, probably during the winter, and in the autumn, and upon arable at night, the farmer saying that the land could not be bad, and that nothing was lost from it, because sheep made manure. He was quite sure no gentleman present believed that sheep made anything upon land they did not find there, if they had lived all day upon the grass of the field, and nothing else, and if they voided their exuviae over that field, and if they made nothing fresh over it; or if it happened, as was often done, that the sheep were put on the pasture, that the sheep were put upon pasture by day that they might drop over the arable at night—it was very clear indeed that they must make the pasture poorer and enrich the arable. But because they feed upon the plants in that meadow people were apt to think that they must leave that meadow richer than they found it. It was, however, impossible to make new material without bringing in something.

After a description of the chemistry of the subject, the lecturer proceeded. With respect to farmyard manure, there was a time when farmers were glad to take in beasts and feed them on straw for the purpose of converting it into manure. This was a very useless and unprofitable process for any farmer to adopt. His own opinion was that it could scarcely pay for the amount of trouble employed in looking after their neighbours' beasts, for this reason—that straw does not convert into manure, but that manure is made by the animals which is required. Let them give them manure, or straw, or something containing manure; for if straw was only worth 12s. per ton as manure, it was very little money to get considering the trouble that was experienced respecting it; but if no manure material were added, the straw would not be very profitable to return to the fields, without corn or cake. If they sold the corn from the straw, they must do something to restore fertility to the land. If they had a thousand animals, and fed them on nothing but straw, they were making so many thousand loads of manure by it, but it back from whence they took it, they did not render the field so fertile as it was before, because they took away the corn; therefore, merely returning the straw contributed very little towards restoring the proportion of manure material that had been removed. It was folly for farmers to suppose that cows made manure in addition to the straw. They did nothing of the kind. There might be some secretions from the animals, but this could not be separated from the water they drank, and this was one of those principles connected with the subject of manure which the Club would do well to discuss. It was just that principle of what was the origin of manure? Landlords made mistakes, and farmers as well. The landlord made a great mistake in saying that the latter should not do anything with his straw, whilst the tenant thought he satisfied his landlord if he took away the corn, leaving the straw behind. If he (Mr. Buckman) was a landlord, the tenant who did that kind of thing would very little suit him, as his farm would soon get out of order. If, however, he bought manure and fed upon his corn, using those substances which would add to the manure material contained in the straw, he (Mr. Buckman) considered that would be a tenant worth having, and it was only upon such a system that a farm could be made pay, whilst it would only be made poorer and poorer if a different principle was pursued. A landlord

should not say to his tenant "You shall not sell the straw," whilst the tenant should maintain that straw, or whatever he could get from the land, was just as much his right as anything else on the farm, always provided that his object was to do himself as much good as he could, and to keep the farm in proper order. He was certain that if a farmer did this he would not leave his landlord anything the worse off when he left the farm than when he took it, and he was sure a recognition of those principles would leave it a great deal better than it was before.

He would now make a few remarks on this subject as applicable to meadows. He might point out that, so far as his experience extended, there was a constant robbery of the meadow on every farm throughout the country, and that the want of a liberal policy to the meadow which the meadow deserved. He had already pointed out that as a general rule the animals folded upon meadows during the day were folded on arable land at night; but in addition farmers proceeded in a very exhaustive process in another way. One expected to take hay from his meadow once a year, and some even twice; at any rate, farmers thought themselves extremely liberal to their meadows if they took away from their meadows once in two years. What was the return? He had taken some pains going over several rich agricultural districts, where he had found that within the memory of man not one scrap or atom of manure had been returned to the meadows, and people were astonished that the land which was so rich in the time of their grandfathers had now become so poor. It was, however, a matter easy of comprehension. Every animal fed on these meadows, and every bit of exuviae made from them and taken away a quantity of bone for the animals' bones themselves contained a great quantity of phosphatic matter. When one looked at the country, and found that rents ranged from 7s. 6d. to £5 per acre, he must conclude there is some reason for these two extremes. What was the difference? As a general rule it was to take into consideration if the land had been properly ploughed, but the real difference was in the amount of bones, phosphatic matter, such as soda, potash, and alkaline salts, and many other things, which he knew that in soils naturally fertile and naturally rich they would not be obliged to incur such an expenditure as where the land was poor. He believed that some people in order to get a crop were obliged to put into the land all the material from which the crop is made. They created a system of manufacture, just as the manufacture of articles which required raw materials to be worked up into a new form. The more of this raw material plant make away the poorer they made the soil, unless they took something back. And when they considered that the principle of action was this, that the exuviae of animals and the more solid matters of the plant were so many materials taken out of the earth by which the earth was impoverished, it became necessary that these materials should be returned again in order to restore fertilisation. This was a subject on which one could go on talking for a month, but he must now leave it to the Club for discussion.

Notices of Books.

Premium Report on the Condition of the English Agricultural Labourer, in Relation to his Food, &c., considered in Contrast to the Dietary of the Scotch Agricultural Labourer. By Robert Hutchison, F.R.S.E., of Carlisle. From the Transactions of the Highland and Agricultural Society. Edinburgh: Neill & Co.

The author has done well to republish this useful statistical paper for the more extensive general perusal which it will thus receive than it could command in the pages of the annual volume in which it first appeared. A large number of instances are described of the actual consumption of food by agricultural labourers and their families in no fewer than 40 counties of England and Wales; and the quantities going to the food of an adult are reduced to their chemical equivalents—nitrogen and carbon respectively. The differences existing are thus very definitely represented, and how considerable they are appears from the fact that, while the labourer's average weekly consumption corresponds to 1867 grains of nitrogen and 47,647 grains of carbon, the figures vary in the different examples from 875 to 2687 grains of the former, and from 33,746 to 68,838 grains of the latter. There is the case of a Whithshire labourer, who consumes 875 grains of nitrogen and 33,746 grains of carbon, and another of a labourer in Anglesea consuming 2566 grains of nitrogen and 58,838 grains of carbon. Translated into common English, these dietaries are given thus:

No. 40. PARISH OF HORNINGSHAM, WILTS.
"A. S. Family above 10 years; 1; below, 3. Takes meals at home. Rent, £2 10s. Weekly wages, 10s.; family, 3s. Keeps a pig.
"Breakfast, bread alone, or what is called 'broth' i.e., wheaten bread cut up in a bowl, with a few sliced onions, a little salt added, and hot water poured over it; family the same, or sometimes weak tea. Dinner, bread and cheese, or bacon; in winter, Potatoes and Cabbage and dry bread. Tea, none; family, weak tea and bread. Supper, bread and weak tea; and in winter, Potatoes and cabbage and bread, with cider or beer occasionally; family, none. Health not robust, and in middling health.

Remarks.—The men in this district and in the adjoining parishes having been long on low wages and poor diet are generally slow and broken-spirited at work, many not worth 8s. a week, owing, doubtless, to their low dietary. Hired carters are nevertheless well clothed, they only receive 12s. per week; many here only get 9s. a week.

No. 49. PARISH OF LLANIDNAN, ANGLESEA.
"H. H. Family above 10 years; 2; below, 3. Takes meals at home. Rent, £2 10s. Weekly wages 13s.; family, 8s. Keeps a pig.

"Breakfast, oatmeal-porridge and milk. Dinner, meat and Potatoes daily, and a pudding on Sundays. Tea, bread and milk, or coffee, in the bedroom, and butter on Sundays. Supper, 'strabout.' Health good.

Remarks.—"Strabout," used here generally for supper, and sometimes for children's dinner, is oatmeal mixed with hot water."

The use or non-use of milk in the regular diet seems to have a considerable share in the explanation of the contrasts which Mr. Hutchison describes. The general conclusion is nevertheless so favourable to the general condition of the class from which he takes his examples. They are as follows:—

"1. That, as a class, they are 'well-to-do,' and where not burdened with large families (which is not at all exceptional), their condition as to dietary is good.

"Many instances were mentioned to us where the labourers had money in the savings banks. In most districts sick clubs are established, and are productive of much benefit to the labourers during times of illness when unable to work, and in some places clubs of a similar nature were in progress of organisation to provide medical attendance for the families of the poorer classes of agricultural and rural labourers. The members of Dunston, Lincolnshire, the Ripon Lodge of Oddfellows (chiefly agricultural labourers) numbered more than 250 members—a formidable body leagued together for mutual assistance and co-operation. In the same parish, the aged and infirm poor are not sent to the workhouse, but are provided with easy labour on the roads, and are paid for it, so that they maintain their feeling of independence, and can live comparatively comfortable.

"2. That the payment of part of the wages 'in kind' is an advantage to the labourer, as it does not 'work' beer given in the counties already quoted, and that it would be well for the health of the labourer and his family if a daily supply of milk were given by farmers in every county and reckoned in part payment of wages at hiring time, so that the farmer would not be obliged to sell milk daily to those upon his own farm who wished it.

"3. That with a view to the greater comfort of the hind's household, and to their more frequent use of hot food, a yearly allowance of fuel, specified at hiring-time, and computed along with the wages, should be given by the farmer, and carried free of expense to the labourer. This practice is in use in some parts of England, and where fuel is scarce, or has to be brought from a considerable distance, is of great advantage to the labourer. In the county of Durham, for example, and where the coal fields belong to the estate proprietor as the farm, the farmer's servants are allowed as much small coals as they can burn; and in other cases, in the same county, where coals are purchased by the farmer for the hinds, the yearly allowance is twelve loads, and if the labourer's consumption exceeds, he must make up the requires, and his master carries them for him free of expense.

"4. That the employment of the wife of the labourer in field-work is not desirable, tending as it does to the neglect of household comforts and cooking, and frequently to the careless neglect of the children. Nor should the hind be tempted by the wages his family can earn to send them to such employment at too early an age, to the neglect of their education. We have sometimes heard it alleged that to eke out his poor wages the labourer is obliged to send his children early to the workhouse; indeed, it might be better, economy to augment the earnings of the father than to starve the education of his family.

"5. That where it is practicable, the payment of the labourer by contract in field-work operations, for 'contract-work,' or 'piece-work,' or 'task-work,' or 'tit'-work, as it is variously designated in different counties, is more desirable than the merely 'day-wages' arrangement. The labourer can thus earn more, and is stimulated to habits of industry and activity. This would be beneficial to the farmer, as he would not have to pay wages of coal-pits or other public works, whether the temptation of better wages draws off many agricultural labourers, who go without considering whether the nature of the work be as easy as on the farm; while if shown that they may thus 'pick up' more money, they will not come to the coal-pits, or at more laborious occupations, they would be likely to remain.

"6. That the general dietary is better during the harvest months, when the wages are higher, and when the labourers have their food in their hands, than the farmer, than during the other seasons; also, that on Sundays throughout the year, the household diet of the English agricultural labourer is more liberal than on week-days.

"7. That continued improvement is necessary in building, renovation, and house-fitting, in order to greater accommodation and increased comfort. Every cottager's house should be supplied by the landlord with built-in grates. Kitchens should all be supplied with ovens (as many families in this class bake their own bread), and every block of cottages, even if not every house should have a furnace-boiler erected in an out-house or other convenient situation, to afford, when required, an adequate supply of hot-water for washing or for other domestic purposes, or for boiling up refuse vegetable substances for the pig, where this is not done. An extension of the ground plots allotted for gardens or Potato ground is desirable. For general and increased use, this esculent is to be recommended, its value as an anti-scorbutic having been clearly established. On the increased use of this article, the following is highly desirable:—Hot meats, Broth, with meat in it, or drip-

ping and abundance of vegetables or Barley well boiled in it. Peas and peasmeal are of high nitrogenous value, and should be more extensively used. Indian Corn meal pudding may be occasionally taken, and seasoned according to the taste of the labourer. Oatmeal porridge and milk, as a morning meal, is more nutritious, as already stated, than any other. The increased use of milk has been already insisted upon, and cannot be too strongly urged upon the agricultural labourer.

"to. A more frequent payment of wages is also desirable, and if this arrangement could be made weekly, we believe it would tend to foster frugal habits amongst the peasantry, by encouraging them to save a little from their hard-won earnings.

Farm Memoranda.

GOUDA AND ITS CHEESE.—[We take the following from the columns of the *Mark Lane Express*.]—The first place we were ushered into was the working cheese or kitchen as it might be called. A huge barn-like structure it was, very much opposed to what our notions of such a place should be. At first glance it seemed to possess none, at least few, of the attributes of the order and precision which are the popular characteristics of the Dutch; a fire, or rather the remains of one, lay smouldering in the huge open grateless fire-place—not of coal, but of peat, which is got in abundance in the neighbourhood, as we may judge from the numerous black pools in the district, with their mossy sides and heaps. At the opposite end the cheese-making part was placed, with its rows of curd tubs and dairy utensils.

Although the appearance of the place was anything but Dutch-like, still a more observant glance showed that there was to order amidst the apparent disorder, and the national reputation for cleanliness was not belied in the condition of the neighbourhood; not a person of the comely, burly housewife, who gave us such a hearty welcome, and at once began to show us "her treasures new and old." Of these, doubtless, the cows would have formed the not least valuable portion had they been at home; but the "cattle had not been called home," they were browsing to their heart's content in the rich pastures beyond the canal, and were therefore only to be talked of, not seen; but with as much pride and interest as the wife who owned a *fat*, but had not yet it showed-off the purse which had contained the treasure, she showed us the stalls they would have occupied had they been at home; and from the way she talked of them, and the pride she took in showing the milk and talked of the cheese which the milk produced, she let us know that in her opinion they were "sehr schön"—very good cows, not a doubt of it.

As the cow-house, there was nothing very particular about it, not in the order and cleanliness; although it was by no means dirty, yet it did not come up to anything like the condition in which we have seen so often exemplified in cow-houses nearer our home. The cow-houses are generally quite close to the house, so close indeed that in some farmhouses direct access is had from the kitchen to the cow-house, an arrangement one would think more convenient than comfortable; in such cases the cow-house is Irishman's pig is selected as one of the family, and accordingly the animals are all house-fed in winter-time, and the leading food is hay. The hay-house forms, therefore, an important part of a Dutch farmhouse, for it is well kept under cover. So far as our observation showed, we do not think the practice of cutting the hay is extended, although hay-cutters we have seen, and evidences also that mashes or boiled food were part of the dairy economy, to one important part of which we must come.

The "guidwife" obligingly showed us the process of making a "Gouda cheese," so far at least as the working up of the curd into the peculiar form so well known, and its after management. She did not show the same readiness to detail the preliminary processes, but we believe the following method is pretty nearly that followed by the best makers, at least it is said to give a good quality of cheese. The curd is first made by people who are skilled in doing the work, so that it is worthy of adoption amongst us. The rennet is prepared very carefully, being steeped in water along with salt and saltpetre and about a quart of wine vinegar, the whole being allowed to stand for about three weeks. About a gallon of water is used, about 10 lb. of salt, 2 oz. of saltpetre, and six "bag pieces," or stomach of the calf. The milk used at one time that produced at the milking, and is put into a wooden vessel, which we need not say is kept in Holland most scrupulously clean, as all dairy utensils should be kept if success is desiderated. In the farm now under notice there were several vessels, and all of moderate size. On the rennet being added to the milk, which when required is slightly warmed, the whole is gently stirred. When the curd is formed the whey is poured off, this being expedited by breaking up the pressing the curd with the far as is possible, the curd was not cut up or broken with a "curd breaker." A small vessel is next taken of the same internal diameter and depth as the finished cheese presents; into this a portion of the curd is placed, being taken from the curd vessel in a small dish. The small vessel or mould is provided with a perforated sieve-like bottom, and the whey passes through the perforation as the curd is carefully pressed down into the mould. As the curd gets dry other portions of curd are placed in the

mould. But the process is not one of pressing merely—a careful and thorough kneading of the mass is gone through; this being done by the hand, and we presume has for its object the giving of that close, compact solidity to the cheese which is one of the characteristics of "Gouda;" for, as is well known to those who eat it, it is not an open, friable cheese like some English-made cheeses. When the mould is filled sufficiently with a well-kneaded mass, it is taken out and worked most dextrously into proper shape by the hand, in which process the flat edge gradually assumes the rounded form so well known. During the shaping the compressing process is carefully attended to, and the surface repeatedly washed with the whey which has escaped from the curd, and which has been collected in the vessel, upon the top of which the mould stands when being filled and pressed, the whey being merely lifted up by the hand from the vessel, or the cheese is tipped into it. The accuracy of the formation to the effect of the cheese is only gained by long practice. The formation of the cheese from the time the mould is first filled till that when the cheese is finished is about a quarter of an hour or 20 minutes. The great point aimed at in the manufacture of the cheese at this stage is evidently to get the whole mass into a collection of perfect uniformity, and as compact and close in texture as possible. The pressure to which the cheese is subjected is at first slight, and is gradually increased; but the pressure is not nearly so long continued as in other cheeses, which may be well conceived from the nature of the process already described through which the cheese is put previous to being pressed. After being taken out of the press the cheese is steeped for about a week in a strong salt pickle, so strong as to float an egg, and is, while in the pickle, kept covered on its upper surface with a strong salt. The cheese is then placed in a cool chamber upon a shelf, and turned from time to time till it is fit to be sent to market.

It was with no small degree of pride that the housewife showed us her store, with none the less but rather the more satisfaction, however, that her store was little, she having sold nearly all her stock. It was hard indeed to say whether she had more pride in her cheeses than in her little "kammer, a sitting room, the ornaments of which she showed us with a natural simplicity, and almost childish glee; which pleased us much, as all natural behaviour always does. She was disposed, like all good-natured people, are to be very communicative; and, if she had known English or we Dutch better than either of us did, we have no doubt that a full, true, and particular account of her and her belongings would have been given us. Fortunately she knew, and we understood enough of German to enable us to get much pleasant information as to farm living and its ways amidst the green pastures of Gouda. Nov. 14, 1870.

Miscellaneous.

SUBSTITUTES FOR WINTER KEEF FOR CATTLE.—*Nature* pertinently remarks that the great difficulty which has been experienced by farmers during the present winter in procuring sufficient food for their cattle may have the effect of directing attention to fresh substitutes for the ordinary winter keep. Turnips and Swedes have been a complete failure throughout a large breadth of the country, and the hay crop has been generally so deficient that the agriculturalists are left with little prospect to the verge of ruin. In the Argentine Republic, as is well known, vast herds of cattle are reared upon the natural grasses of the pampas, or upon the Lucerne which grows there in great abundance, but in the province of Catamarca both man and beast depend for support mainly upon the leaf and fruit of the algarrobo. It provides their principal stock of food during the winter months, and is said to be exceedingly nutritious. The Algarrobo (Eymenia Couratensis (tetaiba) is indigenous to the country, and its fruit is gathered annually and stored with much care. The long pods are pounded in a wooden mortar, and the residuum is then passed through a sieve, and the meal converted into circular cakes, which, after having been dried in the sun, are fit for use. In this state it is called "patay," and is exported as a bread-stuff into other districts of the Republic, in some of which it forms a considerable food for the people. It is also a means for fattening cattle, and is also thoroughly appreciated, and it might be a great boon to our farmers if the Acclimatisation Society would ascertain whether the algarrobo might not be introduced into this country with advantage. The tree grows to a height of 40 feet, with wide-spreading branches, and a rather slender stem, and flourishes best upon a dry soil.

The Week's Work.

MAY V.—*Buckwheat* sown throughout the month as the land is got ready to receive it. It frequently pays better on poor sandy and gravelly land than any other crop, and on good land, where Wheat, Barley, or Oats fail, it may pay better than re-sowing with Bere or Barley. The grain may be ground into meal for cattle. Buckwheat is also grown in grass preserves. All kinds of winged game and fowls generally are partial to it. The seed, about 1 to 1½ bush, per acre, is sometimes sown broadcast and harrowed in, but drilling is prefer-

able, as birds devour greedily every particle of seed not wholly covered.

Hemp sown as directed last month. The later the sowing the more need is there to attend to a fine seed-bed and sound seed.

Liming land intended for Turnips is best done immediately before the stretches or ridges are set up for the manure.

Swedes, sown and harrowed in, so as effectually to incorporate it with the land, as much of its efficacy depends upon this. The use of superphosphate renders its use less frequent than formerly; but in newly broken up land, and in many cases where it is naturally deficient in the soil, large doses may be needed. We have applied from 30 to 300 bushels of newly burnt shells from the kiln per acre, and in one or two exceptional cases from 800 to 1000 bushels, at three separate applications in one season.

Kohl Rabi, if not in, sow without delay. The plant is a slow grower, and should be sown early. It is a most valuable root, and is fast superseding Swedes in southern counties, and should be cultivated further north than it now is. In most places the season is favourable, and as there is plenty of sap in the land, the braird will soon rise beyond the reach of any frost, and is thus a promising seed-bed. Much of the health and vigour of the young plant depends upon the seed-bed; and in showery weather it is often no easy task to suit the requirements of the crop in this respect. Avoid crusting the surface with the coulters and rollers of the machine, and should a heavy shower of rain fall immediately after sowing, so as to cake the surface when followed by a scorching May sun, roll in fine, so as to break the crust. The crop prospers on almost any soil, light or heavy, provided there is a sufficiency of sap and manure at the bottom. Farmyard manure, therefore, should be got in with as much sap as possible, and should the dunghill be too dry, yoke the water-cart a day or two before the manure is applied. It will spread all the better that it is well soaked from the liquid manure tank. Cover close up to the spreading, and in seeding sandy land in dry weather, cover with straw, and in sowing as much water as the machine will apply, more especially if 3 to 4 cwt. of superphosphate with an equal weight of common salt per acre is dissolved in the liquid, otherwise the liquid will be too strong for the young braird, should a rapid surface evaporation follow the sowing. If dry land is examined when only 200 gallons are applied per acre, it will be seen that the liquid only wets an inch or so of the surface, but if 1000 gallons are applied the close growth of the plants is secured by the roots of the plant; and upon this depends the successful use of the liquid manure drill.

Rolling, if not finished, conclude as fast as circumstances will permit. Hay meadows promise to be early, so that the harrowing and rolling should have been finished before now. In the North, where the hay crop is composed of Rye-grass and Clover, it may be otherwise. The chain-harrow is a useful implement, it loosens the soil about the plants, lets in heat and air to the roots, and thus promotes early growth. The harrow, therefore, should always be a day or more in advance of the roller, according to the weather. Prior to rolling corn or grass crops stones and every obstruction to the mowing and reaping machines should be gathered off; if infested with Collisfoot and the like, the land should also be picked clean. All ploughs should be repaired and mended, and if this has not been done last month, it should be so this, by shifting the stock, finishing field after field as the state of things will permit. The good effects of the chain-harrow and roller on some pastures is often wonderful.

Wireworm and **Slugs** now require close watching. The severity of the past winter may have killed its thousands, but Nature teaches insects to creep and crawl in the soil, and rise to the surface as spring and summer heat invites them. In point of fact, the severity of winter has very little influence upon the havoc they often play at this season, much more depends upon the attractive state of the land to their natural requirements. Hence the opposite practice, so to speak, of sowing soot, lime, and common salt in moist weather for the twofold purpose of killing and checking their ravages. The close growth of slugs where top-dressings are applied late in the evening or during night when they (the slugs) are abroad feeding. Some roll at night to crush the slugs and consolidate the land about the roots of plants. Such salts affect not only the food of slugs, but their bodies, but they have very little influence on the body of a wireworm. To kill the latter the salts should be applied in a soluble form, so as to soak the roots upon which the wireworm feeds; and if this is done in time much good may be effected. Unfortunately all such remedies are generally too late in being applied; the insects having established themselves in the land, the spring growth of fresh roots in the grass, and the roots and leaves of the newly braided corn crop forming ample supplies of food for their existence. All remedial means therefore should be applied before the spring growth sets in. Thus, when "daddy-long-legs," cockchafers, and click-beetles, abound in the pastures the previous season, it may be taken for certain that instinct has taught them that the ground is in a fit

state for their ova being deposited. It will thus be seen, without going into details, that the food of the insects during winter and early spring is the roots of the grass of the lea furrow. It follows that if this is rotted by a good dose of town or farm sewage, liquid manure, or the like, the food of the insects will be destroyed, and with it the means of preserving life, and that this should be done before the autumn or spring corn is sown on a lea furrow. Where such means have been neglected, the alternative, when blanks are made in corn crops, is to transplant or re-sow. In grass land the loose sods should be raked off, with all the wireworms that can be gathered, a top-dressing of lime, earth, and salt applied, or potash and ammonia-salts if lime is naturally present in the land, and grass seeds sown. When the attack is less severe, a top-dressing with grass seeds, well chain-harrowed in to the roots of the grass, may prove an effective remedy.

Live Stock.—Farm horses require extra corn and grooming with green food, if possible, to bring away the bots. In the North grass parks begin to be stocked, and milch cows when newly turned out to grass should be housed at night, and have dry food before they are turned out in the morning. *W. B.*

Notices to Correspondents.

MILKING MACHINE: *C. Palmer* writes—Can you tell me if the milking machines are successful? There is such a favourable report of one in this day's *Land and Water*, p. 326, that I think of buying one. A year or two ago I believe I saw it stated somewhere that they would not thoroughly drain the cow, but from this account it appears that they will do this as well, if not better, than can be done by hand. Have they been improved since they first came out? There are two milking machines, one of 1869, when an American introduced a pumping arrangement very cleverly adaptable to the udder, by which a large portion of the milk of the cow was drawn off. The second milking machine is a tube inserted in the duct through which the milk flows from the teat, and is provided with a flange preventing it from going too far. It opens the natural passage, and the milk flows. We doubt if it is all likely to flow out, and we fear that the habitual use of these tubes may so relax the natural constriction of the teat upon its natural channel that the milk will be liable to escape at other beside the milking times.]

Markets.

ENGLISH WOOL.

The demand continues unabated. Stocks are much reduced, indeed almost exhausted; and although manufacturers at present complain, that at prices now asked there is no margin left for profit, still all stocks of goods are also very moderate, they will no doubt soon be able to work up the prices of the manufactured article, and we look for high prices all through the year.

HOPS.

BOROUGH MARKET, May 11.

The market is very quiet; buyers are reluctant to give any advance on recent prices. The stock of Kent and Sussex Hops offering is limited.

MARK LANE.

MONDAY, May 8.

There was a moderate supply of English Wheat to this morning's market, and factors succeeded in obtaining an advance of 1s. per qr. The attendance was good, and foreign Wheat sold in retail at the prices of this day's night. There was no change in the value of Barley, Beans, or Peas. Oats were about 6d. per qr. cheaper. Flour was steady at late rates.

PRICE PER IMPERIAL QUARTER.			
WHEAT, Essex, Kent, Suffolk, White 46-59	Red 54-59	—	—
— fine selected, round 53-64	Red 59-64	—	—
— Talavera 51-65	Red 59-64	—	—
— Norfolk 51-65	Red 59-64	—	—
— Foreign 48-63	Red 59-64	—	—
BARLEY, grind & dist. 36-41	Cheaf 41-46	Malting 36-41	—
— Foreign grinding and distilling 29-33	Malting 36-41	—	—
OATS, Essex and Suffolk 26-28	—	—	—
— Scotch and Lincolnshire Potatoes 26-28	Feed 25-28	—	—
— Irish 26-28	Feed 25-28	—	—
— Foreign 26-28	Feed 25-28	—	—
RYE, MEAT, Foreign 34-36	Foreign 33-36	—	—
BEANS, Managan 37-41	Tick 40-50	Harrow 49-50	—
— Pigson 51-54	59-60	Wim 59-60	—
— Foreign 45-47	Exception 42-44	—	—
PEAS, White, Essex, and Kent 38-40	Suffolk 40-42	—	—
— Maple, 40s. to 44s. 36-40	Foreign 36-40	—	—
MAIZE, best marks, delivered, per sack 42-50	—	—	—
— 2d dist 36-42	Country 36-42	—	—
— Foreign 28-30	Per sack 33-36	—	—

WEDNESDAY, May 10.

At Mark Lane to-day the business doing was on a limited scale, nevertheless the cool weather, coupled with the firmness apparent in most of the provincial markets, had a strengthening influence upon quotations. There were short arrivals of both English and foreign Wheat on the 1st; the demand was inactive, but extreme prices were realised. Malting Barley was dull, on former terms, but grinding parcels were in fair request, at steady prices. Malt was inactive, without change in value. The show of Oats on the stand was large; the trade was quiet, at the late decline. Beans and Peas changed hands slowly, at recent values. The Flour trade rather more animated, and previous prices were well maintained.

ARRIVALS OF GRAIN, &c., INTO LONDON BY WATER CARRIAGE.

	Wheat.	Barley.	Oats.	Flour.
English & Irish ..	Qrs. 170	Qrs. —	Qrs. —	Sacks. —
Foreign ..	—	680	24,840	{ 410 3200 brls.
	170	680	24,840	—

LIVERPOOL, May 9.—There was a good attendance. In Wheat a large consumptive business was transacted, at 1d. to 2d. per cental advance since Friday on both red and white descriptions. Flour in rather better demand, at full prices. Beans, Oats, and Oatmeal quiet, at late rates. Indian Corn met with a brisk sale, at 6d. to 9d. per qr. more money; mixed American, 34s.

AVERAGES.

	Wheat.	Barley.	Oats.
Mar. 25 ..	55s 2d	36s 3d	25s 0d
April 1 ..	55 9	36 6	25 4
— 8 ..	56 7	36 8	26 10
— 15 ..	56 6	36 5	26 5
— 22 ..	58 12	37 3	27 9
— 29 ..	59 7	36 9	27 9
Average ..	57 3	36 7	26 9

METROPOLITAN CATTLE MARKET.

MONDAY, May 8.

We have a larger supply of Beasts, and trade is very dull; prices on the average are lower, and a clearance is not effected. The number of Sheep is also larger, but the excess is again principally in foreign consignments; trade is not so active as of late, and our quotations cannot be maintained throughout. Choicest Lambs and Calves are in demand, at late rates, but it is difficult to dispose of middling qualities. Our foreign supply consists of 1200 Beasts, 16,000 Sheep, and 85 Calves; from Scotland there are 245 Beasts; from Norfolk and Suffolk, 1530; and 325 from the Midland and Home Counties.

	s. d. s. d.		s. d. s. d.
Best Steers, Herefords, &c.	5 4 10s 8	Best Long-wools	5 6-5 10
Best Shorthorns ..	5 2-5 4	Do. Shorn	5 6-5 10
2d quality Beasts	3 4-4 4	Do. Shorn	4 4-5 0
Best Down and Half-breds ..	—	Lambs	4 4-5 0
Do. Shorn	6 0-6 2	Calves	4 0-6 2
Beasts, 3200; Sheep and Lambs, 30,950; Calves, 100; Pigs, 140.		Pigs	3 4-5 0

THURSDAY, May 11.

We have an unusually short supply of Beasts, consequently they are readily disposed of, at rather higher rates. The supply of Sheep has greatly increased; prices on the average are decidedly lower, and a considerable number remain unsold. Trade is dull for Lambs and Calves; prices are lower, and a clearance cannot be effected. Our foreign supply consists of 80 Beasts, 3850 Sheep, 47 Calves, and 10 Pigs.

	s. d. s. d.		s. d. s. d.
Best Steers, Herefords, &c.	5 6 10s 10	Best Long-wools	5 6-5 10
Best Shorthorns ..	5 4-5 3	Do. Shorn	5 6-5 10
2d quality Beasts	3 8-4 8	Ewes & 2d quality	4 4-5 0
Best Down and Half-breds ..	—	Do. Shorn	4 4-5 0
Do. Shorn	5 10-6 2	Lambs	4 4-5 0
Beasts, 475; Sheep and Lambs, 12,800; Calves, 345; Pigs, 90.		Calves	3 8-6 0
		Pigs	3 4-5 0

METROPOLITAN MEAT MARKET, May 11.

Best Fresh Butter ..	..	15s. per dozen lb.
Second do. ..	..	13s. "
Small Pork, 4s. 8d. to 5s. od.		Large Pork, 3s. 8d. to 4s. od. per 8 lb.

HAY.—Per Load of 36 TRUCKS.

SMITHFIELD, Thursday, May 11.

SMITHFIELD, Thursday, May 11.			
Prime Meadow Hay, 13s. to 14s.	Clover, old 13s.	14s.	
Inferior do. 80 110	Inferior do. 110	120	
New Hay — —	Prime 2d cut do. .. 13s	14s	
Inferior do. — —	Inferior do. 10s	120	
Straw 36 44			

CUMBERLAND MARKET, Thursday, May 11.

Sup. Meadow Hay 13s. to 14s.	Inferior Clover .. 11s. to 13s.
Inferior do. .. 10s 12s	Prime 2d cut do. .. — —
New do. .. — —	New do. .. — —
Inferior do. .. — —	Straw 4s 4s
Superior Clover .. 13s 14s	JOSHUA BAKER.

COALS.—May 10.

Walls End Gosforth, 15s. 3d.; Walls End Harton, 15s. 3d.; Walls End Thrislington, 15s. 3d.; Edon Main, 15s. 6d.; Walls End Elliot, 16s. 3d.; Walls End Haswell, 17s. 6d.; Walls End Hetton, 17s. 6d.; Walls End Hetton Russell, 15s. 3d.; Walls End Hawthorn, 15s.; Walls End Lyons's Hetton, 15s. 6d.; Walls End South Hetton, 17s.; Walls End Hartlepool, 16s. 6d.; Walls End Original Hartlepool, 17s. 6d.; Walls End South Kellie, 16s. 3d.—Ships at market, 43; sold, 36; unsold, 7; at sea, 5.			
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SEED MARKET.

As might be expected, our markets are now exceedingly quiet. There is hardly any consumptive demand, and no speculation has yet sprung up. In Clover seeds there is nothing passing. For Rape and Mustard seed we have a fair trade, at the recent advance. Hemp seed is dearer. Canary without alteration. Blue Peas meet with some inquiry. Feeding Linseed moves off at recent currencies. Spring Tares are in diminished request.

JOHN SHAW & SONS, Seed Merchants,
16, Water Lane, London, E.C.



SUTTONS'

HOME-GROWN

FARM SEEDS,

CARRIAGE FREE.

SUTTONS' CHAMPION SWEDE

(Improved),

THE HARDEST SWEDE,
THE HEAVIEST SWEDE,
THE BEST KEEPING SWEDE,

IN CULTIVATION.



Suttons' Improved Champion Swede,

The best in cultivation, as shown by the following unsolicited Testimonials:—

From JONAS PANTON, Esq., Leicester.

Feb. 11, 1871.—"I have won a dozen cups and other prizes for roots, but I never grew anything but your Champion Swede in my life, and I never saw any other so good."

From JAMES LING, Esq., M.D., Wintonville.

April 10, 1871.—"None of my friends here have been able to compete with me in the weight or hardness of the Champion Swede, which resisted in a most remarkable way the effects of a frost, which on several nights during last winter was 10 or 12 deg. below zero of Fahrenheit."

From Mr. GEO. TACH, Elmstead Brook.

Dec. 10, 1870.—"I have a first-rate piece of Champion Swedes, the best piece in Wickenhoe Park. These are as round as balls, and as sound as rocks."

From Mr. A. GUNTON, Kentish Lane Farm.

May 10, 1870.—"The Champion Swede is certainly the best I ever grew. I kept them perfectly sound and good until the middle of April this year."

Suttons' Improved Champion Swede,

Price 1s. per lb.; cheaper by the cwt. or bushel.

Other sorts of Swedes from 9d. per lb.

Yellow and White-fleshed Turnips from 10d.

per lb., as see

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GARDEN ENGINE.
12 Gallons .. £3 0 0
16 3 16 0
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30 5 13 0



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AQUAJECT.**
Useful for every variety of purpose—in watering or washing Flowers or Trees in Gardens, Conservatories, &c.; also for washing Carriages or Windows, laying Dust, &c.
Price complete £1 8 0
Small size for the hand, as an ordinary Syringe .. 0 15 0



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GARDEN or FIRE ENGINE.



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**CAST-IRON
PUMPS.**

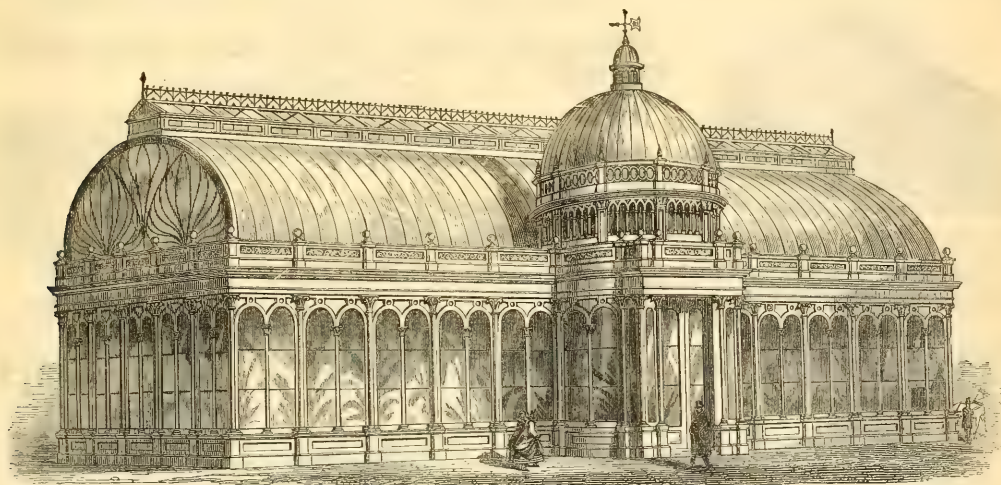
2½ inches	£1 9 0
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3½	2 7 0
4	2 15 6



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PORTABLE PUMP.
With improved Valves for Liquid Manure, £2 16s 6d. Two-inch Flexible Rubber Suction Pipe, in 10, 12, and 15 feet lengths, per foot 2s. 5d.



No. 60½—SWING
WATER BARROW.
Galls. Galls.
20 £2 2 0 138 £3 18 0
30 2 14 0 150 5 14 0

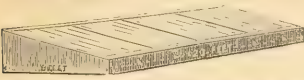


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These are strong and well made Sliding Lights, glazed, and painted
 three coats. Height of frame, 14 inches at front, 25 inches at back.
 With handles complete.
 Prices.—Carriage paid to any station within 200 miles of Norwich,
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 8 feet long by 6 feet wide. £2 15 | 10 feet long by 6 feet wide. £3 0
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 If prepared with wood cills, to build on brick wall, and lights to
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 101 feet long by 6 feet wide. £3 0 | 24 feet long by 6 feet wide. £7 0
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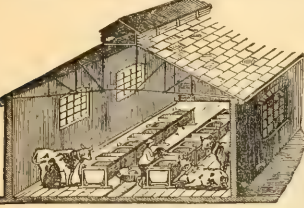
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PROPAGATING		GLASSES.	
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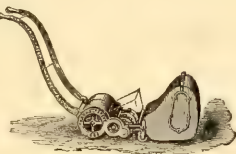
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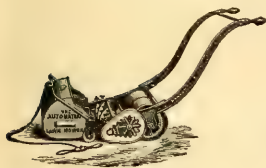
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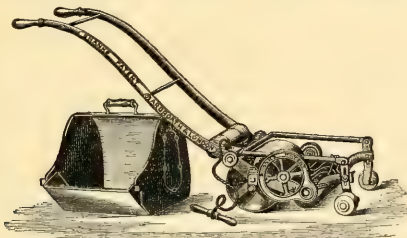
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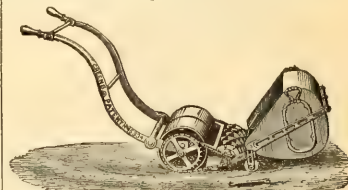
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"	22	"	"	8	0	0	By Man and Boy.	
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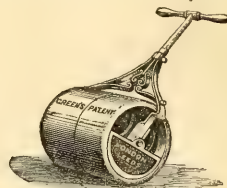
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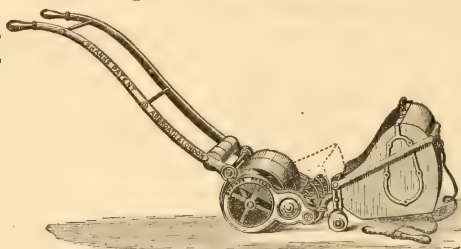
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conviction of any such offence before any justice or justices in England or Ireland, or before the sheriff or any justice of the peace in Scotland, forfeit and pay for every wild land bird so killed, wounded, or taken, or so in his possession, such sum of money, not exceeding —, as the said justice or justices or sheriff shall deem fit, together with the costs of the conviction.

“3. When any person shall be found offending against this Act it shall be lawful for any person to require the person so offending to give his christian name, surname, and place of abode, and in case the person so offending shall refuse to do so or give an untrue name of place of abode, he shall be liable on being convicted of any such offence before a justice of the peace or sheriff to forfeit and pay, in addition to the penalties imposed by section 2 of this Act, such sum of money, not exceeding —, as the said justice or justices or sheriff shall deem fit, together with the costs of the conviction.

“4. One moiety of every penalty or forfeiture under this Act shall go and be paid to the person who shall inform and prosecute for the same, and the other moiety of the poor, or to some other officer (as the convicting justice or justices may direct) of the parish, township, or place in which the offence shall have been committed, to be by such overseer or officer paid over to the use of the general fund of the county, riding, or division in which such parish, township, or place shall be situated, whether the same shall or shall not contribute to such general rate; and, in Scotland, to the inspector of the poor of the parish in which the offence shall have been committed, to be by such inspector paid over to the funds for the relief of the poor in such parish; and if recovered in Ireland, such penalty shall be applied according to the provisions of the Fines Act (Ireland), 1851, or any Act amending the same.”

—The well-known astronomer, SIR JOHN FREDERICK WILLIAM HERSCHEL, whose death has been recently recorded, has claims upon the respect of horticulturists. The late baronet was not only attached to horticultural and botanical pursuits, but promoted their extension, especially by his researches at the Cape of Good Hope. The Herschel family may be cited as a striking instance of hereditary talent and devotion to science.

—It is one of the misfortunes that befall “people who write in the papers,” that such writing entails a great deal of private correspondence. Now this is unfair to the writer in most cases, and subjects him to a great deal of unnecessary trouble. We say thus to protect Mr. CANNELL, for another week at least. His reply to many questioners, and which is in our hands for publication, is delayed till next week, when we hope to illustrate his system of CIRCULATION of HOT WATER, already alluded to, p. 578, by a woodcut.

—The occurrence of the KILLARNEY FERN (*Trichomanes radicans*) in England, has long been a matter of doubt. That it did at one time occur in Yorkshire is scarcely to be denied in the face of the figure and locality given in the third edition of RAY'S “Synopsis,” on the authority of Dr. RICHARDSON, who found it “scarce half a mile from Lingate, at the head of a remarkable spring, and nowhere else.” Besides subsequent and probably erroneous records of Scotch localities, we believe it was found in North Wales by Mr. BACKHOUSE, who wisely abstained from publishing the locality. From a notice in the report of the Cheltenham College Natural History Society, and from letters in recent numbers of *Nature*, we learn on the authority of three observers that the Fern has been found in small quantity in Cornwall. There is nothing improbable in its occurrence there, and we may assume that the record is correct; but we regret that any details as to the whereabouts of so rare and interesting a plant should have been published. Should it yet remain, a “small patch” only having been found, we fear for its safety during the coming summer.

—The toll-house (so long known as “Ratty’s”) and the gates at the entrance of the old road to the Chain Pier, BRIGHTON, will soon be cleared away. A new toll-house is to be erected close to the flight of stone steps at the eastern extremity of the Chain Pier Esplanade. That portion of the work at the bottom of the steps will be an open court-yard, leading to the entrance-hall of the AQUARIUM. This hall will be paved with encaustic tiles, and roofed with groined arches. A corridor of 250 feet in length, divided by columns of polished marble, and forming two promenades, will terminate in a conservatory. On each side of the corridor will be immense tanks, fronted with plate glass. It is proposed, says the *Builder*, to construct fountains inside as well as outside the aquarium, and the idea is also entertained of forming an aviary in the interior of the building.

—The Metropolitan Board of Works has lately completed the drainage of the ORNAMENTAL WATER in ST. JAMES'S PARK, with a view to cleanse its bed. As this is composed of concrete the process of cleansing is comparatively easy. The mud which was some 5 inches or 6 inches deep, was fearfully offensive, and it was necessary that it should be deodorised with chloride of lime.

—Mr. ROBERT BROWN, of Camptree, describes in the April number of the “Annals and Magazine of Natural History,” five NEW SPECIES OF OAK from North-West America. They will be more fully illus-

trated in a work on the forests of that country about to be published by the same author.

—The wood of the AMERICAN DOGWOOD (*Cornus florida*) is very close-grained and firm, and valuable for many purposes in mechanics. Cabinet-makers sometimes employ it with good effect in the manufacture of small articles of furniture. The woodman selects it as the best material for wooden wedges; the young straight stems make good hoops for the cooper, and the slender branches once furnished distasts for spinsters. The bark is said to be an excellent tonic, almost rivaling the Cinchona in efficacy. According to KALM it was regarded somewhat as the Rowan tree was of old among ourselves, for he says that “when the cattle fall down in spring for want of strength, the people tie a branch of this tree on their neck, thinking it will help them.” Observing farmers have remarked, that the proper time to plant Indian Corn is when the involucre of the Dogwood is first developed.

—The accompanying illustration, for which we are indebted to Mr. AYRES, represents a MALE FLOWER of a CUCUMBER growing from one of the branches of the tendrill—an unusual though not unprecedented



FIG. 129.—FLOWER ON TENDRIL OF CUCUMBER.

circumstance, and which would favour the supposition that the tendrill was of the nature of a branch.

—It appears from the *Society of Arts Journal* that the EXPORTATION OF FRESH FRUIT AND VEGETABLES at Naples has of late become a matter of considerable importance, and that a large quantity is despatched weekly by rail, not only for the north of Italy, but also to Vienna, and even ST. PETERSBURG. The green stuff, such as Cabbage, Cauliflowers, Spinach, &c., is chiefly produced in the neighbourhood of Castellamare, while the other vegetables are brought from Messina, Palermo, and Sorrento. The fresh fruit is almost entirely furnished by the province of Naples, and the dried fruit from Calabria and Salerno.

—THE WEATHER DURING THE WEEK ending May 13 was more seasonable than that experienced during the preceding week. The MAXIMUM TEMPERATURES in England ranged from 75° at Birmingham to 69° at Norwich, the mean for the eight southern stations being 71°·8, and of the eight northern 69°·7, or for the whole country 70°·8, which is 3°·3 above the mean for Scotland, where the extremes were 73°·4 (at Glasgow) and 62° (at Dundee). The MINIMUM TEMPERATURES would appear to indicate that the nights were cold, such low temperatures as 32°·2 (at Wolverhampton) and 33°·8 (at Salford) being recorded in England, and 33° (at Edinburgh and Paisley) in Scotland; the means for the two countries were 36°·3 and 35°·9 respectively. MEAN TEMPERATURES.—The highest mean temperatures recorded in England during the week was 50°·4 at

Nottingham, and 50°·1 at Portsmouth; and in Scotland was 50°·7 at Greenock, and 49°·6 at Perth; from the mean of the values at the different stations in the two countries, England was slightly warmer than Scotland, the values being 48°·4 and 48°. RAINFALL.—0·15 inch at Blackheath during a thunderstorm on May 8, and 0·12 inch at Leicester, also during a thunderstorm on the same day, are the largest falls recorded in England, where the mean for all stations is only 0·03 inch; and 0·25 inch at Greenock, makes the mean for Scotland to 0·04 inch. (See Mr. GLAISHER'S Tables in our present issue.)

—The term SALEP is applied to the tubers of several species of Orchideaceous plants. *Orchis mascula*, *O. Morio*, and *O. latifolia* are said to yield the best European Salep, but the finest kind of all is the produce of the Persian region, about the origin of which little or nothing is known. Dr. ROYLE has referred a kind of Salep received by him from near Cashmere to *Eulophia vera*, and another plant furnishing a similar substance, at the foot of the Himalayas, in N.W. India, is said to be *E. campestris*. *E. bicolor* is also said to produce it in the Bombay provinces. These tubers are of a brown colour, and have a semi-transparent or horny appearance, almost like a mass of hardened gum or glue, and have a sweetish mucilaginous taste. Their chief constituents are isochlorin, soluble gum, and starch, and are considered by some persons to contain the largest amount of wholesome and nutritious food in the smallest possible space. Medicinally Salep has been used as a restorative, emollient, and emunct.

—As illustrations of the want of energy on the part of proprietors of LAND in JAMAICA, the following products may be mentioned as articles of import into the colony from Castor-oil from Europe, the West Indian islands being most suitable to the cultivation of the plant; Guinea Corn and Indian Corn, which could easily be made large articles of export; Theobroma Cacao, which formerly grew most luxuriantly in Jamaica; and the Cocoa-nut (*Cocos nucifera*), which in other countries is a most useful Palm, while in Jamaica no oil or coir is produced from it.

—One of the most useful and beautiful of BRAZILIAN PALMS is the *Copernicia cerifera*, Mart., known as the Carnauba or Wax Palm. It grows principally in the northern districts of Brazil, and attains a height of from 20 to 40 feet. From the central portion of the trunk the natives prepare, for their own use, a kind of farina or meal. The lower part of the trunk is very hard, and is now used for all kinds of building purposes, while the leaves are used for thatching, for plaiting into hats, mats, &c. The most important and interesting product, however, is the wax, which is collected from the surface of the young leaves. To obtain this wax the leaves are cut, dried, and beaten, so that the wax is thrown off in the form of a fine whitish dust. When a large quantity of leaves have been thus beaten, the dust is collected and boiled in water, the extraneous matter sinks to the bottom, and the water and wax are collected for use or exportation. This wax is said to be sometimes used by the Brazilians to adulterate bees'-wax, and was at one time, if it is not now, imported into this country for candle-making. The only objection to its use was said to be the difficulty in bleaching, the yellowish tint of the wax being considered unsuitable for candles. This, however, ought not to be an objection any longer, seeing that candles are now made even of a dark brown colour.

—ALCYON EXCELSUM, D.C., is a large tree of some interest, being the only species of the genus, and being confined to the forests of New Zealand, where the seeds, which are globose and enveloped in a thick fleshy scarlet aril, are valued by the natives for food or pough, made of the strong fibrous leaves of the New Zealand Flax. After being softened by baking and steaming in the native ovens, they are well beaten, and the bag or pouch is twisted so that the oil is squeezed through it. It is used for various purposes, amongst others for anointing the body.

—The progress of chemistry and the introduction of coal-tar dyes have to a great extent displaced those of vegetable origin. Orchis and Cudbear are perhaps of all the most seriously interfered with. At one time the collecting of these Lichens formed a profitable and important occupation. One of the most interesting, however, of vegetable dyes is that known as the Chinese or Loeko, and is valued by the natives for CHINESE GREEN INDIGO. It is prepared from the bark of two species of *Rhamnus*, *Rhamnus chlorophorus* and *R. utilis*. It has occasionally been seen in the London market, and has realised as much as 75. 6d. per oz. Its chief use, however, is in France, £8000 worth having been imported into that country in the space of six months. It is largely used as a Lychnis for dyeing silks, imparting a purplish or greenish tinge to various shades, which are said to retain their original tints when exposed to artificial light. To prepare the dye, the barks of the two species of *Rhamnus* are thoroughly boiled in water, the decoction is allowed to stand for some days, after which it is placed in earthen vessels and cotton cloths previously prepared with

lime are dyed with it. The dye is then removed from the cloths by washing them thoroughly in water, which is again boiled, the sediment being collected and spread on blotting-paper to dry, when it forms into thin flakes more or less curled, and is ready for exportation. *R. catharticus* has been found to yield a similar dye.

PROF. H. G. REICHENBACH.

There are few to whom British horticulturists, and the readers of the *Gardeners' Chronicle* in particular, owe profounder homage than to the Orchid king. Having acted as viceroys for a number of years, the Professor ascended the throne vacated on the death of Lindley, amid the unanimous assent of his colleagues and his subjects, and worthily, most worthily, does he fulfil his regal duties. Nor does our Orchid king share the exclusiveness sometimes manifested by those in high positions; on the contrary, we doubt whether the President of the United States himself is more accessible than our Professor. Does a new Orchid arrive? forthwith it is despatched to Professor Reichenbach. Does a stranger make his appearance without his passport or visiting card? forthwith he is forwarded to the Edinburgh professor for identification, verification, or baptism, as may be required. Does any question arise concerning that most intricate and difficult family, the Orchidaceæ? Prof. Reichenbach acts as the universal referee and umpire. He is never too busy to reply where an Orchid is in the case.

Be the petitioner gentle or simple, it makes no difference, the answer is cheerfully, speedily, and satisfactorily given, often, too, accompanied by a strikingly apt allusion or a playful witticism, rendered the more pungent by the Teutonic English in which it is framed.

It does not often happen that a botanist devotes himself for many years so exclusively to a single family in the way that Prof. Reichenbach has done, but the devotion has manifest advantage as giving the naturalist a knowledge of detail and a comprehensive grasp unattainable by others of more discursive range of study. Nor in the case of a large group like Orchids has such an exclusive devotion a tendency to contract or narrow the judgment. The group is too large—too multifiform, too varied in all its relations, whether of form, function, or locality, to warp prejudicially the mental powers of its devotee.

It must not, however, be supposed from our remarks that Prof. Reichenbach is exclusively an Orchidographer. He is best known to horticulturists in this field, but botanists have to thank him for the zealous collaboration he has given to his father's grand undertaking—the *Icones Floræ Germaniæ et Helvetiæ*—a work devoted to the description and illustration of the plants of Central Europe, and of which Heinrich Gustav Reichenbach, the younger, has edited the later volumes and illustrated them *proprio manu*. The first of this extensive and valuable publication which Prof. Reichenbach edited was naturally enough that devoted to the Orchids of Europe. It bears the title, "Tentamen Orchidographiæ Europæ," and is dated 1851. "Forten years," says the Professor in the preface to that volume, "I had devoted myself to the study of Orchids."

Since 1841, then, our Professor has most diligently studied Orchids in association with Lindley, who repeatedly acknowledged his obligations to the subject of this notice. In consequence it is scarcely possible to take up a set of volumes of periodical botanical literature, German, French, or English, or any work devoted to the enumeration of the floras of distant

lands, without meeting traces of the Professor's industry and research. Our own columns in particular have been enriched with very numerous descriptions of the Orchids that have been from time to time introduced into cultivation, and the services the Professor has rendered to British horticulturists were acknowledged in the dedication by Dr. Hooker of the volume of the "Botanical Magazine" for 1868 to him.

Of separate publications we may mention the well-known "Xenia Orchidacea," which has appeared in occasional fascicles from 1851, and the "Observations on the Orchids of Central America."

Professor Reichenbach is also the author of the synopsis of Orchid lore contained in the sixth volume of "Walper's Annales," and it is much to be desired that he would give us in a compendious form, a synopsis of all the known genera and species up to the present time.

Prof. Reichenbach has always taken a lively interest in horticultural exhibitions, both on the Continent and in this country, and has frequently been called on to act in the capacity of judge, especially where Orchids or new plants have been concerned.

ings, would be hailed with pleasure and approbation by all who wish horticulture well. Good concrete presents this very desirable condition as contrasted with brickwork in a very material shape, as its cost is relatively from one-half to two-thirds less, whilst its durability is of the most enduring kind, and its usefulness almost unlimited. Living in a neighbourhood where concrete erections are very general, I have had my attention somewhat minutely attracted to the various purposes to which it is here applied, and find no reason for believing that that use is not deserving of a much wider knowledge and more general application. Beginning with neat, well-built cottages, in which thousands of working men would delight to reside, then stables, outhouses, sheds, garden walls, pits, field fences, and finally pigsties, there seems to be no limit to the uses to which concrete may not be put for the benefit of man.

Its horticultural appliances, however, are necessarily restricted within certain limits, but those limits will include many diverse purposes. Foremost amongst these uses I place the construction of garden walls, whether boundary or otherwise, all of which can be made to serve the double purpose of a fence and a means of fruit culture. Of course there is no new idea involved in this, but there is the important one of cost, and here the comparison rests so strongly with concrete as contrasted with brickwork that it may in the case of thousands of gardens make all the difference between having a wall with the consequent fruit culture, or none at all. Within 50 yards of my dwelling is a meadow of some 7 or 8 acres in extent that is enclosed on two sides by a concrete wall 6 inches thick, and averaging 4 feet in height from the ground, with 12-inch piers at long intervals, and comprising an entire length of about 500 yards. This wall, I am informed, cost, including foundations, about 1s. per foot run; its solidity is perfect, it is without coping, is quite unaffected by frost, and impervious to moisture, and kept several hungry horses within bounds during the late severe winter. Horticulturists would, no doubt, demur as to the advantages to be derived from a wall 4 feet in height, except for nursery or training purposes; but as there need be no limitation to reasonable thickness, neither need there be any as to reasonable height. A 6-inch wall may be however safely erected to a height of 6 feet if the piers are put nearer together, and a wall of such a height is not only a good

garden fence, but eminently useful for the growth of permanent trees. Still more to the point, however, is another concrete wall of some 400 yards in length, that forms the northern boundary of a market garden. This wall is 7 feet in height, 12 inches in thickness, and has its southern aspect utilised by having a large number of trained trees planted against it for future training. I quote these instances to show that in the matter of wall erections we have here some considerable specimens, quite enough to show that the concrete might be made for that particular purpose.

Just before coming here early last winter the owner erected a lean-to potting shed, some 40 feet in length, the outer wall being of 6-inch concrete, composed of moderately fine shingle and Portland cement, and about 2 inches of extra thickness at the corners. This wall presents as good a specimen of the quality of concrete work as can well be found, and to show the low useful surface is thinly coated over with a mixture of sand and cement, a surface as hard and smooth as stone is produced. In addition to this the shed has also a concrete floor, over which is laid a coating of cement, and a firm, dry, and very smooth surface results. For the flooring of many kinds of plant-houses and conserva-



PROF. H. G. REICHENBACH.

At the several Horticultural and Botanical Congresses Prof. Reichenbach has generally taken a prominent part, and at our own International of 1866 he served as juror in the Orchid classes and acted as one of the Vice-Presidents of the Congress, to whose report he contributed some interesting communications.

Professor Reichenbach's labours were for some time conducted at Leipzig, but of late years he has occupied the position of Professor of Botany and Director of the Botanic Garden at Hamburg. The collections of living Orchids, and the dried ones contained in our herbaria, have frequently tempted the Professor, in spite of his own very rich collections, to visit this country, where his advent is always hailed with joy by those interested in Orchids.

THE USES OF CONCRETE FOR HORTICULTURAL PURPOSES.

THE introduction into horticultural constructions of any kind of material that will greatly assist to reduce the prime cost of such erections without in any degree detracting either from the necessary durability or usefulness so essential in all that relates to garden build-

ories, a good layer of concrete, surfaced with cement, is a capital and cheap substitute for stone, and far neater than brick. The exceedingly impervious character of Portland cement prevents the soakage of moisture, and such floors can be washed, cleansed, and dried without producing those nasty green patches that are so indicative of damp.

To many persons there will be presented a strong objection to the use of concrete walls to which to train trees, because they are impregnable to the points of nails, and also that an additional outlay is necessitated to cover the wall with stout wire before the surface can be made available. That these may appear to be well grounded objections I can well conceive, but I sincerely think that either plan, or a compromise between them, is the best. Still, were I to treat all the holes and crevices left by the nails afford safe refuge for the myriads of insects that come forth and prey upon them. So much for nailing. Now, as wires are essential to the training of trees on concrete walls, it is of importance that their mode of fixture should be permanent. On the walls here this is accomplished either by the introduction of iron holdfasts at certain intervals when the wall is being built, or else the apparatus used in the construction is removed, certain bolt-holes are left, and these have pins with eyelet-holes at one end inserted in them, and the hole is then stopped with fine concrete. Preferable to this plan, however, would be that of having lengths of, say, $\frac{1}{4}$ -inch iron, drilled at 6-inch intervals with small holes, running from the bottom to the top of the wall at intervals of about 10 feet. If each of these wire supports were bolted through the wall, top, bottom and middle, and lengths of stout wire run through each hole, and securely fastened at either end, there would be presented a means on which to train trees that would far excel all nailing for neatness, simplicity, and durability of wear and tear; besides which, without at all considering the relative cost of concrete and brick walls, I believe the additional expenditure required for the wiring and fixing would be met in seven or eight years by the saving effected in the probable cost of nails and shreds.

I may mention that a less costly mode of fixing the wires would be found by bolting at intervals to the walls lengths of $\frac{1}{4}$ -inch quartering, placed perpendicularly, the wires being fastened as desired by the aid of small iron staples; the wood, however, must not somewhat, still it would be cheap. Lest the question should be raised, as to the difference of retention of soil between brick walls and those made of concrete, I may say that I have equal lengths of both kinds of wall, 8 feet in height, on which are growing a capital lot of Peach trees. The two walls constitute an angle, the brick wall looking south, and the concrete wall west. All the trees were in full bloom together, and nothing in the way of evidence has as yet been afforded either way.

The most useful persons who may be troubled with lot of old wooden sheds or outhouses are those who have a garden. A stable and cart-house of such a character, with earth floors, and as Potato stores almost useless, I found a few weeks later on, metamorphosed by the introduction of concrete and cement-surfaced floors; and as two sides of the building simply consisted of old weather-boarding fixed to quartering on the inside, it afforded abundant admission either to cold or vermin. I now found the whole of the spaces between the quartering were filled to the roof with solid concrete, about 4 inches thick, against which the rains may blow, or the rats may gnaw in vain. I have, however, far from exhausted a description of all the horticultural uses to which concrete erections might be put, but I purpose now to allude to one other only, and that is, the form of pits and frames.

Surrounded, as I am, largely by market gardens, nothing has surprised me so much in connection with them, as an almost entire absence of pits or frames of any kind in which to house half-hardy stock for the winter. What a capital thing it would be just now for a market gardener if he had, say 1000 strong early Cauliflower plants to put out, or a few thousands of Cos Lettuce; but how few of the smaller men are there who have even ten of either, and yet the outlay necessary to obtain them is only a few shillings, and for 20 years would be comparatively small compared with the results obtained. I have just seen a small forcing-pit that has been constructed of 4-inch concrete, and having 2-inch drain-pipes let in all round the bottom, instead of pigeon-holes. This is a sample of what can be done with concrete; but for market garden purposes I should advocate cold pits, only of 4-inch work say, rising from 1½ foot in front, to 2½ feet behind. Such a pit would run very cheap, indeed, and could be nearly done with ordinary plankings; and as capital lights, 6 feet by 4 feet, unglazed, can be bought at 5s. each, and can be glazed and painted for about 5s. each more, I should commend the construction of pits to fit this very convenient sized light. A pit of say 20 lights in length would probably not cost £20, and

this amount it would soon be made to earn. Suppose it were filled in the autumn with Endive and Cabbage Lettuces, and perhaps late Cauliflowers. After these were marketed in February, the pit might be filled with freshly raised Cauliflower and Lettuce plants, and when these were put out, Cucumbers might follow all the summer. Or if flowers for market were grown, what would be the value of the contents of such a pit were it full of Mignonette or Stock? *Alex. Dean, Bedford.*

ORNAMENTAL PLANTING FOR PLACES OF SEPULTURE.

THE area enclosed by a wall around the parish church, *i.e.*, the churchyard, being consecrated ground, can be regarded as nothing less than an outer court to the House of God; and its claims to veneration have rarely been questioned. I was indeed disgusted to see the ruin of the little dome revealing unbecomingly the churchyard of my native parish—having possession of nearly half the area of the burial ground. In places of sepulture there repose the remains of the scrupulously clean, who during life set a good example by their neatness and orderly conduct; and all the pious, the charitable, the wise and good are there, with those who have laid up treasure for the world to come; lovely babies, of whom it is said, "Suffer them to come," and virgins of whom it is said, "Who are betrothed to Christ," and those that they are to follow the Lamb of God. Surely then, the churchyard claims our high regard, since all Christendom firmly believes that those who have gone before are there sleeping away the long night of years, unconscious of the age of ages that is rolling over their heads, until the dawn of that day when the blessed shall bask in beams of light from the inaccessible, where it is said, "Gloria in excelsis." In some places the churchyard is called "God's Acre," and we read of a place of sepulture called the "Field of the Blessed;" but call it what we may, wherever God hath such treasure, and man hath such high hopes laid up, the place is thereby rendered sacred—in short, it is holy ground. But besides the churchyard, with its humble graves and stately tombs, there is the cemetery, the battlefield, and the bed of the sea. Of these we might say, that the ocean would give up her dead more gracefully than any of the other "waters," for over the face of the restless deep man has never had any control, and its face is always fair to look upon. The Nettle is said to follow the footsteps of man, go where he may; and glad should we be if the churchyard could be got as free of the Nettle and the Hemlock as the face of the deep, deep sea. I have watched with the greatest delight the throes of the second child of the blue dragon-fly rising out of the still water of a garden pond, and it looked as fair as if it had descended from heaven, instead of having risen from a layer of soft mud under a fathom of water, where it had passed into the winged state, and had again come to inhabit earth and air, but not this time as a crawling worm, greedy of coarse fare, but to live in the love of its fellows, and sip nectar from the painted cups of the fairest flowers. Had I seen the grubs entering their gloomy prison-house, and had I seen the history of their life, I should not have believed that they could rise again; but with this miniature example before our eyes, we may well say: "How are the dead raised, and with what bodies do they come," for the crawling grub, like the Lilies of Holy Writ, comes forth arrayed in such a manner as—

"Solomon in all his glory was not."

It is necessary to state clearly at the outset the truly religious character of places of sepulture, in order that their planting, dressing, and adorning may be somewhat in harmony with the general tenor of the subject, the keystone of which is, the resurrection unto life, to which the Christian religion, in its teaching of hope, honour, and virtues of those who sleep under the tombs and tablets.

The peaceful stillness of plant life makes it very desirable to have trees and shrubs planted in cemeteries whose leaves are long-lived (evergreen), for although the leaves of the Cedar and the like (which seem to occupy their places in perpetuity but which have a time to fall), are not the *immortelles* they appear to be, still the neat growth and decided character of such evergreens as those of the Juniper tribe are all that could be desired among the tombs. It is never desirable to plant trees that may grow large where the space is manifestly very limited, indeed an individual grave may be reckoned as being very little more than 6 feet by 3 feet; and it requires some little knowledge of the habits of plants to ornament an Elm an Ash or a Willow, and a Hawthorn, as these will grow and winter well and have felt sorrow that shows itself in weeping for those who have gone the way whence they shall not return. The Elm, the Ash, and the Willow in their normal state are fine trees, and over a piece of ornamental water the Weeping Willow hangs gracefully, so that in the southern countries, where it is quite hardy, it is desir-

able in connection with water; but the Golden Willow on dry land far surpasseth the Weeping as an ornamental tree, for when its twigs are leafless they show a bright warm yellow. The Weeping Ash is simply a small tree, or large shrub turned, as it were, upside down; and so of the Weeping Elm, and many other shrubs and trees—their oddities, like blotched and spotted leaves, are reckoned handsome. The old-fashioned breed of fowls, called in my young days French hens, had all their feathers turned the wrong way up, and certainly they looked something quite out of the common way; but when we look at a pheasant's breast and see the way that his feathers are set off so beautifully, we cease to admire the Frenchman's banderol fowl with its bristling plumage. Doubtless double flowers are likewise monstrosities, and when the stamens of a Rose are transformed into petals, that is the only change the plant undergoes, for the stem, twigs, and leaves are all as good as before, if they are not changed for the better; whereas the plants called weeping are almost entirely so termed in the trade "water," and they are often sickly-looking specimens, and always short-lived. Were our climate that of the Cypress and Myrtle, we should have no difficulty with the planting of our places of sepulture; but as it is we can choose plants flame-shaped, as if the church spire had been their model, and not like a wet blanket on a bush, as weeping trees frequently appear: the one class of plants points hitherward to the earth, and the other to the heavenward to the sky. The holy ground are beyond our control, but we may add the stake.

The small enclosures of churchyards give little scope for any re-arrangement, for they are often full; and in towns we see the churchyards closed, and the grave-stones side by side, paving the area almost as closely as the flagged footpaths of the street, with not a leaf to be seen, and not a blade of grass for the sun to shine upon or the wind of heaven to wave. The churchyard is there simply a desert land, and the graves are like the graves at the idea of treading under foot those we wish to honour. Mr. Hole in his book about Roses, mentions an immense Rose bush growing on one of the walls of his church. Surely there must be many unemployed walls of other churches, where a white Rose could climb, and where its sweet petals might fall on the graves of innocent babes, whom God has in His holy keeping for a great end. On the other hand we see some churchyards choked by trees, and the trees are the worst objects in the churchyard. In Denbighshire, is an example of this kind. There had been a time when the church stood fair to see, and the Yew trees clad in sober green stood young and beautiful around the venerable pile; but many years ago the Yew trees got the upper hand, and larded it over the church, high overtopping the choir and chancel. At the present time the trees are first, and the church only secondary, for the Yew trees and the Elm trees are the worst objects in the churchyard. As some Yew trees have borne to be cut back nearly for 100 years and yet live, there need be little difficulty with these fine Yew trees in skilful hands. In the palm days—on Palm Sunday—twigs of the Yew were blessed and distributed in the church service; and in the days of the Bowyers and Fletchers (the bow and arrow makers)—when as on Flodden Plain the clothyard arrows were like haws, and our warriors had to be content with a few tree bows, when the dead were delivered at the lych-gate of the churchyard for interment—the fine old Yew trees formed a leafy tent all the year round overhead. No wonder, then, that this tree was respected, since it gave the Palm to gladness, the brand to warfare, and the canopy to death. The Elm, among deciduous trees, holds the same rank for churchyards as the Yew among evergreens; and, when I planted a churchyard for the first time, I was told to plant beyond distasteful trees of fair and unblemished character for that end.

In working a churchyard or cemetery, there are several awkward things that might easily be better done. One in particular is the manner of digging the graves. We see a grave, say 6 feet long, 2 feet wide, and 15 feet deep, carefully dug out, and brought to the surface, and this 180 cubic feet or 20 cubic feet of earth, being piled up, and the grave being left to be flogged loose all round the adjoining graves, and over them. Now if the whole of this soil were put in bags in the grave, the whole could be neatly done, and in filling in the grave the saving of labour would be at least one-third. In the London district coals are delivered in bags, and it adds nothing to the cost, while it insures full weight, whereas loose coals tumbled down from one's door in a single afternoon would be of no use, as the coals would be got in, and some what doubtful sometimes as to full weight. What is already done in the affair of coals, I need not say, could readily be done with clay. Let the well sinker and the miner sink shafts still after their own fashion, but let us respect the graves of our neighbours, and not permit a handful of red earth to soil the surface of the grave sacred to some one who so devoutly wishes the resting place of the unforgotten.

The next thing that I would mention is one that may very easily be remedied. No one will deny that, whether in the full glare of sunshine, or while heavy rain is falling, the burial of the dead has to be done under difficulties, but if only a square tent were pitched over the open grave, high enough to admit the officiat-

ing clergyman, the chief mourners, and the bearers, the service would be more grave where both readers and hearers have to be uncovered.

In arranging the ground for a cemetery, or place of sepulture, let us suppose that we take a beautiful likeness done in line engraving, and scan it very closely; here are the lineaments all correctly given, the fair angelic face, and yet when we ask by what means, we find it is by long and short lines all drawn in one direction, and all parallel to one another, yet there is nothing stiff or formal. Now there can be no need for formal lines in the walks, carriage ways, and parades of such places, but yet there must needs be a good road, walk, or path to every part of the ground, a sort of herring-bone style of alleys running right and left from the main lines of walks or roads. Hundreds of graves are huddled together in some of our cemeteries, with no other means of being got at than by treading on all the graves that lie between the walk and the grave that is wanted. The alley seems never to have been thought of, but every grave is treated as if it were a paving stone. There is but one way of obtaining due respect for the dead, and that is by bearing in mind that they will rise again. When we have to cope with such a subject, against such fearful odds, one almost despairs of making much headway, for we find that the evidence of at least ten eye-witnesses failed to convince St. Thomas of the Lord's rising from the dead, and we have the word of Abraham, the father of the faithful, that even if one were to rise from the dead, their presence, their prayers, and their tears, would not convince their brethren concerning the world to come. The subject is a highly important one, and as churchyards are fast closing, and fresh fields for sepulture opening, their dress and adornment well deserve attention. My limits here prevent me from going into particulars, but if I succeed in calling attention to the subject, and claim for it the veneration of all good men, something will be gained; for well hath the poet said—

"Slight not the warning sound—

Put off thy shoes from off thy feet:

The place where man his God shall meet

Be sure is holy ground."

Alex. Forsyth, Salford.

BOTANY FOR BEGINNERS.—VII.

OUR artist has drawn a Wallflower (*Cheiranthus*) in a stage which enables us to say something more of the *inflorescence* than we have hitherto done. It will be seen that there is a cluster of flowers at the end of a shoot, each flower provided with its own separate little stalk. Such an inflorescence is technically called a *raceme*. But the fact we wish specially to call attention to is this, that while the topmost flowers are still in full bloom the lower ones have shed their petals and only the pods remain. Clearly, then, the lowermost flowers have been the first to open, while the youngest flowers, the latest in order of expansion, are at the end of the shoot. An inflorescence of this kind is called *indefinite*, whereas one in which the topmost flowers open first, and those lower down expand subsequently, is called *definite*.

It matters not what form the inflorescence assumes—long or short, rounded or flat, simple or branched, few or many-flowered—all the variations admit of being grouped under these two heads. If the inflorescence be rounded or flat, like a Daisy, then it is the outermost flower that opens first in the case of indefinite inflorescence, the central one in the case of the definite arrangement. Of course the outermost and lowermost, or the innermost and topmost flowers mutually correspond. Suppose a coil of measuring tape rolled up, that would represent the rounded or flat-topped inflorescences; pull up the end, which is in the centre of the coil, and you would have the analogue of the long inflorescences. These two modes of growth, definite and indefinite, are well worth carefully noting, as they apply not only to the inflorescence, but to the branches, and indeed to every part of the plant. Sometimes the direction of growth is from above downwards (*definite*), at other times from below upwards (*indefinite*). It is easy to see how the whole form of the plant depends on this very simple circumstance; and, moreover, every thoughtful young gardener who has to prune fruit trees, vine trellises, and even cut flowers for a bouquet, will recognise how important it may be in some cases to have an accurate knowledge of this difference in the mode of growth, and to act on it. If, for instance, the top of the Wallflower be taken off, no more flowers are produced on that shoot; but if the central flower of a cluster of Roses be cut out, there will still be others left to cut and come again for its necessity.

Proceeding to pick our Wallflower to pieces (a single Stockett or a purple Rocket will answer the purpose as well if a Wallflower is not at hand), the beginner will notice that there are four free *sepals*, but that two of the four are placed at a slightly lower level than the other two, and have, moreover, a little pouch-like projection at their base. Here, then, we have a calyx in two rows; outer row of two pouched sepals, inner row of two sepals destitute of pouch. Then comes the corolla of four free petals, the chief mourners, and the bearers (see p. 613) with the other, and each petal having a well-marked stalk or claw, and a broad limb nearly at right

angles to the claw. This peculiar cruciferous condition of the corolla is very characteristic. Four stalked petals, placed crosswise, occur in the order Cruciferae (cross-bearers), and in no other. Wallflower, Stock, Rocket, Cabbage, Turnip, Mustard, and a host of other ornamental or useful plants, belong to this cruciferous family, which may be recognised in a moment by the character just pointed out.



FIG. 131.—INFLORESCENCE OF WALLFLOWER.

Within the four petals we come to six stamens, of unequal length, and on a slightly different level (o, fig. 132); in point of fact, we have two rows of stamens—an outer row of two short stamens opposite to the two lower pouched sepals, an inner row of four long stamens opposite to the four petals. The presence of

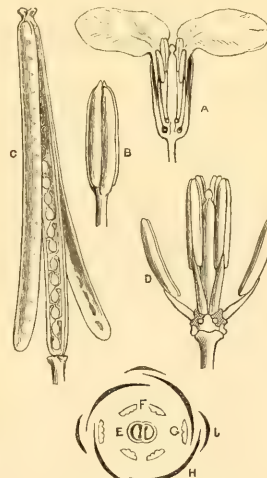


FIG. 132.—WALLFLOWER. A, Cut through the flower lengthwise; B, A flower-bud; C, A ripe pod splitting into two valves; D, Stamens and glands; E-H, Ground plan of flower.

six stamens, two short, four long, is almost as good a mark of Cruciferae as the four stalked petals.

Each stamen has a filament or stalk and an anther at the top, which latter is two-lobed, each lobe splitting by a long chink to permit the escape of its contents, the dust-like substance called *pollen*. Pull the stamens away, which can be easily done, as they are free and not in union with either calyx or corolla, and there is left in the centre the pistil, in this case consisting of a long ovary which is two-celled (as

shown at E, fig. 132) and is surmounted by two stigmas. Should the beginner have any doubt as to the two-celled character of the pistil, he has but to wait till the pod (C, fig. 132) is ripe, and then he will readily see that the ripe pistil or pod splits into its two constituent parts from below upwards, and leaves in the centre the *placenta* with the ovules or seeds attached. In this flower, then, the parts are arranged in twos or fours, two outer sepals, two inner sepals, four petals, two outer stamens, four inner ones, and a two-celled pistil. The arrangement of these parts is shown in a sort of plan at the lower part of the cut; J shows the position of one of the outer sepals, H of a petal, F of two long stamens, G of one of the short ones, and E is the pistil. Such ground plans are very useful to botanists, in enabling them to see at a glance the number and arrangement of the parts of any given flower. Now it may possibly strike the pupil that there is a sort of inconsistency in this flower, and that to make up the proper harmony of proportion there should be two more short stamens to make up the outer quartette. Perhaps also, if he be a stickler for proportion, he may say that two more cells should be added to the ovary. Supposing this to happen, the flower would have four sepals, in two rows of two each, four petals, eight stamens in two rows, and a four-celled pistil. Such a flower is supposititious. Nevertheless there are some grounds for the belief that some part at least of this supposition is correct, and sometimes flowers may be met with confirming this conjecture. If the observer will look at the base of the short stamens of the Wallflower he will see some small bright green knobs or glands, as they are called, whose function is to secrete honey. They are shown in the cut at A, and also at D. Now in various Cruciferae the number and position of these glands varies, and from these and other circumstances, which it is, perhaps, premature to mention, botanists have arrived at the conclusion that these glands represent, at least, some of the missing organs. We cannot fully enter on this subject, as it is, perhaps, more fitted for an advanced pupil; but we may say that there is an interest and a fascination about this sort of research—a sense of satisfaction at being permitted to pry into Nature's workshop and model-room—which the mere flower-gatherer never knows. Further we may add that to Mr. Worthington Smith, the delineator of the illustrations accompanying this series, botanists are indebted for the most plausible account of the structural meaning of these little green glands, whose office now is only to secrete honey.

Home Correspondence.

Mimetic Plants.—In your remarks on Mr. Wilson Saunders' curious collection of plants exhibited at the recent *soirée* of the Linnean Society, you object to the use of the above term in reference to them, though I do not know what better expression can be found to express the extraordinary resemblance between them. With you, I find it difficult to believe that they can be instances of protective resemblance. Some other cause has evidently been at work to produce the external identity, and this suggests the idea whether this cause, whatever it may be, may not also have brought about some of those resemblances which are generally considered as protective. The fact that this resemblance gives insects or other animals an immunity from their enemies, we must recollect, generally rests on assumption only. The parallelism can, I believe, be followed out to a far greater extent than it has been at present, existing not only in the foliage but in the form of the fruit belonging to widely separated natural families. Of this I hope to publish some remarkable illustrations shortly. That this resemblance is explained by "the growth of the plants under similar conditions of soil, climate," &c., as you suggest, I can no more believe than that it is due to a natural selection for the purpose of protection, or to hybridisation. *Alfred W. Bennett, 6, Park Village East, Regent's Park.* [We await with interest further explanations of this phenomenon. Eds.]

Holly-leaf Mining Insect.—Can any of your correspondents kindly give any information as to the best means of getting rid of this destructive insect? There are in the pleasure grounds here extensive groves of fine Hollies, in which Mr. Bennett takes great interest, and I regret to find that nearly every tree is just now infested with this pest. The insect is described in "McIntosh's Book of the Garden," vol. ii., p. 827, as *Phytomyza ilicis* (Curtis), and it is there recommended that every leaf be gathered and burned. This I have no doubt would be an effectual plan, but in this case it would be a very extensive undertaking, as there must be many millions of leaves affected. *John Pearson, The Gardens, Rangoon House, May 15.*

Dracæna congesta as a Bedding Plant.—I have tried *D. terminalis* as a bedding plant, but I cannot recommend it for that purpose in general. It may be put out in very sheltered situations, but mine were quite distressed in foliage before midsummer, so much so that I had to cut them all down close to the pots in September, and to get good foliage upon them again. This plant will not stand the winds with me, and in the stove it has a great tendency to die off at the tips of the leaves, do what I may with it. My plants of this species produce

the best foliage when they are pot-bound. *Dracena congesta* is a real acquisition to the flower garden. When planted in pots in the centre of the beds, they have a fine effect, also as single specimens. I have some grown here as standards, and when taken out of the conservatory, where I winter them, say in March, and put them into a cold house, and well harden them off before planting them out, they will throw up flower-spikes from 17 to 18 inches above the foliage, and look decidedly tropical. Another recommendation of *D. congesta* is that it is vigorous in growth; if grown in a stove it can be grown from 4 to 5 feet per season, so that any one possessed of a stove can very soon get up a stock of it, being very readily propagated from both stem and root. *John Burns, Gr., Tollysty Hall, Middlesex-Trees.*

The Nightingale.—I think no one denies that birds add a great charm to every garden, in spite of their destructive propensities. It is delightful at this season of the year to sit and gaze upon the objects around us, whether they be beds of flowers or clumps of shrubs, or it may be specimen trees of many years' standing, either evergreen or deciduous. The latter are now unfolding their foliage, of various forms and hues, and the songs of many of our feathered friends cheer us as it were and enliven the whole. Of all the songsters none are to be compared with the nightingale. In appearance the bird is rather insignificant, being small, and of a brownish colour, but from morning till night, and from night till morning, this little warbler is to be heard pouring forth such exquisite carols that it is quite enchanting to listen to them. What a treat is lost in those counties which he does not frequent. I never heard one in Cheshire, Shropshire, Warwickshire, or in any of the counties on the borders of North Wales. They arrive here in the middle of April, and I have found their nests, which are fragile in appearance, very near to the ground in the middle of thick bushes in the shrubbery. *T. Wynne, Holbrooke, Suffolk.*

Charlock as Human Food.—The writer was born in a farmhouse, has lived 74 years, and has known much of country life, but he never understood "Charlock," as it is called in the West of England (a weed not unlike, and whose blossom is very similar to, the Mustard plant), to be other than a useless troublesome weed until last May, when seeing a Wiltshire shepherd with a bunch of the tops of that weed, he learnt, on inquiring, that the tops of the "Charlock," when boiled as greens, are excellent food. But not being satisfied without practical evidence, he gathered a quantity and had them cooked for dinner, and an excellent vegetable they proved to be—equal to if not superior to any Turnip greens. What an acquisition for poor people, and for destroying the farmer's weeds. The tops should be broken off, just before they are in blossom, as below the breaking-off point they will prove tough and stringy. *E. Wat, Salford, near Bristol.* [Our experience is, that they are superior to Turnip-tops. EDS.]

Breeding Gold Fish.—I still require a little information respecting gold fish. What I should be glad to know now is their method of breeding, as I have noticed the swarm of male fish continually following the females, which appear to be very stout and full of spawn. I am also inclined to think that the male fish eat the spawn, as the female deposits it, and that would prevent the increase I have previously noticed. *A Constant Reader.*

Fruit Setting and the late Wet Weather.—Like Mr. Tillery, and others of your correspondents, I was somewhat uneasy about the setting of my Plums and Cherries during the late rainy weather, for, though I advocate sunshine and shower as the most favourable conditions for the setting of fruit, still I do not approve of a continual vapour bath, such as a wall of Cherry trees here has been subjected to lately. From the time the trees began to come into bloom till a fortnight afterwards, I think there was only one day in which rain did not fall some time or other; and, as I passed along the wall in question every day, I noticed that the trees were rarely ever dry during that time, and it occurred to me to watch how much moisture the blossom would endure without endangering the setting of the fruit. I have been along the wall again to-day, and am pleased to find that there is every prospect of an abundant crop; the fruit generally are the size of small Peas and under, I therefore conclude they are set. I shall be glad to learn how Mr. Tillery's trees have fared, if frost has not interfered, also Mr. Miller's, at Workop Manor, as both are apparently somewhat dubious in the matter. Our Apricot trees here were simply smothered with fruit before thinning, and as neither rain nor copious dews were absent when they were in bloom, I consider the fact is corroborative of the syringing theory. Our late Peach-house was copiously syringed while the trees were in bloom, and the "set" is not extraordinary. I have also seen the same Mr. Tillery and Mr. Miller practise the dry system in their Peach-houses. It would be instructive to learn how their fruit has set, especially the following kinds, which we have here:—Peaches: Noblesse, Royal George, Bellegarde, Barrington; Nectarines: Elruge, Violette Hative, Pitmanston Orange. I have this season, in some instances, syringed Pines overhead while in bloom, without the least bad effect, and Passiflora

quadrangularis sets freely with us in a regular steaming atmosphere. For all this, I do not doubt that fruit will set in a very dry atmosphere, but I do not consider such conditions favourable, especially in forcing, though one has to look up any Gardening Calendar to see that a dry atmosphere is deemed essential. I was certainly always taught to avoid spilling even a drop of water on the path, or anywhere else, when Vines and Peaches, &c., were in flower; tanks and all used to be emptied of their water, or covered with boards, and the temperature otherwise made as dry and uncomfortable as possible. *J. Simpson, Wortley.* [Certainly, if the water fell on the pollen grain, the latter would burst and set free its contents. It would therefore depend where the pollen was, whether good or bad results followed. If close to the stigma well—if not nil. EDS.]

Semi-double Auricula.—I send you a semi-double flower from a common Auricula. The old plant formerly had single flowers, but last year it died away to one stem and produced only one flower, exactly similar to the one sent. I moved the plant, which is now growing nicely, but it has not shown more than one flower this year. *G. Donaldson, Keith Hall.* [A sort of hose-in-hose flower; very curious. EDS.]

The Crops.—Since the thunderstorm on the 8th inst., the cold N., N.E., and E. winds have had a very injurious effect on vegetation and upon the fruit crops. I observe that the Apple trees are very much overrun with caterpillars, and are daily getting a more leafless, scorched appearance. The Plums and Cherries are also much infested with aphids and caterpillars; while the fruit of the Pear is much stunted. The Currants are infested with honey-dew and aphids; the points of the young wood of the Gooseberry are full of aphids, and there has been, this last fortnight, swarms of the fly about them. I fear the trees will soon be visited by their worst enemy—the caterpillar. The Elm, Beech, and other forest trees, that were so clean and perfect only ten days since, are now full of holes, and eaten by the larvae of various kinds of insects. I fear, therefore, that when we get clear, hot, sunny weather, we shall see much imperfection and nakedness. *James Burns, estate of Babo, May 16.*

Cool Treatment of Orchids.—At p. 615 of your journal I observe another communication from the fertile pen of your correspondent "G. H." I send you, therefore, a letter of mine on the above subject, which appeared in your columns some time ago. Judging from the tone of his remarks, it would appear as if he supposed that in writing that letter I had taken up the gauntlet which he had thrown down, and had consented to do battle with him as champion of the system of Orchid culture which he perseveringly denounces. If such is his conclusion, and lest he be inclined to flatter himself by so doing, I would say that I would not leave the cause to itself, I trust I may be allowed to explain my reasons for declining the controversy. In the opening part of his letter, p. 310, he states that he replies to me with considerable reluctance, because the examples I adduced are not my own. Here he begrudges me a hearing, because I do not professedly quote my own practice, while further, and in the body of his letter, in reply to my query, as to whether he has ever tried the cool system, as he called it, of treating *Odontoglossum*, he concedes to say, "I have never tried growing them for any length of time, say three or four months, at a temperature of 40° to 45° for a minimum, nor has anyone else, in my opinion, without seriously injuring his plants." This appears to me a simple admission that he condemns that of which he has no experience, since he has never fairly tried the system; while he modestly pits his own "opinion" against the approved practice, backed with the most gratifying results, of many growers whose experience has been neither so short-lived nor so limited in scope as "G. H." confesses his to have been. My main object in writing was to call attention to the proofs. I mentioned that complete success in the cultivation of *Odontoglossum* is attainable without the necessity of employing the degree of heat which "G. H." considers essential. I had no desire nor intention to interfere in the controversy, but, as the subject, and still less did I feel inclined to do so when I found my opponent arrogating to himself the right to advance his own opinion unsupported by experience, while denying to me the privilege of quoting instances of success because they were not my own. Under the conditions I think "G. H." has little room for surprise that I "modestly leave the cause to take care of itself," but as I take considerable interest in the matter, and the subject is of the greatest importance to me, I am glad to find that in "Ex-Cantab" a champion has appeared who is able to present credentials which must satisfy all the requirements of "G. H.," but even failing him, I have confidence enough in the practice I approve to have little fear of any general revolution in the system which has now gained a firm and satisfactory footing amongst the Orchid growing fraternity, resulting from the dissertations of "G. H." *Scrutator.*

Reversion—and Something Else.—It is pleasant, after the lapse of thirty odd years, to have a friendly greeting across "the gloomy ocean" from an old schoolfellow. Ay, Mr. Fish, there has been a

revolution in flower gardening, as well as in other things, since we were schoolfellows. The affectionate memories of schoolboy days will survive all the mutations of time. That great, old-fashioned, herbaceous flower garden in the far North, that you wot of, was, and, I believe, still is, a different affair from our modern parterres. So far as I can remember, there was not a single variegated plant to be seen within its ample bounds. It was not "sicklified o'er" with the pale cast of gold and bronze. There was, it is true, the Golden Rod in abundance, there was the Marigold and the Marsh Marigold, the Gold of Pleasure and Goldlocks, Golden Samphire, and Golden Saxifrage; but then all this wealth of gold glittered in the flowers and not in the leaves. But plants with variegated leaves are often singularly beautiful in the flower garden, and I would be the last to "revert" to the ancient style of herbaceous flower-beds. The grand recommendation of these variegated-leaved plants is their continued beauty in all kinds of weather; it would, therefore, be a great pity to lose any of the best sorts, either through reversion or any other cause. In discussing the question of reversion, we must be careful to distinguish between species, varieties, and hybrids. A true species may, and often does, become variegated. I have from time to time picked up species of wild plants with variegated leaves, but like my friend Mr. Fish, have never succeeded in perpetuating the variegation. I gathered a plant of *Veronica Beccabunga* with prettily variegated leaves, transferred it to a suitable station in the hardy fernery, and notwithstanding constant care in cutting away green portions as they appeared, it ultimately turned green. So with a plant of *Viola canna* and some others. Wild plants in shady situations are more liable to become variegated than when fully exposed. I have seen some botanical habits that are to be much more constant in their variegation than those from colder regions. With regard to cross-breeds like Mrs. Pollock Pelargonium, the reversion is to one or both of the parental types; my plants of Mrs. Pollock have reverted chiefly, but not wholly, to the male parent—the Emperor of the French, but some of the plants present the grotesque appearance of a partial reversion to both parents—the Emperor and Gold Pheasant, which were the parents of the true Mrs. Pollock. Nay, some of the individuals have all three characters struggling for the mastery. I enclose a few leaves for your inspection, some of them very grotesque. I am inclined to think that in the reversion of both plants and animals the general tendency is towards the male type. *John Douglas, Kilkeel Castle.* [It would be very desirable to substantiate this by further evidence. EDS.]

Holly Sports.—The variegated Holly leaf I forward is from one of two shoots, with leaves of the same kind, which appeared last year on the common green Holly. The shoots referred to are strong and healthy, and their bark is paler in colour than that of the green portions. The variegated shoots are growing on the south side of the plant, and 3 feet from the ground. We intend to have them worked shortly. *G. Donaldson, Keith Hall.* [A well-marked variegation, with a golden centre to the leaf, but not extending from the golden centre. This is an excellent illustration of the manner in which many variegated plants are obtained. EDS.]

Heating by Hot Water.—I agree with your remarks (p. 578), on the desirability of a rapid circulation as a means of economical and efficient heating, but I fail to see the importance attributed to making the return-pipe the flow, supposing it to be done by simply sinking the top of the boiler to the level of the return-pipe. The flow-pipe, being still the highest, the hottest water would most assuredly be found there, and it would be not only as hot but hotter than the so-called flow at the bottom. A considerable force would likewise be expended in driving the cold water along, supposing it possible, which I doubt, without a partial check in the upper pipe, to make the lowest pipe the flow. True, the motive power is heat, but in the ordinary arrangement the caloric is helped in its circulating work by the pressure of the steam. The pressure of the water of cold water over hot represents so much work done in aid of its circulation. Apply the heat beneath, and all this weight must be lifted by the caloric; and I submit the force expended on its mere motion is lost to the warming of the house. I should not attribute the economy or efficiency of Cannell's boiler, assuming that it is both economical and efficient, to this inversion of function in the flow and return pipes, but to surfaces exposed to the fire; and, if the two sets of pipes are equally warm, to a compound circulation established in each. In regard to Mr. Stevens' boiler, I wish to ask what proportion of heat passes into the lower flues? and whether an unusual height of chimney shaft is needed to draw the fire freely through the same? I cannot see my way to running down cast-iron boilers at present. *A Practical Hand.* [Does our correspondent really mean to imply that the "Ex-Cantab" is an ordinary apparatus after it is once set fairly going, to justify his argument that the caloric has to lift it? And does he really mean to argue that the force which induces circulation is attributable to the cold water, and not to the caloric? As to the circulation being secured by the arrangement Mr. Cannell has adopted, there can be no doubt about it, as we hope to show next week. EDS.]

Lathrea Squamaria.—This interesting plant, so like another allied genus of parasitic plants, *Orobanchæ*—that is, in general appearance, is well worth attention from the youthful botanist. It may annually be seen in the Royal Botanic Gardens at Kew, a few yards from the Sun Temple, and the authorities very wisely afford it the protection of an iron fence *pro tem*, and I have no doubt but that it may now be seen in the locality named. *Lathrea* differs in a few minor details from *Orobanchæ*, but the latter is parasitical on other vegetable forms. Now that mimetic plants are occupying some amount of attention one might name the common Birds'-nest Orchid, *Listera Nidus-avis*, as it in general appearance and mode of growth very nearly resembles the two parasitical genera before mentioned. Latterly I have seen one or two instances of *Orobanchæ* (*œrulea*?) growing on the roots of bedding Pelargoniums. *F. W. B.*

Phytinia arbutifolia.—Your correspondent "Somerset" (p. 582) remarks that this fine plant will not stand the wind. There stands here, within 150 yards of the open sea, and fully exposed to the southern gales, of which we get no small share, a fine specimen, measuring near the ground from extremity to extremity of branch fully 20 feet, and about 25 feet high, forming a nice pyramid. It is very beautiful at all seasons of the year. (May 11) It has a few small growths from 9 to 12 inches long, of a beautiful pale brownish green colour, which, as the season advances, changes to dark green. It is very rarely indeed that the wind damages it to any extent, though it sometimes kills common Laurels by hundreds a few hundred yards off, and Bays, Yews, Cupressus macrocarpa, and some other shrubs, become as brown as if scorched with fire on the side most exposed to the sea. The *Phytinia* is also growing beautifully in the nursery of Mr. Scott, Northgate, Chichester, where it is fully exposed from all points, and it is very rarely that the wind damages it at all there. I have also seen beautiful specimens of it in various places in the south of England, but do not remember anywhere seeing it damaged to any extent more than other things suffer at times from the same cause. *J. May, The Gardens, Westfield, Havant, Hants.*

I think "Somerset" must be right as to the name of the plant mentioned at p. 559; I, however, enclose a leaf, that you may settle the point. As to the hardness of the plant in question, I beg to inform him that the largest specimen here is 36 feet high; other plants, which are exposed somewhat less, have made shoots 1 foot long this spring. The large specimen is open to the south-west winds. This is not the only place in Cornwall where this tree may be found, although the above, I believe, the largest. "Somerset" will find that many other things would suffer if planted where the wind could play upon them, especially in the early stages of growth. He must know, too, that it is not usual to plant anything that is considered somewhat tender in exposed places. I find also that poor soil should be used, as this will prevent sappy wood in autumn, and ensure a preparation for the rigours of winter. This is not a measure applicable to many plants, but the Antipodes stand out here. In my communication respecting these plants there is an error. It should be the "Dicksonia" is a small plant, not the "Dracena," as is seen from what is stated after respecting that plant. *H. M. [It is Phytinia arbutifolia. Eds.]*

Town Trees.—Your correspondent "W. T." (p. 614) rather forcibly brings his recollections of an old friend, Mr. Timothy Linkinwater, head clerk and book-keeper to Messrs.—I suppose I ought to say, the late Messrs.—Cheerys Brothers. On one occasion when he and Mrs. Nicholas Nickleby were disputing as to the relative merits of London and the country, "Pooh! pooh!" said Tim Linkinwater, "don't tell me, Country! Nonsense! What you can get in the country but not in eggs and flowers, I can buy in London. In Leadenhall Market I can get my breakfast; and as to flowers it's worth a run upstairs to smell my Mignonette, or to see the double Wallflowers in the back attic window at No. 6 in the Court." I can fancy your correspondent getting up some day from his *Gardeners' Chronicle*, having just read an article of Mr. Newton's, saying, "Pooh! pooh! it's all very well to talk of Droopore, or Knaphill, for Conifers, especially Arbor-vites, but to work a run into my fragrant gular area of 500 square feet [inches] I surrounded by buildings 70 feet high, within a stone's-throw of the Royal Exchange, to see my Arbor-vites in tubs, with their wires over the soil to keep the cat's off, that's all." All things, however, in this world are good or bad by comparison, and I strongly suspect if your correspondent were to start off then and there, either by Great Western railway to Droopore, or by South-Western to Knaphill, and have a look at such Conifers, especially Arbor-vites, as he would meet with in either of those localities, he would return decidedly out of conceit with his tub-planted specimens, notwithstanding his wires, and all his care and syringing. I have not the pleasure of knowing Mr. Newton, but I must make bold to say I entirely agree with him, that Arbor-vites will not do well "at least within 15 miles of the Great Cross and the Great Church of London," generally, when he says, "None of these useful class of evergreen trees and shrubs can be employed anywhere

in smoky towns." If your correspondent will keep his Arbor-vites in his tubs in the situation he describes for a year or two, and will then ask me to dine with him, I will undertake to eat them, if they are as handsome, clean, and healthy as similar plants grown, and then growing, at either of the localities I have mentioned. My experience of Conifers extends now, I am sorry to say, over very nearly a quarter of a century. I have tried growing them in the county of Durham, within the influence of coal smoke, and dismally failed; I have also tried in the county of Somerset, in a clear, pure atmosphere, and have succeeded. I have come to the conclusion that smoke, even in small quantities, is detrimental to their well doing, but that in large quantities it is positively destructive. Neither your correspondent, nor any one else, will ever be able to grow them in London, or any other town or place where the atmosphere is so completely saturated with it as it must be within a stone's-throw of the Royal Exchange. *C. F. P., The Grange, Kingston, near Taunton. [We quite agree with you. Eds.]*

Arum tenuifolium.—I have received from Portugal some bulbs of an *Arum*, which I am told is *A. tenuifolium*. Can you give any information as to what it is like? *P.* The following, which I borrow from Messrs. Haage & Schmidt's Catalogue, will give you some idea of the appearance of the plant in question, which was called *Biarum tenuifolium* by Schott. It has linear-lanceolate leaves, a dark brown purple spathe reflexed in the upper part, and a very long subuliform spadix. There is a figure in the Bot. Reg., t. 512, from a plant imported from Italy, and flowered at South Lambeth in 1821, by Mr.



FIG. 133.—ARUM TENUIFOLIUM.

Griffin, after whom Griffinia is named, and who had considerable reputation in those days for his collection of bulbous plants. Eds.]

The "Climax" Mowing-Machine.—Can any of your readers give me any information as to the merits of the above machine? Its leading feature is lightness, and consequently ease of working, obtained by dispensing with the roller common to all other mowing-machines. I wish to ascertain if it answers as well as others, such as Green's or Shanks'. *S. Garland, Sandhill Park, Taunton.*

Orchids v. Cacti.—I am glad to see Mr. Croucher defending the many beautiful plants that come under the latter head, and indeed I know of no one better qualified to champion the cause of Cacti, or succulents generally. The fact is, Cacti are not fashionable. Orchids, "bedders" and "subtropicals" seem to absorb all the thought and skill of the generality of gardeners at the present period of our history, just as the Tulip mania did in years gone by; the consequence is that Cacti, and many, many other beautiful plants which our forefathers cultivated, are now neglected, if they are retained at all. It is only lately that the taste for herbaceous plants has been in some measure revived, and yet among them may be found some of the fairest gems that sparkle in Flora's coronet—gems that one can admire whilst surrounded by green trees, and the cool ambrosial atmosphere perhaps perfumed by Musk, Mignonette, Roses, or Jasmine. I know that there are but few natural orders in the vegetable kingdom that can excel the floral charms possessed by Orchideæ—charms that in many cases last unimpaired for weeks, nay, even months together; but what charm or beauty is there in a house of these plants when not in flower? Again, the expense or first cost of Orchids must be taken into consideration, if comparisons are to be made *pro et con*. Do we not have to pay—yes, and dearly too—for any additional beauty we obtain in this direction? Orchids, when cultivated on a large scale for decorative purposes only, are a very expensive luxury, and I know of no class of plants that give a cultivator more trouble and anxiety than these. I can fully agree with your correspondent as to the beauty of the plants he names, since they are plants that are beautiful "all the year round." I venture to assert, without fear of contradiction, that no class of plants

excites a greater amount of interest, amongst the many thousands who visit the Royal Gardens. I knew every year, than the Cacti, and other succulents. Every one admires, or is astonished by their graceful, peculiar, or grotesque outlines, from the fair dame who can boast of her coronet of strawberry leaves, to Jane the nursemaid, who divides her attentions pretty equally between the "Cactuses" and baby. Again how very rarely we meet with Cacti in places favourable to their perfect development. Come they are thrust on any out-of-the-way shelf, and left to take care of themselves. Epiphyllums are perhaps a little better treated in a general way, and who can say that they do not repay any little extra attention which they may receive? For winter decoration they are well high invaluable, and I can fearlessly assert that there is no genus of Orchids that can surpass them, either for profusion of bloom or richness of colouring, and their culture is of the most simple description. Looking at the argument on all sides, Cacti are comparatively useless for cut flowers, and some of the plants are not beautiful to a general observer; but *chacun à son goût*. What is the use of quibbling over the comparative beauties of these two classes of plants, when all plants are beautiful to him who looks at them with the mind's eye? Nay, good friends, remember the fable of the golden shield. *F. W. B.*

The Early Leafage of Particular Hardy Trees.—Mr. Earley adverts to this interesting subject at p. 552, and wisely endeavours to draw some important conclusions, even from the exceptional cases. The seasons are excellent, but whether they may be fairly deduced from the caprices of precocious trees, is somewhat doubtful. Within the range of my observation, Sycamores and Horse Chestnuts are the species in which cases of this kind are the most common, and, unlike the Sycamore described by Mr. Earley, there has often been nothing in the surroundings of the plants calculated to excite early growth. There is a Sycamore here quite in the open meadow, which is always from three weeks to a month before all other Sycamores, many of them growing in much warmer and more sheltered localities. True, it has been once a hedgerow tree, and stands on a slight elevation, but so also have many others in different parts of the grounds; and large Oaks, similarly situated, within twenty yards, manifest no tendency to leaf earlier than other Oaks. I have noticed this tree now for sixteen years, and it has never, once forgotten its early leafage; and trustworthy testimony of its doings extend to thirty years. I have seen similar instances of precocity, but not to the same extent, among Thorns; I never remember a case of an Oak, Beech, or Elm. It would be interesting if your numerous readers would record their experience on this point. In doing it, it would be useful to discriminate between diseased and healthy trees. The former often play false with the eye, though their weakness, and the cases I refer to, and doubtless Mr. Earley's Sycamore likewise, are perfectly healthy; the only peculiarity is their abnormal earliness—in my case certainly without any visible cause. *D. T. Fish. [Oaks, Q. pendula, certainly. Eds.]*

Societies.

ROYAL HORTICULTURAL: May 17.—Lord H. Gordon Lennox, M.P., in the chair. The usual preliminary business being concluded, the Rev. Mr. Berkeley announced the results of the Fruit and Flower Committee, and whilst alluding to the former, remarked that as the new Early Ascot Frontignan Grape, shown by Messrs. Standish & Co., was considerably earlier than the Black Hamburgh grown with it, it would no doubt prove a useful variety for growing out-of-doors. He then directed attention to the beautiful *Hæmaphys tenuiflorus*, shown by Mr. Marshall, and stated that it was the same plant as was shown by him last year. It was figured in the "Botanical Magazine," and described by Dean Hewart some time since, in a paper which he was anxious to which he read to the meeting. Alluding next to Mr. Thompson's specimens of *Collinsia violacea*, Mr. Berkeley remarked that it was no doubt a variety of *C. grandiflora*, and that it was also the same variety as was figured by him under the name of *Collinsia* in the "Gardener's Magazine." B. S. Williams' interesting Maidenhair Fern, *Adiantum asarifolium*, a collection of Scillas from Mr. Barr, King Street, Covent Garden, came under review, as being very extensive, though it was doubtful if there were more than three distinct species in the whole, and nearly all were referable to *S. campanulata*.

Mr. Bateman said he had taken much interest from time to time in the Logat, from its having fruited in his father's fine stove some 30 years ago. He had always expected some day to see it, and he was glad to see it, and the exhibitor on the present occasion had solved that difficulty, for the specimens exhibited were the finest he had ever seen. It usually flowered before Christmas; and, allowing six weeks for the fruit to ripen, it would be seen at once. He was much interested to see the variety he had seen, and the exhibitor on the present occasion had solved that difficulty, for the specimens exhibited were the finest he had ever seen. It usually flowered before Christmas; and, allowing six weeks for the fruit to ripen, it would be seen at once. He was much interested to see the variety he had seen, and the exhibitor on the present occasion had solved that difficulty, for the specimens exhibited were the finest he had ever seen. 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We had some this season till the 4th of that month, which were cut early last August. If you should desire any Grapes sent a month hence or later, probably I may be able to do so, as we have a quantity still in a small shed, which are finer than those sent. The latest date to which we have kept Lady Downe's in good condition, was June 10. We exhibited a bunch three years ago on that date. They were coloured in the July of the previous year."

Mr. Temple received a Special Certificate, and the thanks of the Committee for his letter.

Notices of Books.

The Descent of Man, and Selection in Relation to Sex. By Charles Darwin, M.A., F.R.S. 2 vols. Post 8vo.

There are two points of view from which a book like the present may be considered, and the conclusion arrived at will differ very materially according to the point chosen. If we apply a rigid mathematical test to Mr. Darwin's conclusions, we shall assuredly have to dissent from them. But on the other hand it is quite clear that from the very nature of things such a test must fail. The test and the thing to be tested are not congruous.

In dealing with such tremendous questions, we must rest content with approximations—demonstration is out of the question. The laboriously deduced inferences of the most learned in such matters can be but more or less shallow guesses at best. Such guesses are what scientific men call hypotheses, and their value in affording a rational explanation of observed facts is admitted on all hands. What the magnet is to a heap of iron filings such should a hypothesis be to a mass of facts. When the magnet is applied each particle of iron instantly assumes a definite position in relation to all the other particles in the heap, and to the magnet itself. Where chaos was, order is. "Form rises out of void solution and discontinuity," as Carlyle has it; and "as in some chemical mixture that has stood long evaporating but would not crystallise, when the wire of another element is introduced crystallisation commences." The larger the number of facts the more perfectly they can be made to harmonise, the more thoroughly they can be brought into relation the one with another and with the whole, the better obviously is the hypothesis. Even if the hypothesis be ultimately proven false, and have to be superseded by a better one, the gain is still great. As Mr. Darwin himself says: "The facts are not so injurious to the progress of science, for they often long endure; but false views, if supported by some evidence, do little harm, as every one takes a salutary pleasure in proving their falseness; and when this is done one path towards error is closed, and the road to truth is often at the same time opened. From this point of view the hypothesis of evolution appears to us to present enormous advantages over any that has been yet advanced. A multitude of heretofore isolated facts become coherent, and the hypothesis is invested with significance and meaning which enables us at once to co-relate them with other facts. Organs, for whose appearance and peculiarities we could previously only give what is ungallantly called a ladies' reason, "they are so because they are so," are now often susceptible of a rational interpretation, and can be fitted into their places much as the pieces of a child's puzzle are.

This hypothesis of evolution Mr. Darwin added that of natural selection, or, as otherwise expressed, the survival of the fittest. Given an inherent tendency to vary, those variations which confer on the individual manifesting them a greater power of maintaining itself against adverse conditions, would be the most likely to be perpetuated. It is, however, needless to dwell on these points, nor on the "provisional hypothesis" of pangenesis, the main features of which are probably by this time familiar to the majority of our readers. Let us rather endeavour to put before them in general terms the nature of Mr. Darwin's arguments as applied to the genealogy of man. "Descent" is the term used by the author, and correctly enough, in one sense, though from another point of view it may be said that the whole work is a series of arguments in support of the hypothesis that man has descended from some lowly organism and form to his present position. To this is added his argument, Mr. Darwin adduces a vast number of demonstrated facts, and an almost equal number of more or less plausible assumptions, and which go to show that in mental endowments, no less than in bodily conformation, there is absolutely no difference in kind, but only in degree, between man and the lower animals. Now, this is somewhat startling, and may wound the prejudices or self-complacency of the self-styled lords of the creation, but we may console ourselves by the recollection that we are dealing with an hypothesis, which may be false; and that at any rate, whichever view we take, the miracle of life remains as great and unfathomable by finite intelligence as ever.

The germ from which all animated creatures proceed is so simple in construction as almost to transcend analysis. The physical nature and appearance of the general are well known to observers. They are essentially the same throughout all classes of animated nature. It can be demonstrably proved that a jelly-fish and a man, like every other living thing, progress from a simple speck of this character up to their full development.

The highest organised creature begins, for aught we can tell, exactly as the lowest does. This being so, it seems the height of silliness to feel any wounded pride at the notion that our ancestors in a period far too remote for us to be able to realise, were more like monkeys than men—when each individual among ourselves, only a few years back, was represented by a group of men less than a pin's head in size, and at that time absolutely undistinguishable from the similar starting points, not of highly organised monkeys only, but of creatures that in their most highly developed condition could live on a pin's point! What right have we to sneer even at such an organism as this? It is the Creator's handiwork as much as ourselves, and as such transcends anything man can do.

To revert to our author and his line of argument. Naturally it may be divided into two parts, the physical or corporeal, and the mental. Of course so learned a naturalist has no difficulty whatever with the first division. We are fearfully and wonderfully made, it is true; but this is true of every other living creature, be it what it may. If we are physically superior in some respects, in others we are inferior to the animals. There is no one point in the structure of our bodies that is absolutely different from that which occurs in other creatures, and, as we have just said, some creatures are superior to us in certain portions of their organism. Nothing is more absolutely certain than this, that corporeally we rank with and among the animals we affect to despise, and that by no sophistry can we succeed in disowning the relationship. To our thinking it is only those ignorant of anatomy—who by hyaline of me to the Creator, as it has been called—who would really feel this as an indignity. True science, which is always reverent, feels no such desire to efface the Creator's stamp from His handiwork.

That there is an homology or essential identity of structure in man and the higher animals, no naturalist doubts. That there is on the whole a regular gradation from the simplest to the most highly organised creature, is disputable, except, perhaps, here and there in laws and unfilled gaps appear, some of which we know were filled up once, as we have evidence to prove it, and thus it is not unfair to suppose that others may have been so too.

That the embryonic, or earliest visible stages of man, and even the most lowly organised of creatures, are, generally speaking, identical, must also be admitted. This being so, it is clear that a theory which assumes a common origin for the human and the lower animals, have descended, offers great advantages over the old notion that each creature, or species of creature, was separately and independently created without any reference to the others. Surely this latter notion would imply a meaningless waste of power and a want of design quite out of character with what we meet with in Nature. The evolutionists, however, as it appears to us, push their common origin too far, and make the question of a single, or, at least, of a very few starting points. Looking to the curious parallelism in structure, functions, and habitation, which different groups, both such as are evidently closely allied and such as are more remotely so, present, we can see no good reason for limiting the stemmata to so small a number as many adherents of the evolution theory do. Every worker in any department of natural history is familiar with such parallelisms as are alluding to a group of animals or plants, for instance, of generally complex structure, has some members of an extremely simple structure. It is all very well to say that these latter are degenerations from the type—that their peculiarities are to be accounted for by abortion, or suppression, and so forth. What proof of such an assumption does the study of development give? In plants, at least none whatever, as a general rule. An Euphorbiaceous plant, for instance, a Passiflora of simplest structure, is as simple in the beginning as it is at the end. The hypothesis of suppression, or abortion, in such a case is based on analogy merely, or on the assumption that remote times such abortion or suppression did take place, and that it has been perpetuated by inheritance. Similar simplifications take place in most groups. As we constantly find in instances of the same kind, the evidence of food and other attributes, and as we do not always find evidence that convergence takes place, or that divergence has taken place, it seems fair to infer that the number of primordial forms must have been larger than ultra-evolutionists admit. Of course, where intermediate forms do exist, or have existed, the parallelism is destroyed, and the genetic relationship is then unquestioned.

Coming to the mental faculties, Mr. Darwin pursues precisely the same kind of argument. Treating the evidence of mental operations, if they may be so called, up to their highest development in dogs, he has no difficulty in showing the identity of these mental processes, so far as they relate to physical need or to external circumstances, with those which are exercised by man.

We might, in imagination, picture an animal taking up this book and, paraphrasing Shylock's interrogatories, ask—"Hath not a beast eyes? hath not a beast hands, organs, dimensions, senses, affections, passions? fed with the same food, hurt with the same weapons, subject to the same diseases, healed by the same means, warmed and cooled by the same winter and summer as

a Christian is; if you tickle us do we not laugh? if you poison us do we not die?"

So far we can travel with our author. The structure of the brain and nervous system of animals is the same as our own; the difference is one of degree only. Moreover, the conditions under which those mental operations we have referred to manifest themselves are the same in animals as in ourselves.

Mr. Darwin, with his usual caution, feels not to insist on what he calls the enormous difference in mental power between the lowest and most degraded savage and the highest ape: indeed, it appears to us that he overstates the difference. We fail to see the enormous degree of difference between an intelligent dog and a wretched savage unable to count beyond four, with no conscience, no idea of a deity. Again, where is the enormous difference in mental power between the unfortunate human idiot and the dog? Is not the latter often the more highly endowed of the two? Again, is it not often a virtual libel on the animal creation to say in the case of abandoned ruffians—

"The souls of animals infuse themselves into the trunks of men."

Assuming the identity in kind of the mental operations of men and animals, so far as they have reference to physical needs and outward circumstances—so far even as memory and conscience—there yet remains a still higher class of faculties, of which the "moral sense," or the conscience may be taken as illustrations. Man is not only "a forked straddling animal with bandy legs," as Swift has it, but also "a spirit and an unutterable mystery of mysteries." Now we can conceive it possible that these faculties of our nature are superior developments of our other mental powers; but we have no evidence whatever that animals have these higher faculties, or that they support the same conditions as they could be evolved from such as they have. On the other hand, it is right to remember that the lowest type of savages seem as destitute of them as animals themselves. Even among the most degraded classes in so-called civilised countries the higher mental faculties are similarly absent, or if present they are latent and in abeyance. If latent and in abeyance in such classes, why not as much so in the brute creation? If the one are capable of improvement the other must be so too.

By far the larger portion of Mr. Darwin's volumes are occupied with the subject of sexual selection, and on this matter he has thrown open to the public another of those wonderful armouries which he has collected. Facts, illustrations, and anecdotes of animal life in all its variety are here brought forward by the hundred, and, as they have been in former works of Mr. Darwin's, so here they are marshalled with wonderful skill and address to support the theory, which is this—that any creature possessing a larger share than his fellow of those personal adornments or qualities which are likely to prove attractive to his mate of the opposite sex, will transmit to his progeny in equal ratio those qualifications, whatever they may be. The unfortunate animals, poorly endowed with the means of making themselves attractive to the opposite sex, will be the last to obtain wives, will get the least desirable mates, and, in the end, will, in consequence, beget a comparatively degenerate posterity. No romance exceeds in interest this portion of Mr. Darwin's volumes. The fierce encounters of fishes, the gorgeous plumage of birds, the curious antics that these vain creatures play off before their ladyloves, the exquisite songs by which others endeavour to enchant their mates, the selection exercised by mammals and by human beings in their choice of a partner—all these subjects are dilated on with that fertility of illustration, clearness of narration, and appositeness to the subject in hand, which have characterised all Mr. Darwin's writings; and a large majority of readers will, we apprehend, be carried away by the accumulated evidence here before them, and on this point, at least so far as the animal creation is concerned, will yield ready assent to his theory.

The least satisfactory portion of the whole work, as we have said, is naturally the treating of the higher mental characteristics of men and animals; the facts recorded are not of equal weight, and but little attempt is made to assign to them their due value. Moreover, obviously the subject is one which no naturalist can ever hope to fathom. Hypothesis here gives way to speculation, and that speculation must of necessity be wild.

Florists' Flowers.

IN addition to the VERENAS named at p. 486, as suitable for bedding purposes, the following have been tried and found very useful indeed in the flower garden, viz.:—Brilliant, vivid scarlet, good dwarf, compact habit; Crimson King, crimson, with white eye, good habit, and free blooming; Exquisite, delicate pink, with a white eye, of a pleasing shade of colour, but a little apt to get very yellow in very warm weather; Firefly, with scarlet, with yellow eye, very close habit, and exceedingly free; Gem, white, the centre flushed with pink; La Grande Boule de Neige, pure white, a thoroughly good bedder; Leah, pink, with crimson centre, very pleasing, and of good habit; Mazerpe, bright scarlet, with small white eye, very showy; Melindres splendens, vivid scarlet, very dwarf and free,

and an excellent bedder; Mons. H. Stenger, white ground, striped and flaked with crimson; Mrs. Mole, clear lavender, a pretty and attractive self flower; Mrs. Pochin, bright pink, with white eye; the old Purple King; Richard Dean, bluish purple, with large pure white eye, does not burn, and an excellent free branching trailing habit; Shirley Hibberd, shaded plum-purple, white eye, a good dwarf bedding variety; Lena; Sylvia, pink, stained with crimson in the centre; and Triomphe de Massis, pale blue, with dark centre, fine and showy.

The Verbena can be used in two ways in the flower garden, either by massing one variety with a view of obtaining a certain hue of colour, or by filling a bed with plants of different varieties. The last method is a sure means of obtaining an effective display, and deserving of commendation. As a general rule the plants should be placed in the bed about 15 or 18 inches apart, and it is a good plan to induce the plants to fill out starting on that side farthest from the sun. A little judicious training soon accomplishes this. When the main shoots of neighbouring plants meet, it is well to pinch them back, as this induces lateral growth, and the side shoots fill up the intervening spaces, and so give a surface to the bed. A little attention is also requisite to keep the bed effective, and if the dead blossoms are kept removed by means of a pair of scissors, any unsightly appearance is prevented. When the plants are covered with some leaf-mould, and a fair sprinkling of sand, makes a capital soil in which to plant Verbenas. R. D.

Garden Memoranda.

CLEMENTS, NEAR LIFORD.—There is no more beautiful feature in hardy fruit culture than is to be seen in a well-ordered pyramidal fruit-tree orchard. The greater the extent the greater is the interest in it, and this is especially so with those who, like myself, have made the study and culture of fruit a speciality. I need not, therefore, say how much I was pleased with a recent visit to such an orchard, planted under the most favourable conditions, and under the supervision of our master mind in these matters, the veteran Mr. Rivers. It is at the seat of John Thompson, Esq., of Clements, just outside the walls of Liford, though well within the range of that dire pest to all vegetation—the London smoke, that an orchard, some five acres in extent, and so planted, exists. It is but just to the owner to say, that Mr. Thompson was the landlord who, a few years since, made such a handsome offer to a proposed company of fruit growers, and who treated the abortive efforts of the projectors with so much liberality. Though I am not going to "stand up" for the projectors of the scheme, as I never had any doubt as to the issue, I am nevertheless bound to confess that these few acres, planted and treated on the same principle, point to a more favourable end. The trees consist mainly of Pears, Apples, and Plums, with a smaller quantity of most other hardy fruits. The former are planted in most average 9 to 12 feet apart, and were originally something like from 3 to 5 feet apart in the rows, which hold about 50 plants in each. The trees are planted at right angles with each other, so that lines diagonally pointing to many aspects are seen as we walk round. It is here that a very interesting view of the whole may be had, as the Apples, Pears, and Plums afford a striking contrast the one to the other, as to a lesser degree, the several varieties of even one and the same sort of tree. Taking the average height of the trees in this large field of pyramids as being about 9 feet, I leave the reader to imagine the beautiful contour of the whole.

Mr. Green, the much esteemed and intelligent manager of this orchard, who appears to know every tree by some extraordinary individuality which it seems to possess, has undertaken the extensive work of taking out every other tree, and by finding more room so increasing the extent of the orchard, which, in the end, will be second to none in the country—that is, if he maintains the now possessed by him. Most cultivators, and myself included, I confess, would now and then have resorted to uprooting and root-pruning every other tree, say every third or fourth year. But Mr. Green does not seem disposed to treat his favourites thus harshly. And in view of the grandeur which such an orchard is likely to possess in the future, I would almost express a hope that the seasons next, and the one following it, may not, by the abundance of fruit which its "moved ones" will carry him, make him convert to opinions contrary to those held by myself and others. The Pears are mainly on the Quince stock, grafted low, and buried to above the union. Stakes are not used or recommended, though the strong winds of these parts, induced by the general flatness of the country around, are true "sou'-westers." The principle is good, for by inducing your trees to rest upon such "aids" we induce weakly shanks, not half so sturdy as those that have been buffeted, strained, and tried from their infancy by every storm that comes. Of course there are some sorts which are double-grafted, a process which produces some very astounding results, one of which, a case in point, has come under my own notice, and to which I shall refer hereafter. The varieties which appear to be double worked here I took to be

such as Marie Louise, Gansel's Bergamot (these seemed unusually prolific for the sort, which is generally a shy bearer, even against walls), Knight's Monarch, &c. The intermediate stock no doubt consisted frequently of Beurré d'Amanlis, Conseiller à la Cour, and Prince Albert, which is about the only thing this latter is good for. As it may be interesting to those who may meditate planting, I may mention the following as being the varieties most extensively grown—Bergamot d'Esperen, Bezi Mai, Beurré Giffard, Louise Bonne, Conseiller à la Cour, Beurré Diel, Catillac, Beurré d'Amanlis, &c.

Mr. Green seems thoroughly impressed with the fact that the early Pears are the best for market purposes, and the fact has a very practical illustration, for the varieties of this class in the above list predominate greatly. The "Williams' Pear, as the townsfolk of this district, the "Willam's Pear, is absent from the list, nor do I wonder at it, remembering Mr. Rivers' observation, "What, grow a street Pear!" Under an erroneous impression, Mr. Green, two years since, had all his Bezi Mai trees headed down half way, and re-grafted with other sorts, but the fruit which the few remaining branches produced last season were so fine and well flavoured that he intends to give them another year's experience, as mine showed two bad seasons to one good one, and it extended over two years' practice, too. Cassante du Comice seems an especial favourite of Mr. Green's, though I never liked its shape. The Duchesse d'Angoulême, Napoléon, and my greatest favourite, the peculiarly round-leaved Suffolk Thorn, are also grown. Now to the double grafting question. There is in Hertfordshire a somewhat aged planter, Uvedale, a German.

This tree, grafted upon the main shoot of the upper half of a goodly-sized Marie Louise, its lower half still existing, the roots being beneath an ordinary paved yard. The original Marie Louise never produced fruit, but the Uvedale yearly produces one of the finest crops of English grown fruit it is possible to see. I was once no disciple of the veteran father of double grafting, other than as a means of inducing early prolificacy or fruitfulness, but this grand Uvedale severely "gibes" (to use Mr. Disraeli's latest retort) at my former belief in these matters.

Amongst Apples the following sorts appear to be the most largely grown—Cox's Orange Pippin, Cox's Pomona, Dumelow's Seedling, Sturmer Pippin, Stamford Pippin, Blenheim Orange, Waltham Seedling, &c. Of the above, Stamford Pippin and Waltham Seedling should be more generally grown, the former as a keeping variety and the latter for general prolificacy, which is beaten only by one other sort that I know, namely, Orledge's Evesham. Amongst Plums are Prince of England, Black Diamond, Victoria, Rivers' Early Black, July Green Gage, &c. Of these Black Diamond had set a heavy crop, and looked promising. Mr. Green has some remarkable examples of Sturmer Pippin on May 5, when I called. If I am spared a few years hence I hope to again visit this orchard, when size added to shape will confirm a beautiful whole, well assured of Mr. Green's enthusiastic kindness further to do so on a common enjoyment theme—fruit lore. William Earley, Valentines.

THE WEATHER.

STATE OF THE WEATHER AT BLACKHEATH, LONDON, FOR THE WEEK ENDING WEDNESDAY, MAY 17, 1871.

1871. MONTH AND DAY.	At 9 A.M.				Hygrometrical Deduction from Glaisher's Tables, 5th edition.			
	Reading of		Barometer reduced to 32° Fahr.		Dry Ther- mometer.		Wet Ther- mometer.	
May.								
11. Thurs.	Ins.	16.2	30.0	16.2	57.0	57.0	57.0	57.0
12. Friday	Ins.	16.2	30.0	16.2	57.0	57.0	57.0	57.0
13. Satur.	Ins.	16.2	30.0	16.2	57.0	57.0	57.0	57.0
14. Sunday	Ins.	16.2	30.0	16.2	57.0	57.0	57.0	57.0
15. Monday	Ins.	16.2	30.0	16.2	57.0	57.0	57.0	57.0
16. Tues.	Ins.	16.2	30.0	16.2	57.0	57.0	57.0	57.0
17. Wednes.	Ins.	16.2	30.0	16.2	57.0	57.0	57.0	57.0

TEMPERATURE OF THE AIR AND FALL OF RAIN AT DIFFERENT STATIONS.

DURING THE WEEK ENDING SATURDAY, MAY 13, 1871.

NAMES OF STATIONS.	TEMPERATURE OF THE AIR.										FALL OF RAIN.
	Highest.	Lowest.	Range of week.	Mean of all weeks.	Mean of all lowest.	Mean of all highest.	Mean of all range.	Mean of all mean.	Mean of all lowest.	Mean of all highest.	
Portsmouth	75.0	34.0	41.0	54.5	39.1	69.9	20.8	50.1	35.0	65.9	0.15
Blackheath	75.0	34.0	41.0	54.5	39.1	69.9	20.8	50.1	35.0	65.9	0.15
Bristol	75.0	34.0	41.0	54.5	39.1	69.9	20.8	50.1	35.0	65.9	0.15
Birmingham	75.0	34.0	41.0	54.5	39.1	69.9	20.8	50.1	35.0	65.9	0.15
Wolverhampton	75.0	34.0	41.0	54.5	39.1	69.9	20.8	50.1	35.0	65.9	0.15
Leicester	75.0	34.0	41.0	54.5	39.1	69.9	20.8	50.1	35.0	65.9	0.15
Norwich	75.0	34.0	41.0	54.5	39.1	69.9	20.8	50.1	35.0	65.9	0.15
Liverpool	75.0	34.0	41.0	54.5	39.1	69.9	20.8	50.1	35.0	65.9	0.15
Sheffield	75.0	34.0	41.0	54.5	39.1	69.9	20.8	50.1	35.0	65.9	0.15
Manchester	75.0	34.0	41.0	54.5	39.1	69.9	20.8	50.1	35.0	65.9	0.15
Salisbury	75.0	34.0	41.0	54.5	39.1	69.9	20.8	50.1	35.0	65.9	0.15
Bradford	75.0	34.0	41.0	54.5	39.1	69.9	20.8	50.1	35.0	65.9	0.15
Leeds	75.0	34.0	41.0	54.5	39.1	69.9	20.8	50.1	35.0	65.9	0.15
Hull	75.0	34.0	41.0	54.5	39.1	69.9	20.8	50.1	35.0	65.9	0.15
Newcastle	75.0	34.0	41.0	54.5	39.1	69.9	20.8	50.1	35.0	65.9	0.15
Edinburgh	75.0	34.0	41.0	54.5	39.1	69.9	20.8	50.1	35.0	65.9	0.15
Glasgow	75.0	34.0	41.0	54.5	39.1	69.9	20.8	50.1	35.0	65.9	0.15
Dundee	75.0	34.0	41.0	54.5	39.1	69.9	20.8	50.1	35.0	65.9	0.15
Aberdeen	75.0	34.0	41.0	54.5	39.1	69.9	20.8	50.1	35.0	65.9	0.15
Paisley	75.0	34.0	41.0	54.5	39.1	69.9	20.8	50.1	35.0	65.9	0.15
Greenock	75.0	34.0	41.0	54.5	39.1	69.9	20.8	50.1	35.0	65.9	0.15
Leith	75.0	34.0	41.0	54.5	39.1	69.9	20.8	50.1	35.0	65.9	0.15
Perth	75.0	34.0	41.0	54.5	39.1	69.9	20.8	50.1	35.0	65.9	0.15
Dublin	75.0	34.0	41.0	54.5	39.1	69.9	20.8	50.1	35.0	65.9	0.15

JAMES GLAISHER.

Miscellaneous.

THE DESCENT OF MAN.—Talk of the advancement of science! Why should the Royal Commission bear its progress in Britain? Once let it become a subject for the ballad-monger, and its vitality and vigour are secured. Here is one of the latest of London Street-Ballads, bearing evidence, however, of an amount of erudition much beyond what is usual in such cases:—

"DR. DARWIN (NEW EDITION).

Time—King of the Cannibal Islands'

Oh, Doctor Darwin he's the man,

To tell us how the world began;

You may believe him or you may not,

Sing oh, for Dr. Darwin.

Now peers to Herdals' College throng,

To learn to whom they all belong.

For all their quarters are wrong,

According to Dr. Darwin.

Hokey, pokey, monkey fun,

Wonders never will have done—

Huxley and Lubbock, and every one,

Supporting Dr. Darwin.

Some trace their pedigree so far,

With garter, coronet, and star;

Yet no one knows how old they are,

According to Dr. Darwin.

The Howards and Gowers, and all that lot,

Were born to be, I know not what;

But when they came to this world got,

According to Dr. Darwin.

Hokey, pokey, &c.

It's true that all these aristocrats,

May bill and coo like aya-da-vats,

And yet they come from water-rats,

According to Dr. Darwin.

The apes on the Ross you find,

Green grub in frothed saliva blind,

The father is of all mankind,

According to Dr. Darwin.

My lord indeed from being an ape

Has had a wonderful escape,

So Providence thought all this shape,

According to Dr. Darwin.

And much, he says, he would prefer

A monkey for an ancestor,

Than Belle Sauvage for progenitor,

According to Dr. Darwin.

Some monkeys they are wondrous kind,

And some apes have no tails behind;

And that's where they're so like mankind,

According to Dr. Darwin.

Baboons bill orphan monkeys lend,

Like London orphan Christian friend,

Moved by one feeling to one end,

According to Dr. Darwin.

With birds themselves, than men more blessed,

The males the more they're gay dressed

By females are the more caressed,

According to Dr. Darwin.

The fish in shore and out at sea,

Related are to you and me;

Think of that when you've shrimps for tea,

According to Dr. Darwin.

Hokey, pokey, &c.

To think a baby that has gone

Thro' every phase of life was born,

Should end in becoming the Marquis of Lorne!

According to Dr. Darwin.

If ever since the world began

We rise by pre-conceived plan,

Why call it the descent of man,

According to Dr. Darwin?

Hokey, pokey, &c.

And Horace must have been a fool
To press upon us when at school,
"Nos Nequiores," as a rule,

According to Dr. Darwin.
If Nature ever must progress,
What we may be we cannot guess,
And why we ever were so less.

According to Dr. Darwin.
Hokey, pokey, &c.

And as the races intermix,
You can't be certain about the chicks;
What can't you graft on Brier sticks;

According to Dr. Darwin.
If marriage be arranged above,
And crow be wedged to a dove,
It shows how we crossed in love,

According to Dr. Darwin.
Hokey, pokey, &c.

And as one great law governs all,
The weakest must go next the wall:
It's been so ever since the fall,

According to Dr. Darwin.
To nations having greater sense,
We'll push inferior races hence,
Who'll emigrate without expense,

We're not alarmed tho' Darwin sing
Some men have tails, and some a wing;
We know there's a good in every thing,
So a fig for Dr. Darwin.

Hokey, pokey, &c.

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2 and 3, Monmouth Court, Seven Dials, London. The oldest
and cheapest house in the world for Ballads (4000 sorts.)

REMARKS ON NEW PEARS.—We advance but slowly in new good kinds of Pears, but not more than five per cent. of the new varieties raised from seed on the Continent are adapted for universal cultivation; some kinds are good in the south of England, and never good north of Trent; still, they are so capricious in their choice of site and soil, that in many valleys in Scotland some kinds thrive well, and are of better quality than they are in the north-east of England. The season of 1865 had a remarkable effect on early Pears; they ripened too rapidly, and for the most part were very inferior in quality. Double-grafting of Pears will ultimately have a great effect on their culture in gardens—they seem always to make healthy and prolific trees; it must not, however, be concluded that to graft a free-growing sort of Pear on the Quince, and then to re-graft it with the desired sort will always answer. Some kinds require the stock belonging to their race; this can only be found out by the clever cultivator—*as, for instance, the Jargonelle on the Beurré d'Analis, the union of which is so perfect, and the trees thus formed so healthy, that an acre of double-grafted Jargonelle Pears would be a little fortune to a gardener.* Gansel's Bergamot double-grafted, becomes a marvel of fertility, and the sorts raised by the Rev. Mr. Hayshe, all of which are of great excellence, become most fertile trees when double-grafted on the proper kind of stock. When this scientific method of cultivating Pears is fully understood, those who introduced the culture of the Pear on the Quince stock will have warm thanks from all lovers of fruit-tree culture. *Rivers' Fruit Catalogue.*

RICE.—The use of Rice as a breadstuff is probably coeval with the human race. Like that of the other cereals it extends beyond the reach of record. Under the name of *orus* in Arabic, *oruzo* in Greek, *oryza* in Latin, *ris* in French, *reis* in German, and *rice* in English,—it has been known to history for two or three thousand years, being mentioned by Theophrastus 2200 years ago, and by Horace, Pliny, and Celsus at a later date. Its native place is probably the steaming river bottoms of India, whence it travelled eastward and northward to China and Japan, and westward to Egypt and to us. When it reached Egypt we know not; early enough, however, as many think, to give rise to that singular exhortation of the royal preacher of Israel, 2800 years ago, in which, alluding probably to the mode of sowing Rice on the swollen surface of the Nile, he says, "Cast thy bread upon the face of the waters; for thou shalt find it after many days." Eccles. xi. 1. After being introduced into Italy from Greece, as we learn by the form of the name, and being domesticated for centuries in all the southern countries of Europe, it was carried, in the year 1695, to the then infant colony of Carolina; where it was soon cultivated to such extent, and brought to so high a degree of perfection, that the Rice raised upon the southern seaboard of the American colonies, now the United States, has been ever since known in Europe as Carolina Rice. As an article of food it surpasses in importance every other cereal in present use. Wheat may be more nutritious, Rye more hardy, Maize spread over a wider range of temperature—but Rice feeds the greatest number of human mouths. Among the swarming millions of the tropics, and of China, it occupies the same place as Wheat in the warmer parts of the temperate zone, and Rye in the colder. It has been estimated that, if the human race were divided into families according to the predominant use of the several grains, the Rice eaters would occupy the first place in number; while Wheat and Maize would contend for the second, with a fair promise of victory to the Maize; and the fourth place would be held by Rye, Oats, and Barley. Indeed, besides being "the staff of life" in the most populous

parts of the earth, it is now so extensively used among all the other grain-eaters of the race, that it is questionable whether a greater amount of it is not consumed as a breadstuff than all the other cereals combined. Among botanists it is known by its Latin name, *Oryza*. There is but one species, though there are many varieties; for the wild Rice, so called, of the North American ponds and lakes, is not a rice, but a Reed—not an *Oryza*, but a *Zizania*. Food chemists tell us that it contains "less of the nutritive principle than Wheat." This, however, is in some measure compensated by the fact that of all the cereals it is the most compact—a merchantable bushel of Maize, or Indian Corn, being rated at 56 lb., and Wheat at 60 lb., while Rice, which rarely sells by bulk, and therefore has no established standard like the others, seldom weighs less than 65 lb. to the bushel, and oftentimes more. Its compactness is shown also in its resistance to being crushed, having almost a gravel-like hardness; and also in the fact that while being crushed it causes to expand and double, perhaps treble, its former bulk. But, however weighty in the scales, it is exceedingly light upon the stomach. In general wholesomeness, in delicacy of flavour, and in the variety of uses to which it is applicable, it is probably not surpassed by any other grain. To the strong stomach of the day labourer it is as well suited as the coarse bread of the Indian Corn, Rye, or Oats; while for the delicate appetite of the invalid, or for the tender organs of the baby, it is a safe substitute for sago, arrowroot, tapioca, or cassava. *Food Journal.*

ADONIS VERNALIS.—One is often surprised not to see this beautiful hardy plant more extensively cultivated. Mr. Robinson calls it the Queen of all the Buttercup genera, and so no doubt it is. The plant grows about a foot high, and with its finely cut leaves, and bold pale yellow flowers, is really a striking object, when it thrives well, which it does in light or peaty soil, and in a situation where it is not too much exposed to drought or drying winds. It belongs to a group of the genus which has black acid purgative perennial roots, and is distinguished from the well-known *Adonis vernalis* of Adonis or Pheasant's-eye, by having the fruits caryopsides terminated by the recurved styles. It is a capital plant for the permanent spring garden, flowering in the month of April, and is of a lively and showy character.

Garden Operations.

(FOR THE ENSUING WEEK.)

PLANT HOUSES.

Achimenes, which have made a robust growth under the favourable conditions of moisture, shade, and heat, should be removed to a more airy and somewhat lighter position, where the formation of flowers can be more freely carried out. They must be neatly and carefully tied out to fine small sticks, every shoot being separately supported. In instances where plants are grown as single specimens, of course they must be staked in accordance with their requirements. The above remarks apply in some degree to *Gloxinias* also. Pot on such succulent *Fuchsias*, taking care to afford but moderate shifts at a time. Stove climbing plants, such as *Allamanda*, *Dipladenia*, *Siphanotis*, *Gloriosa*, and many others, being now engaged in active growth and commencing to show bloom, must have frequent attention in reference to tying them out neatly, as to neglect them in this wise will cause much unnecessary trouble, and some injury to the blossoms. The above remarks apply to all the blood-red varieties. Many inferior specimens, or varieties of greenhouse plants of minor importance, may now be removed into pits or frames where proper protection can be afforded, thus to make more room for those which remain to perfect their growth with all the more freedom. Any specimens which look shabby, from whatever cause, may now be cut-in somewhat severely. It is better to make them conform to the will and to keep them free of the culture, or to destroy them, than to keep decried specimens which require as much room, time in watering, and like attentions as the best. Proper attention should now be given to all kinds of plants intended for winter decoration, especially such as *Pentas carnea*, *Euphorbias*, *Begonias* (which should be well pinched back), *Geranias*, and the more hardy *Salvias*, &c. Give to all pot plants an abundance of water, and a season of cool air, avoiding always the culture of stagnation, which is one of the worst conditions under which a plant has to live—a strictly artificial regimen. Those who afford the aid of a little additional heat to their *Camellias* during their growing season, should remove them back into an intermediate temperature, and from thence to their own cool house, immediately it is perceived that they have ceased to form more growth. They then to remain longer will be to reduce their ultimate flowering capabilities at the expense of an increase of wood-buds, beside unduly hastening those bloom-buds which do form, causing them sometimes to bloom in the early autumn when their flowers are of little or no value at all. Amateurs and others with limited means may keep a little freshness in their glass structures by selecting now the most bushy from amongst the *Philargenias* grown for bedding-out purposes, potting them liberally and encouraging a free growth by affording air plenty

fully and watering freely as the season advances. These of course in connection with, and as aids to, other kinds of plants grown.

FORCING HOUSES.

Maintain now in *Pineries* an average temperature of from 64° to 65° by night and 75° to 76° by day,—aided by artificial means, when the outer elements do not help to maintain such a warmth. With the latter permit a rise of from 8° to 10° more, by means of sun-heat alone. This, as will be seen, will give a maximum during the finest weather of 85° to 86°, which will be ample for some little time to come. Where "fruiters" can be maintained in a separate structure it will be possible to allow the sun-heat to increase the temperature by another 5°, when the fruits are advancing to the ripening state. With the increase of light and its concomitant warmth, continue to increase the supply of atmospheric humidity. This is done by constantly sprinkling over the floors and all internal cool surfaces, as frequently as these continue to dry. Besides this, the troughs which should be attached to the iron piping or such other vessels as contain water placed in their vicinity, should be kept constantly filled with water, and at 10° or 12° degrees, which they do, though unperceived, in diffusing a really natural humidity intermittently. Shut up for the afternoon to afford a growing period, and to "box up" some of the sun's warmth—both as being more natural and to decrease the expenditure of artificial heat throughout the hours of night—now somewhat later than heretofore; on fine bright warm days 4 P.M. will now be sufficiently early; to cool so much sooner in the afternoon will cause the thermometer to rush up too high for the good of the plants. These remarks are apposite to the more general requirements of vineries, which require every aid to facilitate growth. The period I allude to is from the time when the rods have pushed young side-shoots to the extent of carrying two or three expanded leaves, until the berries are set and have made the major part of their first growth. Hence, now is the time to produce growth; but something more is needed to produce the crop. It is, air, fresh, free, buoyant, and ever changing, in connection with light, that gives the fibre. The two, when admitted to pervade every space around, are always busily engaged, unperceived yet unerringly, in the delicate and more subtle processes which finally bring the cultivator through successfully. This necessary fresh air, the uninitiated should understand, must be given in the form of a breeze, in such a temperature, so divested of draughtiness with its attendant chills, that no possible excess for a check be allowed. A check, bear in mind, does not always produce immediate injury. The leaves may still appear perfect, yet with their more delicate organism crippled to a great degree, just as the animal form may appear intact, although the direst malady be latent within. If these suggestions are carried into practice, Grapes of the finest development will be had in return, but not otherwise.

HARDY FLOWER-GARDEN.

As we may now fairly anticipate that all danger from frost is past, the necessary work of bedding-out should be pushed forward vigorously. Endeavour to aid the effect of the ordinary family of bedding plants by adding, for greater variety, any seeds which can be spared from cool greenhouses. Some climbing plants give much aid in this wise, and afford a pleasing contrast to the popular *Clematis*, which make such a feature, in every form of skilful gardening. *Cobaea*, *Sollyas*, some *Tuberous Tropaeolums* (such as *T. pentaphyllum*), exotic *Ipomaeas*, &c., may be used with advantage. In the case of the commoner sorts, it is often best to proceed with the bedding out, leaving some of the more delicate plants, used for the beauty of their foliage, until the last. These comprise such as *Colons*, *Ricinus*, *Canna*, *Ficus*, *Caladium*, all of which thrive so very much better where, by the aid of fermenting materials, a little bottom-heat can be provided in the beds. Even the movings of lawns, shrubberies, &c., would afford these means, as green substances heat quickly and certainly when placed together in sufficient quantities. Some materials, however, may cause too great a heat for the roots of newly planted subjects.

KITCHEN GARDEN.

The work in this department will now be more or less a repetition of that of last week—hoeing weeds, moulting up anything which requires it, sowing successional crops of *Peas*, *Beans*, &c., so soon as the previous crop is through the ground, and attending to the crops in reference to the attacks of insects. See that all main crops have come up well, and should any fail set to work quickly to make up the deficiency by sowing again. Sow early Dutch early *Leek Carrots* where a constant demand for fresh young ones exists. Plant out at the foot of south or south-east walls with sunny aspects the stock of *Tomato*, tacking them up to the walls forthwith, as an additional protection during cold nights. Break off the seed-vessels upon autumn-sown *Onions*, and twist their green tops down towards the ground in such a manner as not to break them off, but yet to cause them to lie on the air, by which means they will be more readily "Succession" sowings. *Spinach*, *Radishes*, *Lettuces*, and the smaller salads should not be overlooked. *W. E.*

DAIRYMAID, in a Nobleman's or Gentleman's family.
—Age 30. More than two years in present situation. Satisfactory references. — **EMMA SHEPARD**, Bodorgan Hall, Bangor, North Wales.

SUTTONS' IMPROVED CHAMPION SWEDE.—The heaviest, the hardest, the best shape. Price 12 per lb. ch. the bushel, 120 lbs. on SATURDAY, November 18. **SUTTONS' IMPROVED GREEN KOHL RAB.**—The best in cultivation. Lowest price per bushel or cwt. on application. **SUTTON AND SONS,** Seedsmen to the Queen, Reading.

SPECIAL PRIZES FOR SUTTONS' IMPROVED CHAMPION SWEDE. At the Royal Berkshire Root Show to be held at Reading, on SATURDAY, November 18, the following valuable Prizes will be awarded to SUTTONS' Champion Swede:—
For the best 24 Specimens, a Silver Cup, value £10 to 0
For the second best 24 Specimens, Money or Plate, value 5 0 0
For the third best 24 Specimens, Money or Plate, value 3 0 0
For the fourth best 24 Specimens, Money or Plate, value 1 0 0
And upwards of FIFTY POUNDS for the best specimen of MANGEL WURZEL, KOHL RAB, TURNIPS, &c. Full particulars on application.

SUTTON AND SONS, Seedsmen to the Queen, Reading
RAYNBIRD, CALDECOTT, BAWTREE, DOWLING AND COMPANY (Limited),
CORN, SEED, MANURE, and OILCAKE MERCHANTS.
Address, 26, Seed Market, Mark Lane, E.C.; or Basingstoke.
Wholesale and prices post free on application. Prime Medals, 1857, for Wheat; 1860, for "Excellent Seed Corn and Beans."

To the Trade. Agricultural and Garden Seeds.
H. AND F. SHARPE are now prepared to make special offers of the following seeds:—**BRASSICA, CABBAGE, CARROT, MANGEL WURZEL, GARDEN PEAS and BEANS, &c.** grown from the finest seed, sown under the most favourable conditions, and all the above at very low prices. Also, the best of the following seeds:—**WHEAT, BARLEY, OATS, &c.** all the above at very low prices. Seed growing Establishment, Wisbech.

SELECTED STOCKS OF SWEDES.—Hall's Westbury, Suttons' Champion, Shepherds Golden Globe, Green-top, and Improved Purple-top, all up to name. Special offers for large or small quantities.
HARRISON AND SONS, Seed Growers, Leicester.

TO THE TRADE.
FIRST-CLASS STOCKS OF TURNIPS, &c.
Devonshire Grey, and Pomeranian White Globe, Stratton Green Round Improved, and Green Round.
Samples of M'STAKID, RAPE, &c. Special prices for large or small quantities.
HARRISON AND SONS, Royal Midland Seed Warehouse, Leicester.

Special.—To the Seed Trade.
A. ALDgate, London, E., begs to offer the following varieties of **SWEDE TURNIP SEED.** All are fine samples, good and true **SWEDE.—SKIVING'S IMPROVED, 28s.** per bushel.
SUTTONS' IMPROVED, 28s. per bushel.
MARSHALL'S PURPLE TOP, 28s. per bushel.
EAST LOTHIAN PURPLE TOP, 28s. per bushel.
HALLS WINTER PURPLE TOP, 28s. per bushel.
LEGGERS' IMPROVED PURPLE TOP, very fine stock, good and true.
Prices of other Turnips, which are equally as low, can be had upon application.

Select Turnip Seeds.
EDMUND PHILIP DIXON will be glad to offer to intending Purchasers a Surplus Stock of his very select varieties of **TURNIP SEEDS.** Special mention can be made of the following:—
DIXON'S NEW IMPERIAL PURPLE-TOP SWEDE.—This superior Swede is recommended as being the best in cultivation, producing a great weight of roots of fine feeding quality, and a good keeper. It is of a long, and firm, short-necked, with small top, and not liable to blight.
DIXON'S NEW IMPERIAL BRONZE-TOP SWEDE.—Similar in shape and quality to the above, differing in the colour. Those who have grown it speak very highly of it as a decided acquisition. The stock is limited, but will be sold at a low price.

TRAFFHALL HALL NEW YELLOW TURNIP.—This variety has proved to be a better keeper and more productive than any other spring Turnip. It is well adapted for spring, but will be sown as early as Swedes, and ready for eating the latter end of August. But if sown in the autumn or later, it will be ready for October to Lady Day. It is of good quality, a small top, and only one taproot, being a very smart clean Turnip.
GREEN GLOBE.—This is a very generally cultivated variety. Fine large new variety, and strongly recommended. I am convinced this variety is worthy of the name.
GREEN GLOBE.—Very hardy, and good for winter crop.
GREEN BARREL.—Very excellent kind, fine shape.
HENLEY'S WHITE.—This is an excellent stock of the well-known Henley's White.
POULINIAN WAX GLOBE.—A very good sort, a very regular grower, and the most perfect shape.
LITTLE PINKSHIRE.—This is a very superior variety, remarkably free-growing, very hardy, firm, and large.
PARAGON (DIXON'S), or IMPROVED RED GLOBE.—A carefully selected and selected sort of the foregoing, superior to other Reds, and suffers less injury from frost. Highly recommended for spring sowing.
EDMUND PHILIP DIXON, Seed Merchant, Yorkshire Seed Establishment, 57, Queen Street, and High Street, Hull.

IMPORTANT NOTICE.—The undersigned, having purchased the LEASE of an OLD ESTABLISHED BUSINESS, PREMISES, 7, Borough Market, London, intends to carry on the business as hitherto. Messrs. LITTLE & BALLANTYNE, who have been carrying on the business, will be glad to supply the public with a SELECT STOCK of SEEDS, from the very best growers, seeds cannot fail to give every satisfaction.
WM. LITTLE & BALLANTYNE, Seedsmen, 7, Borough Market, London.

THE EXECUTORS of Mr. JOHN LITTLE beg to intimate that they have DISPOSED OF the GOODWILL and STOCK of the NURSERY and SEED BUSINESS so long and so successfully carried on by Mr. JOHN LITTLE & BALLANTYNE, to **WM. BAXTER SMITH** (at present Manager of the Business), and the whole Business will be Transferred to him on JULY 1 next. The Executors have pleasure in recommending as Sole Successors of the firm of **LITTLE & BALLANTYNE** the above-named **WM. BAXTER SMITH.**
LITTLE AND BALLANTYNE, NURSERYMEN and Seedsmen, Kenilworth, 1, English Street, Carlisle. With reference to the above notice, the undersigned respectfully intimate that having, successively, purchased the extensive Nurseries and Glass-houses situated at Messrs. LITTLE & BALLANTYNE, they will continue to carry on the NURSERY and SEED BUSINESS, in every branch, as heretofore, and will be glad to supply the public with the best of the following seeds:—**WHEAT, BARLEY, OATS, &c.** all the above at very low prices. Seed growing Establishment, Wisbech.
WM. BAXTER SMITH, Seed Merchant, 1, English Street, Carlisle.

MR. JAMES FRASER (of the late firm of J. & F. Fraser, Lea Bridge Road), undertakes HORTICULTURAL VALUATIONS of every description, SALES by Auction, and all other business connected with the Horticultural and Gardening Departments.
TO BE DISPOSED OF, the LEASE of a First-class MARKET GARDEN, highly cultivated, and well stocked with choice Fruit Trees, situated about 5 miles from Covent Garden, near Twickenham, Quainton, Watlington, and Light, and Apply personally to Mr. SEARLE, Auctioneer, 2, Bond Court, Watlington, E.C.

To Nurseriesmen and Florists.
TO BE LET, three minutes from Woodford Station, DWELLING HOUSE, SHOW HOUSE, TWO GREEN-HOUSES and TWO HOT-BEDS, for this season—upon very liberal terms. Rent moderate. Apply at once to
Mr. C. FULLER, Snakes Lane, Woodford, N.E.

TO BE LET, with immediate possession, ELEVEN ACRES of ORCHARD LAND, 14 miles from London, S.E., well stocked with Apples, Pears, and Pear Trees, with Strawberries, and Strawberries, with Hotbeds and Forcing Fires. Apply to **MR. J. H. MOORE, 1, Leadenhall Street, London, E.C.**

FOR SALE, an old established NURSERY and SEED BUSINESS, within a few miles of London, containing about 14 Acres of General Nursery Stock, numerous Glass Structures, Seed Shop, Dwelling House, &c. For particulars, apply by letter only, to **G. C. Gardener's Chronicle Office, W.C.**

SALES BY AUCTION.

St. John's Wood, N.W.
IMPORTANT SALE of about 15,000 choice BEDDING PLANTS.
MESSRS. PROTHEROE and MORRIS will sell, by AUCTION, on THURSDAY, May 25, at 10 o'clock precisely, at St. John's Wood, close to the Swiss Cottage Station on the Metropolitan Railway, on MONDAY, May 29, at 12 o'clock precisely, at Mr. Gale, containing about 15,000 choice BEDDING and other PLANTS, consisting principally of Geraniums, large quantities of Verbenas, Calceolarias, Fuchsias, Golden Feather, Geraniums, Heliotropes, and the usual Miscellaneous Assortment; Standard Roses and Evergreens in pots, &c. Catalogues may be had on the Premises, and of the Auctioneers, Leytonstone, E.

Hornsey, N.
HIGHLY IMPORTANT and EXTENSIVE SALE of about 35,000 well grown BEDDING and other PLANTS.
MESSRS. PROTHEROE and MORRIS are instructed by Mr. Maurice Young to SELL by AUCTION, without reserve, on THURSDAY, May 25, at 10 o'clock precisely, at the Railway Station, on FRIDAY, May 26, at 10 o'clock precisely, at the Railway Station, on SATURDAY, May 27, at 10 o'clock precisely, at the Railway Station, on SUNDAY, May 28, at 10 o'clock precisely, at the Railway Station, on MONDAY, May 29, at 10 o'clock precisely, at the Railway Station, on TUESDAY, May 30, at 10 o'clock precisely, at the Railway Station, on WEDNESDAY, May 31, at 10 o'clock precisely, at the Railway Station, on THURSDAY, June 1, at 10 o'clock precisely, at the Railway Station, on FRIDAY, June 2, at 10 o'clock precisely, at the Railway Station, on SATURDAY, June 3, at 10 o'clock precisely, at the Railway Station, on SUNDAY, June 4, at 10 o'clock precisely, at the Railway Station, on MONDAY, June 5, at 10 o'clock precisely, at the Railway Station, on TUESDAY, June 6, at 10 o'clock precisely, at the Railway Station, on 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Privy Council Office, to urge a relaxation of the orders affecting the IMPORTATION OF FOREIGN CATTLE. They declared that the same regulations which apply to London could be carried out at places like Sheffield, Leeds, Stockport, and Manchester. The cattle could be imported at Hull, Goole, Grimsby, and Hartlepool, and conveyed to such towns for slaughter in trucks provided for the purpose, while any regulations would be cheerfully submitted to for securing the cattle being taken direct to the slaughter-house, and not to markets open to the home traffic. Memorials to this effect were handed in by the Mayor of Manchester, and various other members of the deputation, and reference was made to the injustice of treating London differently from those vast provincial centres of industry where the regulations had the effect of raising the price of meat id. per lb. Mr. FORSTER pointed out that it was impossible to extend regulations to inland towns that were applicable only to a port, and reminded the deputation that Thames Haven, upon which much stress had been laid, was confined wholly to cattle imports, and furnished London with only a small portion of its supplies; last year the figures being 35,000 out of a total of 125,000. He had already endeavoured to see if similar regulations could not be made applicable to provincial towns; but he found, in order to get the same security as in London, the towns would have to be fenced round with a cordoned railway reserve, as to make the concession appear a mockery. Reference had been made to the opening of the Holland trade; but that did not arise out of any feeling of partiality, but simply because Holland was free from rinderpest, and had passed a law against the importation of foreign cattle. Could a similar security have been obtained from Germany, the same freedom would have been extended to Schleswig and Holstein, where the cattle disease had not been introduced. Mr. H. J. CLARKE, Hon. gentleman attributed the high price of meat to last year's season, which had affected the Continent as well as the United Kingdom.

— Mr. J. A. CLARKE, the secretary of the Central Chamber of Agriculture, has published a letter showing the dangers by which the LIVE STOCK of this KINGDOM are now IMPERILED:—

"On Sunday, April 30, five cattle, together with 54 sheep and some pigs, were landed at BROWN'S Wharf, out of the General Steam Navigation Company's steamship *Leo*, from Rotterdam. The sheep and pigs were not taken beyond the usual limits for inspection; but the five cattle were condemned to be slaughtered at the inspection place, three of them being very badly affected with pleuro-pneumonia. Two days later than this, on Tuesday, May 2, a number of cattle, also from Rotterdam, were landed at Hull, and, after 12 hours' delay for inspection, were sent away to towns in the West Riding of Yorkshire. What guarantee is there that these animals were not bearers of contagion, seeing that the wharves and stables of Rotterdam must now be looked upon as infected with pleuro-pneumonia? It has come to my knowledge that, in the last week of last year, a consignment from Holland was passed as sound by an inspector, but afterwards proved to have the lung complaint—to a serious extent," says my thoroughly reliable informant, which I suppose to mean "in an advanced stage."

— Messrs. SUTTON & SONS, Reading, have published the schedule of their twenty-second annual ROOST SHOW, to be held at READING, on Saturday, Nov. 18, 1871. This show (open to the United Kingdom) was established so long ago, and has been conducted ever since by Messrs. SUTTON & SONS, of the land in the kingdom. Upwards of £70 are offered for the best specimens of Swedes, Turnips, Koft Rabi, Mangel, Potatoes, &c., including 20 gs. in plate and money for 24 specimens of SUTTON'S Improved Champion Swede; and a £5 ss. cup is given by Messrs. GRIFFIN, of Wolverhampton, for the best collection of roots.

— Mr. H. J. TURNER, of Richmond, an old correspondent of the *Agricultural Gazette*, writes thus to the *Times* about OUR FOOD PROSPECTS, after viewing much land, during the last four or five weeks, in the midland and northern counties:—

"The severe frosts of winter and early spring completely checked all premature growth in autumn-sown Wheat, and although March brought plenty of dust, and April a spring shower, the crops have not improved. They were generally cold and not unfrequently frosty. With such weather the progress of the Wheat plant has been slow everywhere, and in many districts not a few fields of Wheat have had to be ploughed under. If the weather proves favourable, I think the somewhat late condition of the plant favourable rather than otherwise, as we may reasonably expect more vigorous growth than usual when the retarded plant fairly begins to shoot forth; but if we have severe frosty nights frequently now they cannot fail to injure to keep back, if they do not entirely injure, the crop. Last Wednesday night the thermometer here was down to 20 deg., and there was plenty of black ice to be seen on Thursday morning.

"The dry weather in March had made all early ploughed land in good condition for spring sowing, and I think I never remember a finer seed-time, or the land when sown showing a better finish. Clover and other annual grass seeds looked small and poor for a long time, but they have wonderfully recovered, and I have been over many fields in good condition, and the moderate land giving rich living to ewes and lambs for several weeks past, even in the northern counties. The planting of the general crop of Potatoes in the fields has been finished. Sometimes the land when ploughed up for the rows was often sour and cold, and I do not expect, with those frosty nights, that

Potatoes will come up soon. A good deal of land in the northern counties has been sown with Swedes, and the seed has been thus got in at a good time, and with the land in a promising state. All kinds of spring corn have come up fairly, but it is too soon to judge of the prospects of those crops. Old grass land of good quality is very scarce, and has been in the richest condition. The colour is beautiful, and from May 1 on such lands there has been a full bite.

"Wheat is stiff in price, and I think there is every probability of its remaining so until harvest. Potatoes are also in a stiff price.

"Thus every kind of human food is dear, but winter is over; trade generally is flourishing, wages are good, and we may reasonably hope for a season of moderate prosperity."

— A correspondent of the *American Agriculturist* thus describes the EXPERIENCE of a DAIRY FARM in 1870:—

"Having just completed a milk report for 1870, perhaps a few items from it may be of interest to you, especially as farm statistics are not often obtainable unless guessed at. I will state my farm of 30 acres, one mile out of town, is kept for the production of milk sold in the city, and grain and fodder particularly for the cows. I cannot afford to raise such stock as I would prefer; hence I have only a good selection of such cows as I can find about here.

Average number of cows kept	.. 18
" product of milk per cow	.. 5,182 lb.
" price per quart	.. 4 1/2 cts.
" time of cows in milk	9 m. 3 s. 1 d.
" number of cows in milk for the season	.. 14 1/2
" number of cows dry for the season	.. 3 1/2

We estimate a quart of milk to weigh 2 lb. My gain in milk for 1870 over 1869 was 146 lb. per cow; and in 1869 over 1868 the gain was 484 lb. I am satisfied a better mode of raising cows and a better mode of feeding will improve these results.

If the weights given are not ascertained but only calculated, the theory that a quart weighs 2 lb., this is a very good return indeed for the number of cows in milk.

"We read in a lecture, lately delivered in the Horticultural Hall at Philadelphia, by the Hon. MARSHAL B. WARD, of Boston, that in CALIFORNIA, the one-fourth of the CULTIVATED LAND is in Wheat, yielding on an average 25 bush. per acre, but in fertile locations from 50 to 70 bush. per acre, and that culinary vegetables are excellent and abundant: Pumpkins are mentioned weighing 250 lb., Beets 100 lb., Carrots 30 lb." We hear of a dairy farm of 3500 acres and 600 cows, and of another farmer who owns 2300 cows. Of sheep, one firm who crossed the mountains in 1852 with 2000, now shear 150,000, and own 150,000 acres of land. A great deal of interesting information is also given on fruit and Vine culture, which is of less direct agricultural interest.

— Dr. CRISP has published a correspondence with the Secretary of the Royal Agricultural Society, on a proposition to amend the GAME LAWS. The following are the three letters:—

(1). "Dear Sir,—Will you inform me if there will be any objection to my bringing the subject of the Game Laws before the next general meeting on the 22nd inst.? It is one that materially concerns agriculturists and the progress of agriculture. My object will be to ask the Council to form a committee to investigate and report on the subject of this question. An answer will be all I can oblige, yours truly, "EDWARD CRISP, "H. M. JENKINS, Esq., Secretary, R.A.S. England."

(2). "Dear Sir,—I regret that I was engaged with the President of the Society when you called this morning, as I should have preferred explaining to you personally that the subject of the Game Laws cannot be discussed by this Society, as the Charter forbids any discussion at the meetings of subjects either pending or to be brought forward in either House of Parliament.—Yours very faithfully, "H. M. JENKINS, Secretary, "12, Hanover Square, N. Y. 10, 1871."

(3). "Dear Sir,—Your answer, Chelsea, May 10, 1871, has been received. I am sorry to say that the Game Laws are scarcely political, as most tenant-farmers of whatever shade of politics are desirous of their amendment. I have had abundant opportunities of seeing their injurious influence both upon the tenant-farmer and upon the agricultural labourer, and my family and I are therefore, anxious to bring the subject before the meeting. Your reference to the Charter appears to me to be inopportune, and as regards the welfare of the Society impolitic. Your Charter, as Mr. Walsby said of the members of the House of Commons, is made up of 'queerable materials,' and if your dictum were acted upon, it would preclude the discussion of almost any subject relating to agriculture. But, sir, is it that the question is an unpalatable one to the President and to most of the members of the Council? When cattle-plague devastated our herds I was allowed to point out the shortcomings of the Council—their tardy action and inefficient recommendations, as our proceedings and the Journal testify. When education was on the tapis, I was allowed to protest against what I believed to be the inefficient action of the Council; and the same day I was allowed to apply to my denunciation of the present unsatisfactory state of the veterinary profession, and the encouragement given to this by the annual grant to the Veterinary College. All these, and others I could name, are as much political subjects as the Game Laws. Cattle-plague, education, the Charter of the Veterinary College, had all been before the House of Commons. Under these circumstances, I beg of you to refer the matter to the Council.

"According to the Charter, p. 19, clause 14, 'a mem-

ber may comment on the report, and on such other matters relating to the government of the Society, and the management of its affairs, as to him may seem proper.—Yours very truly, "EDWARDS CRISP, "H. M. JENKINS, Esq., Secretary."

THE PRIZE-MEN whose names were published by the Examiners appointed by the AGRICULTURAL EDUCATION COMMITTEE of the ROYAL AGRICULTURAL SOCIETY the other day, are all of them from the Royal Agricultural College, Cirencester. Of course no one regrets more than the authorities of that college the short number of competitors for the valuable prizes of the annual Agricultural Exhibition, and the Agricultural College is very anxious to see more students from the country sending agricultural students up to Hanover Square; and we should be glad to know why this fact is studiously ignored in the official report of the committee. We can point to previous reports, not merely of the Education Committee, but of the Council to the annual meeting of members, in which long lists of prize-men for mathematics, &c., formed the staple subject of the annual agricultural address; and there was no difficulty then in letting the members know that schools sent up the successful candidates. But now, when the education is agricultural, and the prize-men have distinguished themselves in an agricultural examination, the agricultural school from which they were sent up is not announced. The relation or non-relation of the Agricultural Society to the Agricultural College is to an outside agriculturist a perfect mystery.

— In inference to the question—"Which is the true account?" as regards contradictory reports, in the *Daily Telegraph* (see p. 597), of DOUBLE THE PRICES IN THE FENS, we subjoin the following verbatim report of the judges, and would add that no prize was offered for competition, and therefore no award made to either of the exhibitors:—

"We, the undersigned, having been solicited to act as judges at a competitive trial of ploughs of the Messrs. HOWARD, of Bedford, and Messrs. RANSOME & SIMS, of Ipswich, upon land belonging to Mr. NORMAN, in the parish of Chatteris, have come to the following decision. We give our preference to the Messrs. HOWARD'S plough, as being the best plough for use upon fen lands, it also being simplest in construction and easily managed; but at the same time we think Messrs. HOWARD'S N B plough, as a general purpose plough, for use upon farms where a variety of soils are met, deserves the best implement. (Signed) "ARTHUR RUSTON, "JOHN BROOKS."

"Chatteris, April 5, 1871."

OUR LIVE STOCK.

CATTLE.

MR. CHRISTY'S entire herd was disposed of by Mr. Thornton, on the 4th inst., at Boynton Hall, Roxwell, Chelmsford. A large company assembled, and the cattle were brought out in good order. The animals were of uniform good quality, and several were purchased at high figures for exportation. The sale resulted in a general average of £40 18s. 8d. over 67 head, and a total of £2742 12s. Fifty-five cows, among which were twelve bulls, £33 45s. each, made the highest prices given for any of the following:—*French Aster*, of the Sarsden, Crocus tribe, was sold for 160 gs. to Mr. Thornton, for abroad; *Rosleaf*, tracing back to good old Colling stock, for 91 gs., to Mr. Tippler, for abroad; *Portlucella*, descended from *Lady Liverpool* by EARL OF LIVERPOOL, and *Red Rose* by COLUMELLA, for 270 gs., to Mr. Thornton, also for exportation; *Anemone*, another "Crocus," for 145 gs., to Mr. Thornton. Lastly, *Chelmsford*, of the "Crocus" tribe, was purchased for abroad by Mr. Tippler, for 105 gs. All these animals are by DUKE OF GRAFTON (21,594). In the bull sale DUKE OF BABRAHAM, of the *Cornflower* by BASHAW tribe, and ROSOLIO, similarly bred to *Rosleaf*, both by DUKE OF GRAFTON, realised respectively 52 and 75 gs., the first becoming Mr. Tippler's and the second being secured by Mr. Sturgeon.

— A very large company assembled around the sale ring at Cranmore Lodge on Thursday week, to witness the dispersion of Mr. Searson's herd by Mr. Thornton. A fair average of £34 13s. over 72 head was obtained, and the sale was considered to have been successful. Fifty-six cows made £37 1s. 9d., and 16 bulls £27 4s. 8d., each, while a total of £2512 13s. was realised. Prices were uniformly good, rather than high, and we in vain look for the high figures with which we have lately been spoilt. *Cranmore Belle* by SIR SIMON (18,867) was sold for 51 gs., to Mr. J. M. Frudd; *Dairy Girl* by COCK OF THE WALK (15,782), for 56 gs., to Mr. R. Wood; *Sprightly* by BIRTHDAY (19,313), for 54 gs., to Mr. J. Wallis; *Miss Colling* by COLON (15,878), for 55 gs., to Mr. J. Challant; *Winter Rose* by DUKE OF DEVONSHIRE (21,588), for 66 gs., to Mr. T. Pears; *Swiss Rose* by CHIEFTAIN (21,421), for 80 gs., to Mr. Walton; *Modesty* by CHIEF MOGUL (23,559), for 52 gs., to Mr. Jenkins; *Sweetheart* by FALSTAFF (21,720), a prize-taker at Oakham, and elsewhere, for 58 gs., to Mr. J. Sharp; *Tiny* by FALSTAFF, for 52 gs., to Mr. Walton; and *Mina* by FALSTAFF, for 51 gs., to Mr. J. Holland. In the bull sale LORD CHATHAM (26,625) by LORD

and insures a gain to the feeder of at least 33 per cent. Mr. Stewart found that 16 lb. of cooked food given to a cow produced 4 galls. of milk per day, and made 8 lb. of butter per week. To make the same amount of butter required 24 lb. of raw food. From his experiments with milch cows, he is satisfied that cooking saves one-third of the feed.

Mr. Easton, Dutchess County, New York, says that steamed food for cows in milk and fattening animals is a great advantage. Professor Horsfall says bran is greatly improved by steaming, as well as other feed; he could not be deprived of it with any satisfaction. Mr. Stewart tested the healthfulness of cooked food for working horses for a number of years, and they have always been healthy except where badly used. "Cooking," he says, "improves the food, and coughs more efficiently than any other remedy, and double their working ages." Hon. George Geddes, of Syracuse, New York, says:—I find if I take to bush, of meal and wet it in cold water and feed 25 hogs with it, they eat it well; but if I take the same and cook it, it will take the same number of hogs twice as long to eat it up, and I think they fatten quite as fast in the same length of time. The last authority which I shall quote, and which I think is the best, is that of the well-known, learned friend Dr. Smith, who admits in his book, published last week, that "persistence in feeding out cooked food to cattle or swine will undoubtedly produce a larger yield of lard and tallow." It is a

cultural progress that has laved the highest social strata, and reached to almost the lowest ebb in the social scale, seems to have overlooked the middle classes, especially farmers. I trust, however, these examples may stimulate and arouse many of your readers. There is no reason, in the expense, nor in the nature of things, why thousands of small farm gardens like these should not be seen in every county throughout the kingdom.

This plan, with the explanatory references, will be easily understood. It is thoroughly sheltered from the east and the north. Having written pretty fully about the flower gardens on the other plans, I will confine my remarks here to the kitchen garden. One word, however, about the glass-houses, of which I have represented a large number, and which are attached to the dwelling-house, and an orchard-house and viney inside the kitchen garden. I hope these won't alarm your readers. There is nothing that farmers seem so much afraid of as glass, unless it be a new rate. But there is hardly any building material so cheap as glass at the present day. Two or three fat balklocks would build all these glass-houses; and then fancy the pleasure of having choice flowers and fruit in the open air, and the beauty of the glass become that it is actually used in combination with iron for walls, and beats brick in price. For this reason, and also for its other advantages, I recommend the two pieces of wall on each side of these glass

I try to do in agriculture. I have a right to black my own boots, or be my own servant or porter. A peer or peeress has a right to load the elegant carriage with scrubbing brushes and dust pans, and the powdered and silk-stockinged Johnny with bars of soap or bags of sugar—which I not unfrequently see when I pass through the Haymarket.

It appears to me that the members of co-operative societies possess this advantage, that they can buy in such large quantities that they become wholesale purchasers, and thereby avoid the shopkeepers' profits—becoming, in fact, shopkeepers themselves, employing persons to arrange and apportion the goods to them in retail quantities; they also become their own porters and clerks, making out their own bills and carrying away their own parcels, thus saving clerks' and porters' wages. They each provide their own capital, and all is done for ready money.

If my farm were big enough, and I had the ready money, I should buy the 30 tons of guano from Messrs. Bonar & Co., and so save the merchants' or agents' commission. I believe our Scotch agricultural friends do associate themselves and divide cargoes or large bulks. All this is fair and right where it can be done, although such a system is not unattended with certain difficulties and delicate considerations.

In fact, to sum up, do away with the intermediate man if he is of no use to you ; sweep away the shopkeepers and intermediate men and their *employés*.

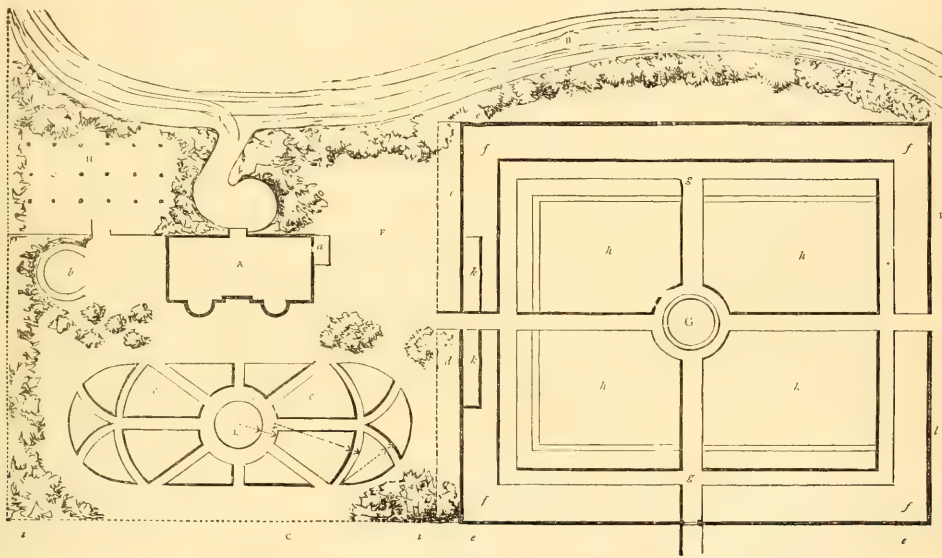


FIG. 134.—PLAN OF GARDEN (1 TO 1½ ACRES) FOR A LARGE FARM (500 TO 1000 ACRES).

REFERENCES: A, Dwelling house; a, bus; Pub; ab, c, Cow meadow; d, Farm buildings; e, Flower garden; f, Croquet lawn; g, Kitchen; Garden with fountain in centre; H, Small orchard, or drying ground; h, Conservatory; i, Summer house; i', c, Flower beds cut in lawn; j, d, Flower border; e, e', e'', Brick or other wall, carrying Peach and Apple; Plum and Cherry trees, and Pears, according to aspect; f, f', f'', f''', For early crops, Potatoes, &c.; g, g', Gravel walks; h, h, h, h, Vegetables, and Gooseberries, Currants, Strawberries, and kitchen crops; i, i, Wire fence; h, h, Orchard-house and Vinery; l, Frames, if any, by farmyard.

favourite idiom with the doctor "that fat meats are diseased." Can it be possible that the whole civilized world is at fault in this respect? The Esquimaux subsists alone on fat. Well developed and nutritious muscle or membrane cannot be produced without fat. Without fat, there would be a scarcity of heat, hence "Nature's laws" are arrayed against the theory that "fat meats are diseased." The English are proverbially a healthy people, and with John Bull the fatter his roast the better. No meats would be eatable and no man would be healthy without the sustaining presence of fat. The beefsteak is better than the tenderloin because it rounds the hump of the pig, thickens the loin of the beef, and swells the breast of the turkey. A pig without fattening would have a shrivelled ham, be tough and wiry, and of light weight.

THE GARDEN OF THE FARM,—No. V.

(Continued from p. 527.)

The following plan (fig. 134) is given as an example of a farm garden of the highest class. It is an acre or more in size, and is suitable to a holding of from 500 to 1000 acres. It differs in nothing but size from the gardens of the nobility and gentry. And this is as it should be. I trust that all the rural gardening of the future will be alike excellent. The garden of the cottage is equal in culture, in product, and in taste to the garden of the palace. Indeed to a great extent it is already, in the matter of culture and produce, between the two extremes of society. But singularly enough, the wave of horti-

houses to be built of glass, to form a warm wall and border for *Tea Roses*, &c. This garden is walled round for the growth of choice fruit. The walls ought not to exceed 6 feet in height for gardens of this size. The borders against the walls to be from 6 to 8 feet wide; walks 4 feet. Then another fruit border of Apples, Peaches, &c. to the house, Filberts, &c. bound most of the principal walk &c. Then a working path a foot or so, and finally the main divisions for fruit bushes or vegetables. This mode of laying out the kitchen garden gives it an artistic and pleasing appearance at all seasons. It likewise facilitates economical management and systematizes the work of the gardener. The water supply for the furnishing of the garden of the farm. Water is an essential element of success in gardening, and we have marked a fountain in the plan as the centre of the kitchen garden. This should be filled from the house or farm, and kept constantly full to the brim, as it were, in beauty and to prepare it for use. Hard water needs artificial means to make it soft. The water of garden plants, as much or more than our linen does before we wear or sleep in it. *D. T. Fish, F.R.H.S.*

Imagine all the shops shut up, and only a few gigantic warehouses in back streets. No more going to Regent Street to see the fashions or show there. What a saving in gas!—and how it would lighten the duties of the tax-collector and receiver of rents. What a number of ladies and gentlemen we should see with parcels under their arms. An apothecary amused me yesterday by describing his woes. Mr. So-and-so, his customer, had just told him that he had purchased a dozen of so-and-so at the co-operative stores as cheap as he could get them, and that he was sending the surplus quantity among his friends. He wanted some little matter and a little advice from the apothecary, who at once gave vent to his feelings, and in a burst of indignation referred him to the co-operative stores where he had bought by the dozen. Now, I don't believe that every shop is going to be shut up, and that every one is going to carry home his own parcel, for the mass of people, especially of the higher and well-to-do classes, have a sense of dignity and propriety and fastidiousness which would prevent them from doing that. There was a general impression that the Industrial

CO-OPERATIVE ASSOCIATIONS.

1. THIS is a free country, and a free-trade country. Every man has a right to do as he pleases, provided he obeys the laws of his country. Every one has a perfect right to buy in the cheapest and sell in the dearest market, and avoid intermediate profits. This is what

But while it is admitted that co-operative stores are partly justifiable, there is arising a deep and angry sentiment concerning them on the part of the civil servants of the Crown; and if I mistake not, it will find vent in overwhelming numbers of petitions to our Houses of Parliament. Go where I will, I hear the plaint. They say, "Here are gentlemen highly paid from the taxes of the country, and lightly worked, becoming shopkeepers and suppliers, not only for their own class but for the general public, and although still retaining their large official salaries, and receiving considerable salaries managers of these trading institutions."

Inferences are drawn that it is impossible that they can manage these gigantic undertakings without trenching upon the public time. Some also say that if cheapness is to be the order of the day, it must, in fair play, be carried into the civil and public service, and that their six hours a day and 10 weeks holiday in a year should be more approximated to the hard-working and busy taxed trader, who can scarcely spare a day's holiday from his daily drudgery of 10 to 14 hours a day. With the better class of traders in rich neighbourhoods the case is somewhat different, but the 2400 grocers, and the vast number of shopkeepers in humble but densely populated districts, who pay heavy rates and taxes, look with very evil eye on the Civil Service Co-operative Stores, and dread their extension. *J. F. Micht, May, 1871.*

2. I cannot but admire the ingenuity with which my new antagonist, who signs himself "E. O. Greening," takes advantage of an observation in my last paper on the above subject (which by no means warrants his inference) to disclaim being the writer of the articles signed "A Member," at the same time to throw a sort of veil of mystery around him, after the manner of Moore's veiled prophet—

"The veil! the silver veil which he had flung
In mercy there to shield from mortal sight
His glorious brow, till man could bear the light."

However, I have no disposition to dispute claims that I have no means of refuting, and in order that even more justice may be done, and to illustrate the subject, I am willing to suppose that my antagonist is not only a member of a co-operative society, but a member of the Legislature likewise,—that he represents a large constituency, and, if so, on the next occasion it will surely be his duty to tell his constituents, "That he has a bad opinion of Englishmen generally; that most of them are rogues; and that what Mr. Carlyle says about their wares and manufactures is quite true. That whilst freely acknowledging that there may be some exceptions amongst his constituents, yet he recommends his friends and purchasers generally to have no dealings with them, but to order their goods from co-operative societies in London, of which he is a member." Even though his own fortune may be due to the industry of his ancestors, perhaps in the very industries he denounces, yet he preferred following the principle of the old lady, who, after borrowing a gridiron all her life, bought a new one at last, declaring that for the future she would neither borrow nor lend." The electors will of course pass him a vote of thanks, and return him at the next election and a share of the poll.

To relieve, however, the mind of "A Member," as well as that of his champion, I may say that I never supposed nor insinuated that the article alluded to was written by any one but "A Member" himself, although I might have thought it not unlikely that there had been a little co-operation in the matter. My opponent is wrong in saying that the controversy began with me. It was commenced by a co-operative member, and I merely defended the industries so unjustly attacked. I have borne testimony to the ingenuity of the manager, and I wish I could compliment either his fairness or candour, but the following incident prevents me so doing. A few weeks since I was asked by a friend if I had seen the *Economist*. I replied, I had not. "Then I will send it," he rejoined, "for you are attacked therein." I expected of course to receive the influential and respectable paper that has been known under the name of *Justice* for many years, of my surprise, when I found that, instead thereof, a sort of trade circular came to hand rejoicing in the imposing name of the *Agricultural Economist*, and consisting almost entirely of price lists,—the advertising medium of the co-operative society in question. Room, however, was afforded for the first article written by "A Member" in this paper, and mention was also made of a meeting of the members or managers of the society, at which my paper was read, and, I trust, it was so caused much merriment. I forget whether the number of members present was three or four, but I rather think the former, for I know when I read it the three tailors of Tooley Street came forcibly to my mind. My paper, however, that caused the merriment to these merry men, was not printed in the paper, thus showing not only the ingenuity of appropriating the designation of two most influential papers, but the remarkable one-sidedness with which the *Agricultural Economist* is conducted. "A Member" does not appear to understand my allegation of personality. I do not apply it offensively, but I assert that he has no right to assume that I am connected in the way of business with the subjects discussed. On any questions of business he is free to address the firm to which I belong, and he will be

treated with every respect, but I claim for myself the right to discuss public questions on public principles and not on the principle of shopkeeping. "A Member" repeats a question in his last story he put before, but which I thought needed no reply. He asks, forsooth, whether I considered the manufacturers of the worthless articles exposed in the Journal of the Royal Agricultural Society were influenced by the motto, "Live and let live." In reply I say, certainly not, but rather by the take-care-of-number-one principle of the co-operative society; and I may add, although in this controversy I have carefully avoided personal matters, that for 30 years I have used every opportunity of denouncing and endeavouring to put down such dishonest practices, and not altogether without success; and I may further state that I hold them in as much abhorrence as any member of the co-operative society can possibly do. I am pleased to find that "A Member" altogether disclaims, on the part of the society, the credit of exposing the fraudulent and dishonest manufacturers of manures, which had previously been put forward as its principal recommendation to public support. I am sorry that he approves of the practice of the possessor of £10,000 a year living in a garret on £100 a year, and that he recommends such examples to farmers, and considers they are fools if they do not adopt it. I always thought that a spirited agriculturist, who improved the soil and increased its productions, was a public benefactor; but, according to "A Member's" notions, this is altogether wrong. I also observe that he accepts as correct my designation of the co-operative societies as being un-English; and, indeed, appears to take it rather as a compliment. I cannot join with him in his denunciation of English goods and manufactures; but, whilst freely acknowledging that there is much to complain of and expose, yet I hold that the way to a remedy is to assist and encourage the honest and successful manufacturers, and not the system of the co-operative societies, which is to injure equally both the good and the bad. One principal cause of deteriorated goods and bad manufactures is that incessant craving after cheapness which many farmers indulge in; for example, a manure that has been repeatedly exposed by the Royal Agricultural Society as not being worth a third of the price at which it is vended, is still sold extensively because it appears to be cheap. It is in this manner that co-operative societies also tend to the craving for cheapness, and to attract customers by such plea. A supersophistic of lime is wanted, to contain so much per cent. of soluble phosphate, and nothing more, save that it must be low in price. A manufacturer who wishes to supply it, of course, in order to secure some profit, buys a very cheap and low class phosphatic material, and treats it with sufficient acid as to secure the amount of solubility required; and in fact a fact that raw materials vary to the extent of 45 to 100 per cent. Thus undue stimulus is given to the inferior material, and the fair-dealing manufacturer is injured to the extent of the business he is deprived of. I will not repeat the arguments I have before used, to show that the best security against imposition and fraud is freedom of trade and unrestricted competition; but I repeat, that, stripped of their borrowed plumes, the utmost these societies do is to act the part of a butcher at roasting more than a broker's charge; and that the centralising principles on which they are founded are altogether opposed to the public good. Although trade and commerce in this country is susceptible of improvement, yet nevertheless it may, without fear for fair dealing, honour, and honesty, challenge comparison with that of any other country in the world. For myself I am not ashamed of my countrymen, and I endorse the sentiment—"England, with all thy faults, I love thee still." *W. C. Spooner.*

Home Correspondence.

Quantity of Sewage applied on Lodge Farm, Barking.—Mr. Hope, in the discussion of the paper which I submitted to the Institute of Surveyors, having challenged the accuracy of the quantities of sewage applied on the farm, as stated in the circular, I wrote upon the Lodge Farm. I found it desirable to refer the matter to our engineer, Mr. Hassard, C.E., with a request that he would state whether the modes by which I had arrived at the quantities were practically correct. Mr. Hassard's letter, of which I enclose a copy, will, I think, satisfactorily show that Mr. Hope's theories must give way before the force of facts. *Henry Morgan, London, May 8, 1871.*—The following is a copy of Mr. Hassard's letter:—

"4, Westminster Chambers, April 27, 1871.

"Dear Sir:—In the last I beg, when the pumping engine and one pump were first erected at the outfall at Barking Creek, I frequently gauged the quantity of sewage delivered at the Lodge Farm. At 10 strokes of the pump per minute, the quantity was 8 cubic feet per minute, equal to 300 tons an hour; at 22 strokes, 100 tons, equal to 320 tons; at 23 strokes, 100.82 tons, equal to 318 tons. Nineteen strokes per minute was found to be the speed at which the pump could be worked most economically, and indeed, was the pace by which the engine was designed. In consequence the quantity of sewage applied, at 66 per cent., gave but 70 per cent. more sewage, and upon increasing the velocity of the engine the delivery fell off,

When you subsequently erected another pump and gave the engine two pumps to work in place of one, the speed of the engine was reduced, and the full capacity of the pump barrels was at each stroke maintained. I cannot lay my hand just now on the measurements I made about a year ago of the sewage flowing in the main trough, but I suspect that they agreed closely with the pump gaugings. Indeed, it is quite manifest that if the trough had not been capable of carrying off the sewage which the pumps delivered into them, that there would have been an overflow, which would have announced an error; but as the delivery of the pumps has been always capable of test by means of the measuring boxes on the farm, there never has been any difficulty in checking the quantity of sewage supplied to the farm by the number of strokes at which the engine is worked.—Very truly yours,

(Signed) "H. Morgan, Esq."

RICHARD HASSARD.

Lord Vernon's Prize.—The meeting of the Bath and West of England Agricultural Society, at Guildford, is near at hand, to be followed by the Royal Agricultural Society at Wolverhampton on July 10, when, according to the report in the Journal of the Bath and West of England Agricultural Society, the extensive nature of the prize. The President, Lord Vernon, will give a silver cup, value £100, for the best combination of machinery for the cultivation of the soil by steam-power, the cost of which shall not exceed £700; the engine to be locomotive, and adapted to other farm purposes. What are we to expect this combination to consist of? Looking over the price list of machinery of Messrs. Fowler and Co., of Leeds, the lowest price of 12-horse power traction engine, with clip-drum, is £500, anchor, rope, porters, &c., bring it up to £754, but we have no plough, cultivator, or harrows. Messrs. Howard, of Bedford, price their 12-horse power engine, with two winding drums, rope, porters, &c., but in this case with a 5-tined double-action cultivator, at £660. Are either of the above to be considered the "combination" of machinery for the cultivation "of the soil for which Lordship's prize is to be awarded, or are the competitors for the valuable prize expected to make the combination complete by adding the three implements essentially necessary for the general cultivation of the soil, viz., cultivator, plough, and harrow? No doubt it has received the attention of the proper authorities; at the same time, perhaps, some of your readers may give their opinion. *R. A. S. E.*

Phospho Guano.—In reply to "A Subscriber's" communication in the columns of your issue of the 13th inst., I would advise him to apply to the Phospho Guano Company for the information he seeks, giving his proper name and address. I have before me copies of analysis by Drs. Voelcker, Anderson, and Macadam, which are supplied by the company to all agents, and I am unable to comprehend the inability of "A Subscriber" to obtain the same. The parties applied to, said to be deputed as agents for the sale." It would be interesting to know the actual results of the practical testing of three separate samples guaranteed to be "genuine as imported," very different from each other. I may be wrong in inferring from this reference to his purchases, that "A Subscriber" has his guano knowledge mixed up; but I am sure upon a matter of such importance, and a source of such experience, that the parties upon investigation may be gone into, affording a channel of useful information to agriculturists generally and "A Subscriber" in particular. Firstly, however, let "A Subscriber" emerge from the anonymous style; it might be dangerous for me to ramble amongst grass, which other agents have apparently and perhaps wisely avoided.—*Wm. Cocks, Agent for the Phospho Guano Company, Donington, Spalding.*

Does Irrigation Pay?—I occasionally visit Hampshire, and wander on the banks of its lovely and pellucid streams. There, early in April, while the upland grass is at "nil," large flocks of sheep and lambs are luxuriating on rich and succulent grass, not forced by manure, but developed, thus early, by irrigation with pure pellucid water that has filtered through the surrounding chalk hills, and which, although so bright and clear, remains in its natural fertilizing element. On making inquiry as to the costs of laying out the fields, in order to receive the irrigation, I found that very large sums were thus expended; in some cases as much as the fee-simple of the land; and the cost varied from £10 to even £100 per acre. No doubt the value of obtaining, very early, suitable and abundant food for ewes and lambs, and then a fine hay crop, amply pays an interest for the outlay. I myself, in writing this paper is to illustrate by the facts the enormous advantages that must accrue where town sewage can be applied for irrigation, and how well it would pay to prepare the ground to receive it. When I recommend the utilisation of town sewage, I am told, "Oh! but see what it will cost to put it on the land." I therefore refer to the Hampshire water-meadows as convincing evidence that it would pay handsomely in any case, the instance to apply town sewage to agricultural production. Those gigantic pumps at Old Ford and Crossness, that each represent the power of several thousand horses, and each raise 60,000 gallons per minute, should be employed in diffusing the sewage over the adjacent lands, rather than pumping it into and poison-

ing and obstructing our noble river. But I know the difficulty; public opinion is hardly ripe for this, although it is gradually ripening. Probably mutton chops at 16d. per lb. (their present price in London) will hasten the ripening process. You can't deal with the gigantic London sewage question on individual grounds and crochets, but, like our great railway parliamentary authorities, you require to manage the matter on a great scale. But Parliament has to consider and defer to public opinion, and that opinion is not at present sufficiently in favour of sewage. There is an absurd horror of the man-fold, but an admiration or tranquil appreciation of the sheep or bullock fold; this prejudice acts as a barrier against sewage utilisation. Such a defence has been paid by Parliament to the public prejudice in this matter that in the Metropolitan Sanitary Company's Act a clause was inserted to prevent the application of sewage within two miles of the River Lea, while on its very banks any farmer may cover the land with ordure or fold sheep or bullocks thickly upon it. When will people believe that human and animal ordure are composed of identical elements? Twenty-eight years of experience with house and animal sewage has taught me that such a barrier is a disease, tapeworm, &c., have no practical value, for during that long period man and beast on my farm, and my own family, have been exceptionally healthy. The earth is the great and only true and cheap deodoriser. A visit to the sewage farms at Barking, Hornchurch, Croydon, &c., would satisfy the most fastidious that farm sewage, much more than ordinary manure, can quickly and safely enter the soil. It is a singular and noteworthy fact that after irrigation with Italian Rye-grass with very strong house sewage and animal sewage mixed, our sheep and lambs can safely graze upon it; not so, however, if we wash in Peruvian guano, for then the animals are unhealthy and die. Why is it so I cannot at present explain. My sewage-irrigated Italian Rye-grass has for some time afforded abundant and excellent food, mowed and passed through the chaff-cutter. It is the only food my farm horses now have. 7. 7. *Melli, May.*

Food for Alderneys.—Would it pay to give dairy cows (Alderneys) 3 lb. of Beans or bean meal a day for six months after calving, in addition to their ordinary food—grain, in summer, and hay, straw, and roots in winter? It seems to me that it could be done for 1s. 9d. or 2s. a-week per cow, with Beans at 5s. to 6s. a bushel; and if the cows would give 2 lb. of butter more per week than they would give without the Beans it would pay. Would they do this? Have Beans an injurious effect upon cows? I have a valuable Alderney, nine years old, and a good milker, and has been very dry since she calved, but twice since she has had them her udder has been quite hard, and one teat would not milk until some thick matter like curd had come away. In your vols., 1865, p. 346, and 1866, p. 1255, palm-nut meal, rape cake, and decorticated cotton seed cake, are highly spoken of. In some experiments given in your vol., 1865, p. 1024, it appears that the best food for Alderney cows would be 1 quart of brewers' grains and 1 lb. of Freeman & Harden's Koye Patent (whatever that may be made of), and that food containing much albuminous and gelatinous matter is better for Channel Island cows than palm-nut meal and other food containing much fatty matter. C. Palmer, *Stewkley Grange, Leighton Buzzard, May 15.* [Bean meal may be most properly given along with succulent food. Do not give food because it contains ingredients which you would continue to find in the produce, meat or milk, which you wish to increase. Give liberating food suited to an animal, and she will increase the amount of her natural produce, whatever that may be.]

Foreign Correspondence.

BERLIN: May 1.—German and English agriculture are at present in much about the same position, being the neglected children of townbred statesmen. The only difference, and no doubt a very decided one, between the two is, that in Germany the landowners themselves are the farmers, whilst in England the monopolising few are either the crops or the money to be borne by them. [Oh!] Since 1813 there is no entailing land, and no difficulty here in transferring it; and there is no gentleman in the empire ashamed of knowing how to handle a plough. They feel something of the old Aryan blood in their veins, these Germans, peers though they be; and know it to be the natural and most noble occupation for any man to grow bread in the sweat of his brow, along with the tending and tennancy system between the large and the small landowners ("gutsbesitzer" and "bauern"), makes people here for something like a listening to complaints but too clearly founded upon hard facts, and still harder cash. Nevertheless, the agricultural interests are in a bad straits, having to contend with a most powerful party—powerful because they have got at the whole of the power. But we will come to this point by-and-by. There is no land letting, and tenancy system in this country, and it is hardly likely that there ever will be; every quality and class of land being freehold, and saleable like a flowerpot, there ought to be no need of such an abnormality.

The bauers, something like English copyholders of old, or fee-simplers that would be, are still numerous everywhere, clustering and working away like bees in a hive. They are the class, according to old Bacon, who are the footstool, or rather the legs, of any State that wants to stand firm; and their sons are the arms, who have disarmed a set of French populace, and to them we must look for their successes. You will no doubt say they ought to feel themselves more comfortable, but the thing is they don't. Profits are at a low ebb in Germany, and taxes food not only the shores but the whole surface of the land. Many of these copyholders, as in England of yore, have had to shut up shop, and are gradually being absorbed by the large landowners, who build sugar refineries and grow Beet-roots, or alcohol distilleries and grow Potatoes; and even they can't carry their way upon their products, having to make up by feeding cattle and sheep with the pulp. That has become the main object, and no doubt it is a good one. Also many capitalists, something like your gentlemen—farming, sporting, scribbling, manufacturers, who can well afford either to look on or to exert themselves in perfecting queer and poor soils, hug a few hundred acres to their estates, and the soil, linen, and astonish the country with gigantic Cauliflowers. But the regular farmers, the small landowners, above all in the provinces with the poorer soils, like Brandenburg and Silesia, are getting thinned. And where do all these work-bo n people go to? Into the army, as professional corporals, or as overseers into the staff of some great baron, or, not the least likely, to America, to set up an acre, and get on splendidly, and never give in.

They are much like the old emigrants, and it is the old story over and over again, of a tree pushing forth its leaves, and of a hard-working country difficult to get on in, still by no means over-populated, pushing off her best sap to make a new one over the seas. These emigrants are like the *Rechen* of the old epics, the wrecked and wretched, the reckless too, such as once upon a time went over to England just as they at present go over to America from the same old reason, and to some of the same old people keep at home, the most energetic go off, and much of the old mother country goes to sleep and vigour and freedom grow up a new-born bud in other climes and countries.

The large landowners and barons do not follow the English system as yet, there is indeed little letting of land to anybody. Mayhap they will stumble upon it by-and-by, just to have the sporting for themselves and leave the labour to some other class as you would not? Some of these German papers point out the thing already, and depict its convenience. The landowners, although naturally conservatives fresh from the pepper-box, are at the same time not unlike the radicals, put-down-taxationists and even anti-militarists. They, of course, won't be long in finding out the expediency of the tenant system to help them to their natural inactivity as lords and lords of the manor; no doubt the system is expedient for a good many purposes, above all for getting capital into the soil. There hardly ever was such an impoverished race as the German nobles—the land, as such, being no better than a boot without a sole to walk on; and they have not even the land, at least not without half a dozen hypothecary plaisters. The tenantry system will be in the end the only means to bring practical agriculture upon anything like a level with the perfection and elevation the mind of the German aristocracy attained long ago. There are about 1000 dozen agricultural colleges all over Germany, the chief being in Halle, Berlin, Jena, Munich, Leipzig, Eldena, where the young inspectors, who intend to serve the large landlords in the way of the practical power, without, however, taking upon themselves anything of the risk, merely enjoying a 10 per cent. tanieme of the nett gains, drink beer, and attain the academic level. These are a bullied and bullying drove, ever aggravated, most servile in the discipline, and most bearing in the other; they take to chemistry and natural economy with that talent for acquiring theoretical knowledge which is so deep-rooted in the German mind, and afterwards find all their fine attainments melt away like sugar in the water of practical difficulties without sweetening it. For why? The putting of theories to practice drains the purses, and hardly ever a man, the individuality of which is like that of a pensive Caran, growing deep into the soil, and leaving the upper regions to those things, rank and gross in nature, Hamlet declaims about in his first monologue.

Now, Jews, no doubt, are a most useful breed to keep you alive in the national comb, but the Germans are like the Polesians, they care little for their toilette as a nation; at least they did not till now, though things may alter. The Jewish gentlemen are allowed to put their fingers in every pie, and to scrape out the plums for themselves; but they are not to be moved; if ever movables were; it is their money that is on the right side of the dish. They of course never think of cultivating for themselves, even so much as an Onion;

all this the men of another, and more industrious race have to do for them, and they look on—sucking the sweatstuf.

In the House of Parliament the great men of that great Manchester party—the national liberals—are all of them Jewish. Even the Socialist party is led on by Jews traditionally, having been founded by one, and continued by another, all of them Israelites staunch against the designs of Goliath. Even the press, even been circumcised, the great bankers paying their literary lieutenants at the elbow of every editor in the land. The Conservatives, who should first of all conserve their country from being overpowered by a set of foreigners, being mostly landowners and noblemen, feel but too keenly of what use the Jews are to them; and so throughout they are *noli me tangere*, and sure not to be nipped in the bud, because they are already advanced far into the flowery state of development, sucking all the sap of a national plant they do not belong to. Royalty itself is like that Pharaoh in Egypt, who took a liking to Joseph for helping him out of a scrape.

Now there is no use for us to be hard upon the Jews certainly; best thing is to leave them alone, even in England. Nevertheless I have heard murmurings more than enough to assure me that by-and-by there will be a row about them.

The agriculturist party are trying to emancipate themselves from them already. Now the Government having determined to create a fund of 230 to 250 millions of dollars for the lasting benefit of the returning invalid soldiers, and of the non-returning soldiers' widows, the landowners in a body, represented by the Berlin Club, have offered aid, and it is sure, which the Government may well accept, alleviating two evils at once, and a remedy. This idea of the Reichsbank is the first step against supremacy of capital, and of the corrupting uses the unscrupulous owners put it to; and the agricultural party sticking to free trade will stand up against the money monopoly, as you did against the land monopoly, having prepared a motion for a universal stamp upon stockbroking and suchlike procreancy at the exchange, and for suppressing usury.

I doubt the Government of the countries but just getting alive to an intensified state of society deals wisely in giving some privileges to the main propeller of life—to money. There are no end of projects,—railway, mining, manufacturing, shipbuilding, and trading, to be gone into in real earnest; there must be exchanging, stockbroking, and even usury to get the money to the right wind and into the best section. As regards the German agriculturists, let there be free trade in mobile capital, but let us have the same rights, and do not make us bear all the heavy loads of an over-exerted country, a state so envious of its power, a bureaucracy so narrow and nervous as that of the Prussian régime, and do not prepare the way for an oligarchy, not of German nobles—no, but of Jewish stockbrokers and usurers. O. B.

Societies.

CHEMICAL.

DR. VOELCKER lately delivered a lecture before this Society "On the Productive Powers of Soils in Relation to the Loss of Plant Food by Drainage," of which the following short account, since slightly corrected, appeared in the *Athenæum*.—The lecturer began by showing the futility of the belief that a soil analysis could be of any use in the agricultural value of land. To those who only imperfectly know the teachings of modern agricultural science, it appears very simple to remedy a deficient soil by finding out, through analysis, the wanting constituents, and then to supply them. But this is not so. Not only is it difficult exactly to analyse a soil, but many other conditions besides the composition of a land are to be observed. There is a great combination in which the chemical constituents of a land are found, the physical condition of the soil, the presence or absence of some matter injurious to the growth of plants,—all these are so many important points upon which soil analysis throws no light whatever. The lecturer equally opposed the views of those who advocate that in a system of rational farming there should be kept up a debtor and creditor account as regards the soil, and that the removals from the soil in the crop grown upon it, and the quantity of fertilising matter restored to it in the shape of manure. The fertility of the soil cannot be maintained, much less increased, if only as much fertilising constituents would be applied to the land as one removes from it in the crops. Dr. Voelcker then discussed the relative values of various mineral salts as manures, quoting, in support of his views, the results of the classical field experiments of Lawes and Gilbert; and then led the lecturer to speak of the examination of land-drainage waters. Lawes and Gilbert, throughout a long series of experiments on the growth of Wheat, have experienced a great loss of nitrogen. The amount of nitrogen supplied in the manure was greater than that recovered in the increased produce, even counting the quantity left in the soil. Lawes and Gilbert had expressed the opinion that this nitrogen had been exhaled by the plants, and that possibly some of it might, as Dr. Voelcker believed most of it had, passed into the drains. Care-

ful collection of such drainage-waters and their analysis proved Dr. Voelcker's supposition to be correct. It became clear that in whatever form the nitrogen is applied to the soil, a large proportion of it is carried off, chiefly in the form of nitrates. At all times of the year, but especially during the active period of growth of the crops, nitrates are found in the watery liquid which circulates in the land, whereas ammonia salts are never met with in any appreciable large quantities. It may therefore be assumed that nitrates, if not solely, from the nitrates that the crops build up their nitrogenous organic constituents. Dr. Voelcker's analyses of drainage-waters further showed that potash and phosphoric acid, which certainly are the most important mineral constituents for the plant, are almost entirely retained in the soil; whilst the less important, as lime, or magnesia, or sulphuric acid, pass with greater readiness out of the land.

Farmers' Clubs.

HADDINGTON.

Special Manures.—Mr. S. D. SHIRREFF said:—

There is now greater necessity than ever for the discussion of this subject, from the fact that the supply of pure Peruvian guano is nearly exhausted. In short, it has become so dear, and so scarce, and the quality so varied, that merchants will not guarantee its quality; and at present the great problem to be solved by the combined agency of agricultural chemistry and field practice, is the possibility of producing artificially a manure equal as a fertilizer to the best Peruvian guano. Our agricultural chemists can tell us perfectly, by analysis, the component parts of Peruvian guano, but I am prepared to defy any manufacturer to make it.

Experiments with Manures.—Experiments were made in the Club's field, some time ago, with the view to find the best substitute for it, and also to try the possibility of growing good crops of Swedish Turnips with artificial manure alone. A committee was formed, of which Mr. Hope, Fentonbarns, was convener, and the following series of experiments were agreed upon:—

(1). 12 tons farmyard manure and 4 cwt. Peruvian guano; (2). 6 cwt. Peruvian guano and 2 cwt. dissolved bones; (3). 6 cwt. Peruvian guano and 2 cwt. bone meal; (4). 6 cwt. Peruvian guano and 2 cwt. Bolivian guano; (5). 6 cwt. Peruvian guano. The above experiments were made with more than 6 cwt. Peruvian guano. (1). 6 cwt. Peruvian guano; (2). nitrate of soda and phosphates, same manurial strength as 6 cwt. Peruvian guano; (3). sulphate of ammonia and phosphates, same manurial strength as above; (4). 2 cwt. experiments with ammonia from the three great sources. (4). 3 cwt. Peruvian guano and 5 cwt. Bolivian guano; (5). 3 cwt. Peruvian guano, and 5 cwt. bone meal or dust. 4 and 5 are experiments with ammonia and undissolved phosphates. (6). 3 cwt. Peruvian guano and 5 cwt. dissolved bones, and 5 cwt. Peruvian guano and 5 cwt. bone-ash superphosphates. 6 and 7 are experiments with ammonia and dissolved phosphates. (8). 2½ cwt. nitrate of soda, 2 cwt. dissolved bones, 2 cwt. bone dust, and a cwt. Bolivian guano. 8 is an experiment with ammonia, dissolved, and undissolved phosphates. Each experiment was made on a quarter of an imperial acre, the drills being 27 inches wide.

Mr. Shirreff then submitted a table of results of the above experiments, from which, he said, one thing is distinctly proved—the superiority of farmyard manure and guano, which gives the largest produce over the rotation. Eight cwt. per acre of Peruvian stands second; 3 cwt. Peruvian guano, and 5 cwt. bone meal, third. This is an argument in favour of bone meal, in preference to the best bone-ash superphosphate. But the difficulty lies in this: one manure may be said comparatively to exhaust itself by doing a great deal the first year. For example, No. 7. The experiment with guano and dissolved bone-ash stood first with Turnip crop, even when Turnips are all eaten on the ground. Perhaps an immediate return in the shape of a better Turnip crop is most advantageous to the farm. The difficulty now is to get good real superphosphate. A mineral superphosphate, on many soils, will grow quite as large a crop as a bone one, when the two are mixed. No chemist can detect the proportions, and I think the best plan is to purchase a well manufactured mineral superphosphate, which can be sold at about £4 or £4 10s. per ton, and bone-meal at £8 10s., and mix the two at home. I do not think it profitable for farmers to buy mixtures. • They may do so to save themselves trouble, but I cannot see how any one living in town can prescribe for soils he does not know the texture of. It is just like a doctor prescribing for a patient he did not know, and probably never saw.

The Best Field Manures.—But to turn more particularly to the best special manures to be used as auxiliaries in raising cereal and green crops in East-Lothian. There is no doubt Peruvian guano is the best, and should be the basis of the mixture for every farm. To grow Potatoes on the generality of soils in the county I would prescribe from not less than 15 to 20 tons per acre of farmyard manure, and 2 cwt. Peruvian guano, and 2 cwt. kainit salt. Without farmyard manure, 5 cwt. Peruvian, 5 cwt. bone meal, 5 cwt. rape dust, 5 cwt. coprolite superphosphate, 2 cwt. kainit. Unless after grass which has been particularly well pastured, less manure will not do. I find it, by experience, far more profitable to manure a small portion thoroughly well, than attempt a large acreage with moderate

quantity. You will grow more Potatoes in the small piece. Turnips will grow a large crop with half the manure required for Potatoes—i. e., if the season is favourable. A doubt existed regarding the possibility of growing Swedes without farmyard manure, but this has been proved a fallacy long ago. On land in good condition, 11 cwt. per acre of the mixture I proposed for Potatoes, will grow a fine crop. For the cereal crops, 10 tons of farmyard manure, 2 or 3 cwt. of guano, with the seed is most profitable, although top-dressing with nitrate of soda, or sulphate of ammonia, is very beneficial, but it is often difficult to get a favourable shower to wash it in. For autumn Wheat—2 or 3 cwt. per acre guano, and 1 cwt. of salt. I have found Lawson's phosphoguanos a most admirable mixture for winter Wheat. The best spring top-dressing is a mixture, in equal proportions, of sulphate of ammonia, common salt, and Peruvian guano—4 cwt. per acre. For Barley, Peruvian guano and salt; 3 cwt. Peruvian, and 1 cwt. salt. For hay, 1½ cwt. nitrate of soda, 1½ cwt. of Peruvian. For the last two seasons, we have scarcely been able to trace any effects from the top-dressing; but it has been remarked that the second crop is generally better after Peruvian guano, than nitrate of soda applied alone.

Value of Analysis.—Now, if I was asked by any one who had heard of various applications of artificial manures, "What would you apply instead of Peruvian?" it would prove a puzzle, and agricultural chemists will never find out a substitute unless they are assisted with field experiments on a large scale. One would suppose that a manure very nearly approaching Peruvian guano could be manufactured from a mixture of the best phosphatic guano and sulphate of ammonia. I do not think so. I believe a mixture might be made to yield the same analysis, but the deposit would be exposed to the same atmospheric influences as the Peruvian guano has experienced—in fact, to lie on some arid rock for a thousand years. One thing is, we must be thoroughly careful whatever manure we use, and be certain it is pure. I take samples of all the manures used every year, and have them analysed. This expense is trifling compared to the sum spent, and it must be satisfactory to merchants to hear a good deal of the other side of the picture we need not dwell upon.

Mr. Shirreff read the following extract from a letter which he had received from Professor Anderson, in illustrating several analyses of manures:—

"I agree with you in the opinion that a more systematic occasion should be had to analyse than is at present customary; but I think that some means should be adopted to diminish the number of analyses. To the small farmer who buys one or two of manure, the cost of an analysis made with proper care is a serious addition to his expenditure, while to the large farmer who buys £500 or £1000 worth the cost of even half-a-dozen analyses is a cheap insurance which he acts unwisely in refusing. I am frequently on occasions offered, urged, on farmers the importance of combining for their own advantage, so that ten or twenty individuals around the same railway station should agree to take their manures from the same manufacturer, so that one or two analyses would serve for all; and if to this were added a record of the produce obtained from each manure, the results would, after some years had passed, far more than repay the labour expended on the experiments, and form a valuable contribution to practical agriculture. A few co-operate associations of this kind have been formed, but none of them have fully carried out my plan, which would no doubt involve some trouble; but I think it well deserves a trial. There is another point on which I think farmers ought to agree, and that is, a fair and definite system for valuing manures. hitherto no such system has been adopted, and it does not properly belong, and it is extremely unsatisfactory, because no sooner has a system been established which receives the support of some manufacturers, than others describe it as totally fallacious, and even absurd, and it can never have any effect. I am satisfied that such a plan, having once been established, would soon annihilate half the manufacturers of inferior manures."

Farm Memoranda.

THE PRESENT APPEARANCE OF THE CROPS.

Berkshire, May 17.—The present appearance of the Wheat crop in this neighbourhood is not so satisfactory, the plants being thin, and there is a weakly growth about which is not promising for a good yield. Barley is looking very well in general, and so are Peas and spring Beans. The winter Beans are nearly all destroyed by the severe frost of the past winter. Oats have lost plant from wireworm and other causes. All kinds of vegetation would be much improved if the atmosphere were to become warmer. The upland grass is very bad, Sainfoin pretty good, but the crop of hay will be light. *James Hulbert, Stratley.*

Buckinghamshire, May 16.—The present appearance of the crops in this neighbourhood may be summed up as follows:—Wheat, Barley, and Peas are very thin, even after a second sowing to fill it up; the filling up appears to have done but little or no good—some look thin, and have a weak appearance as well, others look improving, and some look well; take them together, we must have very favourable weather to make an average of them. Barley plants well, and looks well generally, so do Oats. Winter Beans are a regular failure, either

ploughing up or planting with Spring Beans, &c., to fill them up, has been resorted to. Spring Beans are a good plant, and look well. Not much Clover, the seeding failed last spring; what little there is will be generally eaten by sheep, and the land then fallowed. Vetches generally look well, and will give a lot of keeping. Mangels plant well, and the Turnip fallows are all forward and cleanly state. The meadows and grass land look well. *William Smith, Woolston, Blackley Station, Bucks.*

Charnwood Forest, Leicestershire, May 17.—The somewhat ungenial weather of the last ten days has retarded the progress of vegetation, and there have been some sharp frosts, which have cut down the Potatoes and have even injured the Laurustinus in some places. The crops generally, however, appear promising. Wheats are generally in good condition, and Barley and Oats are looking remarkably well. In some places the sowing of Mangels and Potatoes is only just completed, as the rain in April delayed the preparation of the soil; altogether, the agricultural prospects of this district promise fairly. *H.*

East Yorkshire, May 17.—The weather still continues cold and stormy. It is now past the middle of May, and we have only had two warm days. Most Wheat and spring corn are decidedly backward. Wheat is generally a full plant, except in a few places where wireworm has been busy. Spring corn looks very promising, and only wants a nice shower and warmer weather. The seed pastures are very bare; they were badly planted to begin with, and are now completely eaten up. Sheep are very dear, but do not leave so much profit as many might imagine, as the corn crops are paid. The hay crop is likely to be large. Tillage operations are forward. Mangels have been well got in, and the land is ready for Turnips, only waiting for warmer weather. The crop of lambs generally light; very little loss of either ewes or lambs, and stock of all descriptions particularly healthy. Our great want now is genial weather, and then farm prospects would be improved. *Edmond Kiler, Kipling Cotes Farm, Beverly.*

Northamptonshire, May 17.—I cannot give a favourable report respecting the present appearance of the Wheat crop, many fields in this district having gone so lately (especially on the lighter land) and have been mended up with spring Wheat, always an unsatisfactory proceeding. On good Wheat soils the plant looks tolerably well, but the cold wind and frosts of the last ten days have given it a starved appearance. On the 11th we had 4½ of frost, on the 15th 3½, and on this morning (17th) snow fell from 7 to 7.30 A.M., with very cold N.E. wind. Spring corn had been looking remarkably well until the weather changed; it now looks pinched and yellow, and I am afraid we shall again have a very short hay crop, unless the weather comes in moist and forcing. The pastures are going back fast, and keep of every description is scarce. A considerable breadth of Mangel and Kohl Rabi has been got in, and the seed appears to have come up well. *T. Borlase Tibbitts, Barton Sagrave, Kettering.*

North Lincolnshire, May 17.—The late rains and cold weather have made the Wheats upon wet, cold, badly managed soils look very sickly; deep sowed, good land is looking pretty well. Spring corn has gone in well and looks well. Wheats upon light land thinned off a good deal during winter and spring. If it came up on the whole, we have not the prospect of a good crop of the latter grain. *H. A. Saverby, Ayleby, East Grinstead.*

Suffolk, May 16.—The Wheat crop in this neighbourhood is looking much better than we could expect, considering the frost, cold wind, and rain, we have had lately. The Barley crop, up to a fortnight since, had looked remarkably well, but owing to the great quantity of rain it has gone back very much; it now looks as badly as we have ever seen it, especially on cold, wet lands. Peas are looking middling. Beans look very well, independent of the cold weather. Clovers have the appearance of being a fair crop, grass the same. Barley, however, has not been so good and looking splendidly. *Samuel G. Stearn, Brandston, Wickham Market.*

Wiltshire, May 16.—The appearance of the growing Wheat is for the most part satisfactory, though almost every farmer has a field which has lost plant, either from the effect of the severe frost or from grub or wireworm. Our spring tillages have on the whole been favourable; the corn has come up regularly, and judging from present appearances I think we may reasonably hope for an average harvest. Our rick-yards will be more generally emptied both of hay and corn before another harvest, than I ever remember in any previous year. *F. H. B.*

Wiltshire: Ouse and Dorset District, near York.—Wheat variable, but strong soils, and this is thin in many instances deficient, and the blade spindles up too much to indicate a full crop. On the lighter soils the prospects are more favourable, and, with warm and dry weather, it will do well. Spring corn of all kinds was well planted, the land very healthy, in consequence of the action of frost; growth has been regular, and until lately the appearance most favourable; the prevalence of cold easterly winds for the last few days, however, has caused a check, and in some instances Barley looks yellow and starved—fine warm weather would put all

right, and to this date the prospects are good. Beans and Peas have a clean healthy appearance, the leaves unusually large. Weeds have grown at a great rate, especially in the thin Wheat, and labour being unusually scarce, it will be difficult to keep them down properly. A large breadth of Potatoes have been planted, the earlier ones being aboveground. Mangels, owing to their having succeeded well in the two last years, are again coming into favour; no Swedes in yet, the end of May or beginning of June being considered sufficiently early. Pastures particularly good. *7. C.*

THE RECLAMATION OF WASTE LANDS.—From the report of a recent meeting in Dublin to consider a Bill on this subject prepared by Mr. Morley, M.P., we extract an account by one of the speakers, Mr. Brooks. It had been often objected that deep bog could not be reclaimed, and would not pay the cost, even if it were; that the mountain land was useful at present for grazing purposes; that cutaway bogs were generally reclaimed voluntarily, and that bogs containing turf would, if reclaimed, be a loss instead of a gain; because by this means the people would be deprived of fuel to a large extent. These objections, however, had been as often answered, they had been started, and the one which he would now refer to was that which disputed the practicability of reclamation. He observed closely himself, and had spoken much with those who were acquainted with the subject throughout the country, and had no hesitation in saying that the project was perfectly feasible. At Boree, in the Queen's County, a gentleman had over 100 acres of prime green grazing land, which was nothing before the peat bog. At another place, where the turf was 60 feet deep, something like 200 acres had been reclaimed, 20 years ago, and had remained in grass ever since, after two or three green crops having been taken off it, which, he had heard, were the finest that could be wished for. In another district, about 105 years ago, there had been reclaimed by the father of a nobleman down the country, to the extent of 60 or 80 acres, a quantity of shaling bog, which had now for more than a century remained in good land. The difficulties in reclaiming that were something extraordinary. He was told that the place was so utterly wet and soft that scarcely a snipe could live in it, and that it was quite impossible for any man to walk through it. Yet with same stratagem it had been drained, and was now in meadow, as he had described, after the green crops of the first few years had been removed. The Hon. Mr. French had also referred to the same facts, and he had certainly added that the place, though still green, was not now good for much; and he only mentioned the circumstance to show the entire possibility of reclamation, even of the wettest red bog. The next question, was, could it be done at such a cost as to make it a payable speculation. On this point he did not mean to say but that there were great difficulties in many instances to be encountered; but if the lands were divided amongst the people, and the right was ensured to them, they would, if once brought to give their hearts to the work, readily overcome obstacles in this respect, when convinced of the gain it would be to themselves and to their children after them.—Mr. Morley's desire was to obtain, after the waste lands had been reclaimed, a division of those lands into small farms, not less than 10 acres, and not exceeding 100 acres, to be sold or let on long leases to the peasantry and tenant-farmers, who would soon become, ultimately, a hereditary peasant proprietary. These objects were sought to be accomplished by a Board of Reclamation formed in Dublin, with power to purchase and take all waste lands capable of profitable reclamation, at their present actual value. The waste lands included in the Bill comprised all mountain and other bog land, and all cutaway bog land, which shall not have been thoroughly drained and rendered fit for profitable cultivation; all wet lands, or lands lying wholly or partly under water, and which are incapable of profitable cultivation for want of draining; all moorlands, common fields, or commons, and uncultivated or only partially cultivated lands; all lands which are partially or periodically covered by water, and which, by the lowering of such water, would be left dry. All owners, whatever may be the estates and interests, are entrusted with the duty to sell to the Board, at any time to purchase the fee-simple under conditions intended to ensure proper cultivation. Provision is made for loans by the board to intending purchasers to the amount of two-thirds of the purchase money, to be repayable by way of annuity within 21 or other specified number of years. They all knew how small

farms and independent properties were still, as they ever have been, objects of passionate desire to the Irish farmer and peasant, and it was believed that many thousands of such farms may, by these operations, be created out of the acres of waste which were now profitless to the people.

Miscellaneous.

FIRE INSURANCE OF FARM STOCK.—I recently addressed a letter to the editor of the *Insurance Record*, on the subject of losses sustained by insurance companies on agricultural property and produce, recently referring to the increase in the number of fires affecting that class of risk; in connection with which I submitted a statement of 100 consecutive fires, recently arranged by my brother and myself, for various London and provincial offices, with their alleged and assumed origins; but believing it to be a subject of sufficient importance to justify my trespassing on your space, in the one consideration of which should not be limited to the insurance of I desire, viz. with your permission, through the medium of your journal, to enlist the attention of those interested in the public well thereto, as deserving the notice of statesmen, merchants, philanthropists, &c.—presenting, as it does, various features of interest to each—in the hope that, the necessity of remedial measures being so apparent, such steps may be taken as may appear best calculated, if not to entirely prevent their recurrence, at least to effect a considerable reduction in their number, and proportionate diminution in the amount of loss. I think that even a cursory inspection of the statement given below will suffice to prove the necessity of devising some plan or organised system of repression, since out of the 100 fires—and those not selected, but taken in the order of their occurrence—to which I have limited at present my examination, no less than 75 may be considered as either wilfully occasioned, or the result of carelessness. I do not propose to trespass unduly on your columns, or I might, when venturing to invite the attention of your correspondents and readers, observe that a majority of the fires under consideration occur on property protected by insurance, and proceed to inquire to what that circumstance is attributable; but I may be permitted to ask if, in one description of risk, only 25 fires out of 100 can be considered as either accidental or unavoidable causes, what would an inquiry into the subject generally educe? I have, however, little doubt it would tend greatly to confirm the results now presented, and prove the necessity of Parliamentary interference.

LOSSES ON FARMING STOCK.

No. of claims.	Cause assigned.	Assessed amount of loss.	Percentage of loss.
		£ s. d.	
42	Incendiarism ..	6828 9 3	37.04168
1	Matches ..	2153 13 0	11.62681
15	Unknown ..	1828 4 0	9.19725
9	Sparks ..	5381 15 0	28.81429
5	Matches ..	2221 17 0	11.92117
13	Natural heating ..	334 12 0	1.81507
3	Smoking ..	217 13 0	1.16566
2	Down draught chimneys ..	117 13 0	0.62843
1	Lightning ..	712 0 0	3.82680
1	Gun-wad ..	7 2 0	0.03851
Total ..		18,434 10 9	99.99996

I am averse to suggesting the adoption of any course affecting the liberties of the people, or to add to the burdens (already far too many) of the poorer classes; but, bearing in mind the immense destruction of valuable property, and but too frequently, what is of still higher importance, the sacrifice of life from year to year, it behoves, I think, every well-wisher of his country earnestly to take a matter of this kind into serious consideration; and I may, in addition, remark that I have long entertained the opinion, based on the practical experience of several years, that if it was generally known that in every case when a fire occurred a judicial inquiry might follow, to be conducted by an officer specially appointed for that duty, or by the coroner for the district in which it happened, the object in view would be greatly promoted. And I may add that, in 1869, I gave evidence before the Select Committee of the House of Commons on the subject of fire protection, and among their recommendations, as being pertinent to the subject, I may instance the following extracts from their report:—"Your committee, after giving due consideration to this subject, in recommending that the police should take place into every fire, could not prefer the police to the coroner, and to the fire-marshal, mainly because in the courts of those two officers they have a ready-made machinery; and they, such being the case, are averse to the recommendation of the creation of any new offices; and they would recommend the coroner, because the coroner's court is a movable one, and he can constitute his court and conduct the inquiry in the immediate vicinity of the fire, and because till of late he was generally considered to have the power of inquiry into fires, and such power was exercised by some coroners. Your committee would recommend that he should be paid for conducting the inquiry, partly by fees and partly by salary out of the rates. They do not think that the insurance companies should be called upon to pay any part of the expense, as it is not the duty of any private commercial

company to prosecute for a public crime, and besides, the fire may take place on property not insured. And they would specially recommend that no claim should be settled by any insurance company without a certificate from the police, or fire brigade, or officer appointed to conduct the investigation into the origin of the fire; but this certificate should not bear the insurance offices from opposing the claim if they think proper." Trusting that the importance of the subject will be deemed a sufficient apology for submitting it to your notice, and believing that if public attention is directed to its consideration, important and practical benefits will ensue, I am, &c., Francis White, 262, Kennington Road, Lambeth, S.E., January 21, in the "Journal of the Society of Arts."

The Week's Work.

MAY 20.—*Whitsunday Term* is observed in Scotland, corresponding to Lady Day in England. Unmarried farm servants renew their engagements—a few by the year, but the vast majority for only six months, &c., from Whitsunday to Martinmas. Married servants generally reside on the farm, and are engaged by the year, mostly about Candlemas, or shortly after, so as to enable them to arrange about their gardens and Potato ground.

Whitsunday Farm Entries are to the homestead, Turnip, and pasture lands on the term day, and to the lands under corn and hay at the separation of the crop from the ground. The incoming tenant has the right to sow grass seeds and work the fallow land for green crop, but he more commonly pays the outgoing tenant for doing the latter, and sometimes the former. The tillages on most estates in Scotland belong to the landlord, he having purchased them of the outgoing tenant purposely to hand them over to the incoming tenant free of direct charge, so as indirectly to get an increase of rent—less capital being required to stock the farm. The manure on the farm invariably belongs to the incoming tenant, or, in some cases, sometimes the growing crops, including hay—generally Ryegrass and Clover—but corn and hay crops are not infrequently sold. Sometimes the straw of the away-going crop belongs to the landlord, who hands it over to the incoming tenant free of charge, in which case the outgoing tenant retains possession of the stackyard and corn-barn, he being bound to thresh out the straw as his successor requires it, or arrange with him to do the threshing. In other cases the straw is sold to the incoming tenant, and there is considerable diversity in the county customs of the North.

Sweat Sowing proceeds from the beginning to near the end of the month. The season, so far as gone, is favourable, and to get the crop well in is a great thing. In the northern counties, including part of England and the whole of Scotland, the crop is a valuable one, and no pains should be spared in its cultivation. In the South of England, it is not so much valued. Kohl Rabi as the weeds is a slow-growing plant in the early stage of growth, and rather subject to mildew at an after period, successful growth depends mainly upon a fair start with a suitable supply of food below, including air and moisture. The land is generally manured at the time of sowing, from 15 to 20 tons of farmyard manure being applied, with from 2½ to 3½ cwt. of superphosphate, and the same weight of salt and potash, sown over the farmyard manure. The latter should be put in with the sap, and, if naturally deficient, water the dunghill as directed for Kohl Rabi last week, or the artificial fertilisers may be applied in a liquid form by means of the liquid manure drill. Under the former practice, river or pond water should be applied along with the seed by means of the liquid manure drill in dry weather. With less farmyard manure than is stated above, the difference should be made up with Peruvian guano or its equivalent artificial fertiliser. Farmyard manure should be covered close up to the spreading, and "down below the weather," as it is sometimes termed, and the drills or stiches well rolled down. In favourable weather, 3 lb. of seed will sow an acre, but in dry weather it is better to sow 4 lb., and even more, if the fly is dreaded, and thin them out in time to prevent "spindling," and this applies to cold blasting weather such as was experienced last week.

Water Meadow and Sewage Grass should now be forward, affording a daily supply for soiling or folding; we much prefer the former. From what we have seen this year for April, the yield for the current month should not be less than from 10 to 12 tons per acre after town sewage, the bundles now being sold in the metropolis being long and heavy, and of a quality, when the winter is not very long and hard, and the mixture forms an admirable diet for all sorts of stock at this season; thus proving that if farmers are short of food, they have themselves to blame in ninety-nine cases out of the hundred.

The Health of Live Stock attend to. Farm stock are said to "begin their new year with the grass," and the old maxim still applies; however improved may be the modern system of stock management, as compared with the past, with all the advances recently made relative to pulped roots, chaff, &c., the change from winter food to summer food, although less, is still great. The young grasses during this month have a powerful medicinal effect on the system, and although generally favourable, there are exceptions to the contrary, and

these will this year be more numerous than usual owing to the peculiarities of the past winter, the coldness of the weather, and the luxuriant growth of grass. The temperature, too, is unusually changeable, so that cattle which have put off their winter coats in warm stalls will be liable to suffer. In such cases it is not always the most robust constitution that stands the change the best, the contrary being as frequently the rule. When individuals separate themselves from the herd or flock and otherwise exhibit unfavourable symptoms, exercise, with the free use of the curry-comb, to open the pores of the skin of the ox, and rubbing the sheep, if applied in time, will sometimes set the stagnant circulation in motion, and thus restore health. In bad cases house during the night so long as the cold prevails.

Early Lambs.—From the beginning to the close of the month Dorset ewes are served with Sussex Down or Hampshire Down rams for early lambs. The ewes in many cases are bought in purposely for a single crop of lambs—the practice being technically termed "lamb and dam fattening"—the ewes and the lambs being sent to the shambles together. Sussex and Hampshire Down ewes are also timed for early lambing, but the horned Dorset is generally preferred for a single crop of lambs. In Scotland a similar practice prevails of buying-in during autumn "crock" or draught ewes—Blackfaced and Cheviot—and serving them with Leicester rams, so that the ewes with their followers shall be ripe for the shambles in May, so many being draughted out weekly as they are ready. Ewes that do not fatten readily are fattened after their lambs are sold. Sheep fattening on the arable farms of the North is deservedly on the increase. A few years back you might have travelled across the length and breadth of the lowlands without seeing a single sheep on the pastures, save those that were to be slaughtered for the farmer's own table; but now they begin to enter into rivalry with black cattle, as in the South, grass parks and pastures being stocked with sheep for fattening—other aged Blackfaced and Cheviot from the breeding districts of the North, or Downs and Long-wools from the Southern markets—and the practice commends itself. *W. B.*

Notices to Correspondents.

ALDERNEY. *W. P.* asks any of our readers to tell him whether a black or blackish tongue is a proof of breeding in an Alderney or Jersey cow.

Markets.

ENGLISH WOOL.

The demand has continued good, and manufacturers having in many cases succeeded in obtaining an advance on their goods, are willing to operate more freely. A large business, however, is interfered with by the poor selection and small quantities remaining on offer, which induces buyers where practicable to defer their purchases till the new clip.

HOPS.

BOROUGH MARKET, May 13.

The market is very quiet; buyers are reluctant to give any advance on recent prices. The stock of Kent and Sussex Hops offering is limited.

MARK LANE.

MONDAY, May 15.

There was a short supply of English Wheat to this morning's market, which was sold at an advance of 1s. per qr. upon the prices of this day's night. The attendance was not large. American was realised at 1s. per qr. more money; other descriptions of foreign were unchanged in value. Barley, Beans, and Peas brought last week's rates. Oats were 1s. per qr. cheaper. Flour met with but little inquiry.

PRICE PER IMPERIAL QUARTER.	s. d.	s. d.
WHEAT, Essex, Kent, Suffolk, White 47-50	Red .. 55-60	Red .. 55-60
— fine selected runs .. do. 59-61	Red .. 60-62	Red .. 60-62
— Talavera .. do. 62-66	Red .. 60-62	Red .. 60-62
— Norfolk .. do. 62-66	Red .. 60-62	Red .. 60-62
— Foreign .. do. 48-65	Red .. 60-62	Red .. 60-62
BARLEY, grind & dist. 30 to 34s. Chevi. 43-48	Malt .. 36-41	Malt .. 36-41
— Foreign .. grinding and distilling 29-33	Malt .. 35-43	Malt .. 35-43
OATS, Essex and Suffolk .. 26-28	Feed .. 25-28	Feed .. 25-28
— Scotch and Lincolnshire .. Potatoes 28-30	Feed .. 25-28	Feed .. 25-28
— Irish .. Potatoes 27-29	Feed .. 25-28	Feed .. 25-28
— Foreign .. Poland and Brew 28-32	Feed .. 25-28	Feed .. 25-28
RYE .. 33-36	Foreign .. 33-36	Foreign .. 33-36
RYE-MEAL, Foreign .. 33-36	Foreign .. 33-36	Foreign .. 33-36
BEANS, Mazagan .. 37s. to 47s. Tick 49-50	Harrow .. 49-50	Harrow .. 49-50
— Pigeon .. 51s. to 59s. Winds .. Longpod .. 49-50	Longpod .. 49-50	Longpod .. 49-50
— Foreign .. Small 45-47 Egyptian 42-44	Small 45-47	Small 45-47
PEAS, White, Essex and Suffolk .. 40-42	Suffolk .. 40-42	Suffolk .. 40-42
— Maple, 40s. to 44s. Foreign 36-40	Foreign .. 36-40	Foreign .. 36-40
MAIZE .. 33-36	Foreign .. 33-36	Foreign .. 33-36
FLOUR, 48 marks, 49s. per sack .. 48-50	Foreign .. 48-50	Foreign .. 48-50
— ditto .. 48-50	Foreign .. 48-50	Foreign .. 48-50
— Foreign .. per barrel 28-30 per sack .. 48-50	Foreign .. 48-50	Foreign .. 48-50

WEDNESDAY, May 17.

The Corn Exchange to-day was thinly attended by millers, and the business transacted was insignificant. Prices, however, influenced by the cool weather, were well sustained. The show of English Wheat was small, but the arrivals from abroad were good. Trade was not active, but prices ruled firm. Barley sold quietly, at previous rates. Malt was inactive, without change in value. The supply of Oats on sale were large. Transactions were restricted, but prices were not further reduced. Maize was firm, though not active. Beans and

Peas experienced a slow sale, at Monday's currencies. Country Flour was in moderate request, at fully the late advanced prices. Descriptions were rather more sought after, and extreme rates were realised.

ARRIVALS OF GRAIN, &c., INTO LONDON BY WATER CARRIAGE.

	Wheat.	Barley.	Oats.	Flour.
English & Scotch ..	Qrs. 640	Qrs. —	Qrs. —	Sacks. —
Irish ..	—	—	—	160
Foreign ..	13,580	1040	29,100	4790 bbls.
	14,220	1040	29,100	

LIVERPOOL, May 16.—There was a good attendance at market. In Wheat a large consumptive business was transacted, at 1d. per cental advance since mid-day on all descriptions. Flour in better request, at full prices. Beans steady. Oats and Oatmeal without change. Indian Corn in good demand, at the recent advance; mixed, 35s.

AVERAGES.

	Wheat.	Barley.	Oats.
April 8 ..	362 7d	368 8d	268 0d
13 ..	37 6	36 5	26 5
22 ..	38 11	37 3	27 9
29 ..	39 7	36 9	27 9
May 5 ..	37 11	37 3	26 11
13 ..	38 7	37 10	26 11
Average ..	38 4	37 0	27 1

METROPOLITAN CATTLE MARKET.

MONDAY, May 15.

The supply of Beasts is about the same as last Monday; there are, however, fewer English, and choicest qualities are quickly disposed of at fully late rates. We have a larger number of English Sheep than last week, and also a few more foreign; there is a good demand, and prices are on the average rather better. Trade is dull for Lambs, and lower prices are submitted to, yet a clearance is not effected. Choice Calves are still scarce and dear. Our foreign supply consists of 1490 Beasts, 16,100 Sheep, 160 Calves, and 15 Pigs; from Scotland there are 184 Beasts; from Norfolk and Suffolk, 1530; and 126 from the Midland and Home Counties.

	s. d. s. d.	s. d. s. d.
Best Scots, Here-fords, &c. ..	5 6 10s 10	Do. Shorn .. 5 8-6 0
Best Shorthorns ..	5 4-5 6	Ewes & 2d quality .. 4 8-5 4
2d quality Beasts ..	3 8-4 8	Do. Shorn .. 4 8-5 4
Best Downs and Half-breeds ..	— — —	Lambs .. 3 8-6 0
Do. Shorn ..	6 4 6 6	Calves .. 3 8-6 0
Beasts, 3330; Sheep and Lambs, 32,100; Calves, 170; Pigs, 155.		Pigs .. 3 4-4 8

THURSDAY, May 18.

We have a few more Beasts than on Thursday last, yet the number is small, especially of choice qualities; prices are about the same as on Monday, with a ready sale. The supply both of English and foreign Sheep is rather larger; prices are not quite so high as on Monday, yet there is a fair demand. The trade is dull for Lambs, at about Monday's quotations. Choice Calves are again scarce, and consequently no lower; inferior qualities are plentiful, and are with difficulty cleared off. Our foreign supply consists of 70 Beasts, 5000 Sheep, 315 Calves, and 10 Pigs.

	s. d. s. d.	s. d. s. d.
Best Scots, Here-fords, &c. ..	5 6 10s 10	Do. Shorn .. 5 6-5 10
Best Shorthorns ..	5 4-5 6	Ewes & 2d quality .. 4 8-5 4
2d quality Beasts ..	3 8-4 8	Do. Shorn .. 4 8-5 4
Best Downs and Half-breeds ..	— — —	Lambs .. 3 8-6 0
Do. Shorn ..	6 0-6 4	Calves .. 3 8-6 0
Beasts, 5300; Sheep and Lambs, 15,080; Calves, 385; Pigs, 100.		Pigs .. 3 4-4 8

METROPOLITAN MEAT MARKET, May 18.

Best Fresh Butter ..	15s. per dozen lb.
Second do. ..	13s.
Small Pork, 4s. 6d. to 5s. 4d.; Large Pork, 3s. 4d. to 4s. 2d. per 8 lb.	

HAY.—Per Load of 36 Trusses.

	SMITHFIELD, Thursday, May 18.
Prime Meadow Hay 130s. 103s.	Clover, old .. 130s. 140s.
Superior do. .. 80 110	Inferior do. .. 110 120
New do. .. 100 110	Prime 2d cut do. .. 120 135
Inferior do. .. 30 34	Inferior do. .. 110 120
Straw .. 30 34	Straw .. 30 34

CUMBERLAND MARKET, Thursday, May 18.

Sup. Meadow Hay 134s. 104s.	Inferior Clover .. 110s. 103s.
Superior do. .. 105 128	Prime 2d cut do. .. 120 135
New do. .. 100 110	New do. .. 100 110
Inferior do. .. 30 34	Straw .. 30 34
Superior Clover .. 138 147	Straw .. 30 34

SEED MARKET.

The seed trade continues in the inactive state noted in our last report. A few parcels of American red Clover have changed hands, at a considerable reduction on the rates current during the season; of speculation, however, there has at present been scarcely any. Its Alaska white Clover, nothing whatever is passing. Trefoil seed, in consequence of bad reports of the growing crops, meets with more inquiry. Mustard and Rape are in fair request, at the high prices recently reached. Hemp seed is scarce and dear. Canary seed dull.

JOHN SHAW & SONS, Seed Merchants, 16, Water Lane, London, E.C.



SUTTONS'

HOME-GROWN

FARM SEEDS,

CARRIAGE FREE.

SUTTONS' CHAMPION SWEDE

(Improved),

THE HARDEST SWEDE,
THE HEAVIEST SWEDE,
THE BEST KEEPING SWEDE,

IN CULTIVATION.



Suttons' Improved Champion Swede,

The best in cultivation, as shown by the following unsolicited Testimonials:—

From JONAS PAXTON, Esq., Leicester.
Feb 11, 1871.—"I have won a dozen cups and other prizes for roots, but I never grew anything but your Champion Swede in my life, and I never saw any other so good."

From JAMES LAING, Esq., M.D., Huddersfield.
April 10, 1871.—"None of my friends here have been able to compete with me in the weight or hardness of the Champion Swede, which resisted in a most remarkable way the effects of a frost, which on several nights during last winter was 10 or 12 DEG. BELOW ZERO OF FAHRENHEIT."

From Mr. Geo. TART, Elmstead Green.
Dec 10, 1870.—"I have a first rate piece of Champion Swedes, the best piece in Wivenhoe Parish; they are as round as balls, and as sound as rocks."

From Mr. A. CUNTON, Kentish Lane Farm.
May 10, 1870.—"The Champion Swede is certainly the best I ever grew. I kept them perfectly sound and good until the middle of April this year."

Suttons' Improved Champion Swede,

Price 1s. per lb.; cheaper by the cwt. or bushel.

Other Varieties of Swedes.

SUTTONS' HARDY PURPLE-TOP.
SKIRVING'S LIVERPOOL.
HALLS WESTBURY.
SUTTONS' IMPERIAL PURPLE-TOP.
EAST LOTHIAN.
IMPROVED HARDY WHITE.

Suttons' Turnips for Winter and Spring Use.

Sow in July and August.
SUTTONS' PURPLE-TOP.
YELLOW HYBRID.
HARDY GREEN ROUND.

For Prices, see SUTTONS' FARM SEED LIST.

Special quotations for large quantities.

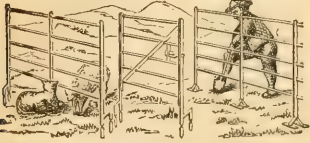
Five per cent. off for cash payments.

All Goods Carriage Free by Rail, except small parcels.

SUTTON AND SONS,
SEEDSMEN TO THE QUEEN, READING, BERKS.

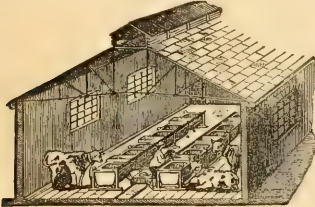
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Cottam's Iron Hurdles, Fencing, and Gates.



COTTAM'S HURDLES are made in the best manner, of superior Wrought Iron, by an improved method. Illustrated Price Lists on application to COTTAM AND CO., Iron Works, 2, Winsley Street, Oxford Street, London, W.

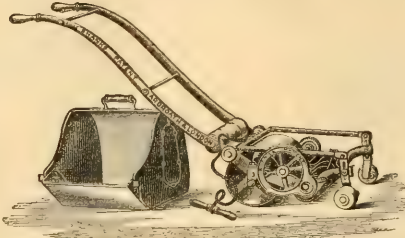
COTTAM'S PATENT PORTABLE UNITED COW FITTINGS



Their advantages are—Portability, not fixtures, removable at pleasure; no Woodwork or Partitions to impede Ventilation or breed Vermin; Hay Rick dispensed with as unnecessary; increased width and depth of Feeding Troughs, Water Fosters, and Patent Drop Cover to prevent overgorging. Cleanly, durable, and impervious to infection, being all of Iron. Price of Fittings per Cow, 55s.

Prospectuses free of COTTAM AND CO., Iron Works, 2, Winsley Street opposite the Pantheon, Oxford Street, London, W., where the above are exhibited, together with several important Improvements in Stable Fittings just secured by Patent.

SHANKS'S IMPROVED LONG GRASS NON-COLLECTING LAWN MOWER FOR 1871.



During the season of 1870 a good deal was written on the desirability of allowing the Grass to remain on the Lawn after having been cut, "for the purpose of acting as a mulch to protect the roots of the Grass from heat or drought." To those Gardeners who still advocate this plan of keeping their Lawns in order, A. S. AND SON beg to intimate that they have succeeded in bringing out a machine which they feel confident will be found to answer the purpose better than any hitherto tried. The Cutter of the Machine is made to cut long Grass; it is fitted with SHANKS'S PATENT DOUBLE-EDGED STEEL SOLE-PLATE. A Grass Box is sent out with each Machine, its use, however, being quite optional. As there is no Roller or other obstruction in front of Cutter, LONG OR WET GRASS can be readily cut with it. At the same time A. S. AND SON wish it to be borne in mind they do not recommend this Machine as the best for an English Lawn, or as a substitute for their "New Patent Lawn Mowers for 1871," particulars of which will be found in separate Advertisement, or sent free on application. These are alone adapted to keep an English Lawn clean, close, and smooth as a piece of velvet, and hitherto this has been the aim of the English Gardener. The long Grass Cutting Machine is only recommended as an excellent and valuable addition to the Lawn Mowers here referred to.

PRICES, DELIVERED FREE AT ANY RAILWAY STATION IN GREAT BRITAIN:

14-inch, £5; 16-inch, £6.

A. SHANKS AND SON,
DENS IRON WORKS, ARBOATH; and 27, LEADENHALL STREET, LONDON, E.C.
Illustrated Circulars, with full particulars, sent free on application.

THE "ARCHIMEDEAN" AMERICAN LAWN MOWER.

The only Lawn Mower that Cuts Wet or Long Grass
(as well as dry) without Clogging,

Leaving the Cuttings in small particles, evenly scattered, never looking untidy, serving as a Mulch to protect the Roots from Heat and Drought, and Fertilising the Sod, which cannot fail to invigorate and beautify the Lawn. Perfectly adapted to SLOPES, UNDULATING LAWNS, RIDGES and VALLEYS; and for the CROQUET GROUND is invaluable.

NOTICE—GREAT REDUCTION IN PRICES FOR 1871.—We have great pleasure in stating that owing to the unprecedented success our "Archimedeian" Lawn Mower met with last year, we have increased our facilities for manufacturing, and notwithstanding that several important improvements have been made in the machine, yet we have made a large Reduction in Prices for 1871.

"Far superior to any of ours."—*Vide The Field.*

"We feel bound to recommend it to our readers as one of the best Mowers we have as yet made acquaintance with."—*Vide Floral World.*

"Remarkably easy to work."—*Vide Gardeners' Magazine.*

"The quickest, most simple, and most efficient Mower ever used."—*Vide Gardeners' Chronicle.*

Numbered Testimonials from the highest authorities in horticulture have been received.

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Wholesale Agent—JOHN G. ROLLINS, American Merchant, Old Swan Wharf, London, E.C.

JOHN WARNER & SONS, HYDRAULIC ENGINEERS,

Bell and Brass Founders to Her Majesty, Manufacturers of Hydraulic Machinery of every description, Wind Engines, Water Wheels, Water Rams, Deep Well Pumps and Frames for Horse or Hand Power, Garden Engines, Swing Barrows, &c., &c. Branch Pipes for Rubber Hose, with Jet and Spreader, or with Haswell's Patent Director, from 3s. 6d. Syringes from 5s., or, fitted with Haswell's Director, 12s. 6d. Lists sent on application.

8, CRESCENT, CRIPPLEGATE,
LONDON, E.C.



FOUNTAIN JETS,
In great variety, from 3s. 6d.



No. 517A.
GARDEN ENGINE.
12 Gallons .. £3 0 0
16 " .. £3 16 0
24 " .. £5 1 0
30 " .. £5 13 0



WARNER'S
AQUAJECT.
Useful for every variety of purpose in watering or washing Flowers or Trees in Gardens, Conservatories, &c.; also for washing Carriages or Windows, laying Dust, &c.
Price complete £1 8 0
Small size for the hand, as ordinary Syringe .. 0 15 0



THE CRYSTAL PALACE
GARDEN or FIRE ENGINE.



No. 35.
CAST-IRON PUMPS.

2½ inches	£1 9 0
3 " "	1 18 0
3½ " "	2 7 0
4 " "	2 15 6



No. 42.
PORTABLE PUMP.
With improved Valves for Liquid Manure, £3 16s. 6d. Two-inch Flexible Rubber Suction Pipe, in 12, 20, and 35 feet lengths, per foot 2s. 5d.



No. 27½—SWING
WATER BARROW.
20 Gallons .. £3 18 0
30 " .. 4 10 0
50 " .. 5 14 0

WINDOW GLASS, SHEET LEAD, PAINTS, &c.**THOMAS MILLINGTON & Co.,**

IMPORTERS AND MANUFACTURERS.

NEW LIST of PRICES for MAY, transmitted or furnished on application.

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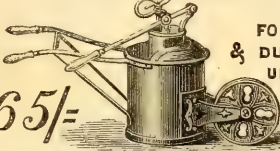
VASES AND FOUNTAINS
FOR THE
GARDEN AND CONSERVATORY.

ILLUSTRATED CATALOGUE, containing Prices and full information concerning FOUNTAINS and VASES, and with 30 large Pages of beautifully Lithographed Designs, Post Free for 6 stamps.

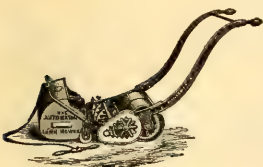
ANDREW HANDYSIDE AND CO.,

Britannia Works, Derby;

LONDON OFFICE:—32, WALBROOK.

**BAMFORD'S "MODEL" GARDEN ENGINE,**FOR STRENGTH
& DURABILITY
UNEQUALLED.**65/-**PRICE LISTS & TESTIMONIALS SENT POST FREE
BAMFORD & SONS, UTTOXETER,**THE "AUTOMATON" LAWN MOWERS,**

THE BEST, SIMPLEST, AND MOST DURABLE MACHINES.



They leave no ribs in the Grass, and are unsurpassed for keeping a Lawn or Croquet Ground in first-rate order.

They will either Collect the Cut Grass in the box according to the approved English method, or leave it on the lawn, by taking the box off.

They are fitted with the best wheel gearing, the best steel-edged knives, and hardened steel pivots and bearings.

5000 are now in use.

Sizes from 8 to 20 inches. Prices from 55s.

Carriage paid to all the principal Railway Stations in England.

They are warranted to give satisfaction, and a month's trial is allowed.

ORDERS EXECUTED ON RECEIPT.

ILLUSTRATED LISTS Free by Post, and TESTIMONIALS from THIRTY ENGLISH COUNTIES. Also,

NEW AND IMPROVED GARDEN ROLLERS.

RANSOMES, SIMS, AND HEAD, IPSWICH.

THE STEAM-ENGINE TRIALS

-OF THE

ROYAL AGRICULTURAL SOCIETY of ENGLAND, OXFORD, 1870.The FIRST PRIZES at this SHOW were again AWARDED to CLAYTON and SHUTTLEWORTH, viz.:—
First Prize for Horizontal Fixed Engine of 10 H.P.; First Prize for Steam Engine, with Boiler combined.At the previous Trials of Steam Engines, at Bury, 1867, CLAYTON and SHUTTLEWORTH took ALL THE FIRST PRIZES for ENGINES; also a PRIZE of £45 for TRESHING MACHINES, and the Society's SILVER MEDAL.
CLAYTON and SHUTTLEWORTH have received FIRST PRIZES at all Trials of the Royal Agricultural Society of England at which they have competed since 1849. N.B.—All the principal Makers of Portable Engines, &c., Compete for this Society's Prizes, being the only Trials in Great Britain conducted by competent and impartial Engineers, and where the capability and value of each Engine is thoroughly tested by practical experiments. C. AND S. therefore do not Compete at any other Shows.**PORTABLE ENGINES, from 4 to 25-Horse Power.****TRESHING MACHINES, Single, Double and Treble Blast, with Patent Rolled Steel Beater Plates, and all other recent improvements.****GRINDING MILLS, SAW BENCHES, STRAW ELEVATORS, &c.**

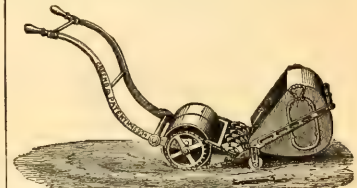
CATALOGUES ON APPLICATION, OR FREE BY POST.

CLAYTON and SHUTTLEWORTH, STAMP END WORKS, LINCOLN;

78, LOMBARD STREET, LONDON, E.C.; and TARLETON STREET, LIVERPOOL.

Great Reduction in Prices for 1871,**GREEN'S PATENT SILENS MESSORS**OR
NOISELESS LAWN MOWING, ROLLING
AND COLLECTING MACHINES.

During the last few years our Machines have been submitted to numerous practical tests, and found to possess all the advantages in working and keeping a Lawn in the greatest possible state of perfection. We therefore have no alterations to report, as they are unnecessary.



The above Machines have carried off every Prize that has been given in all cases of competition.

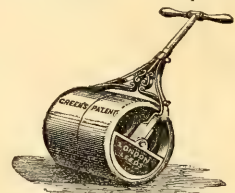
They are warranted to be superior to any others. We guarantee them to give entire satisfaction, otherwise they can be returned, free of cost to the purchaser. With the increased facilities we possess for the Manufacture of Lawn Mowers, we are enabled to Sell them at a reduced rate on former years, as will be seen from the following Scale of Prices:—

To cut 8 inches ..	Price £2 10 0	
.. 10 .. ..	.. 3 0 0	Can be worked by one person.
.. 12 .. ..	.. 4 0 0	
.. 14 .. ..	.. 5 0 0	
.. 16 .. ..	.. 6 0 0	This can be worked by one person on an even Lawn.
.. 18 .. ..	.. 7 0 0	By Man and Boy.
.. 20 .. ..	.. 7 10 0	
.. 22 .. ..	.. 8 0 0	
.. 24 .. ..	.. 8 10 0	

T. GREEN & SON have pleasure in announcing that the demand for their Lawn Mowers this season far exceeds all previous ones, and from this fact they are led to believe that the machines of their manufacture are held higher in the estimation of the public than ever.

Prices of HORSE, PONY, and DONKEY MACHINES on application.

Repairs executed with efficiency and despatch, both at Leeds and London Establishments.

GREEN'S IMPROVED PATENT ROLLER,
FOR LAWNS, DRIVES, BOWLING GREENS, CRICKET FIELDS, AND GRAVEL PATHS,
Suitable for Hand or Horse-power.**PRICES of HAND ROLLERS.**

Diameter.	Length.	£	s.	d.	Diameter.	Length.	£	s.	d.
30 in.	32 in.	7	10	0	20 in.	22 in.	3	10	0
24 in.	26 in.	4	10	0	16 in.	17 in.	2	15	0

PRICES of ROLLERS, fitted with Shafts,
Suitable for Pony or Horse-power.

Diameter.	Length.	£	s.	d.	Diameter.	Length.	£	s.	d.
30 in.	32 in.	10	0	0	30 in.	60 in.	15	10	0
30 in.	36 in.	10	15	0	30 in.	72 in.	17	10	0
30 in.	42 in.	11	15	0	30 in.	84 in.	19	10	0
30 in.	48 in.	13	0	0					

These ROLLERS possess many advantages over all others; they are made in two parts, and are free to revolve on the axis, affording greater facility for turning, and the outer edges are rounded off, or turned inwards, thus avoiding the unsightly marks left by other Rollers. They are manufactured of the best materials, and are got up in a manner surpassing any ever yet brought out.

The ROLLERS, 24 by 26 inches, 20 by 22 inches, and 16 by 17 inches, are also made in one part, at a reduced price; and for Rollers of that size, will be found to answer many requirements, as the handle can be reversed to either side of the Roller at pleasure.

PRICES.

24 inches by 26 inches	£4 0 0
20 .. ..	.. 3 10 0
16 .. ..	.. 2 10 0

Delivered Carriage Free to all the principal Railway Stations and Shipping Ports in England, Ireland, and Scotland.

THOMAS GREEN AND SON, Smithfield Iron Works, Leeds; and 54 and 55, Blackfriars Road, London, S.E.

HOT-WATER PIPES, BOILERS, &c., &c., of			
HOT-WATER PIPES, Nos. 6 and 7—per			
yard	2-inch	3-inch	4-inch
FLANGES, No. 12	each	1 0	1 9
T-PIES, No. 33	.. ..	2 0	2 6
WELDS, No. 11	.. ..	1 1	1 1
VALVES .. ..	.. ..	0 0	1 0

The above, nett cash prices, delivered at London, Liverpool, Bristol, or equivalent.

GEORGE ROBINSON, 16, South Wharf, Paddington Basin; and at Dial Iron Works, Stourbridge.

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MELON LIGHTS Each.

6 ft. by 4 ft. Lights, 2 in. thick, unglazed ..	50
" Primed and Glazed with 10oz. Sheet ..	100
" with stout portable Box, not Painted ..	130
" Painted 4or coats, and Handles on Packed ..	180
" Delivered ..	210
" Railway van ..	210
" ..	215

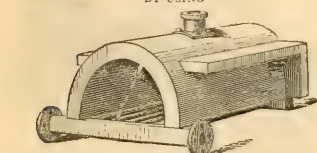
6 ft. by 8 ft., Double Lights, do. 215 0

GREENHOUSES. Per ft. super.

Woodwork only Prepared and Glazed ..	0 0
" Primed and Glazed with 10oz. Sheet ..	0 9
" Delivered, and Fixed with Ironwork ..	0 10
" Painted 4or coats, and Handles on Packed ..	0 12
" Delivered ..	0 13

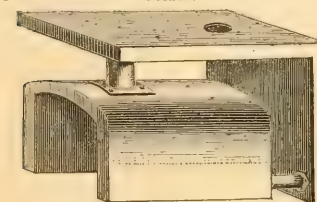
W. H. Lascelles, 100, WATERLOO WORKS, 21, KENYAL ROW, E.C. 4.

Simplicity, Efficiency, and Economy is Secured
BY USING



THE PATENT TERMINAL SADDLE BOILER.
It is easily set, and very powerful. Illustrated Circulars post free.
J. IRELAND, Edward Street, Broughton Lane, Manchester.

JONES'S PATENT "DOUBLE L" SADDLE
BOILER.



These Boilers possess all the advantages of the old Middle Boiler, with the following improvements, viz., the water-space at back and over top of saddle increases the heating surface to such an extent that a "Patent Double L Saddle Boiler" will do about twice the amount of work with the same quantity of fuel; the cost of setting is also considerably reduced, and likewise the space occupied; at the same time these boilers are simple in construction, and, being made of wrought iron, are not liable to crack. They are made of the following

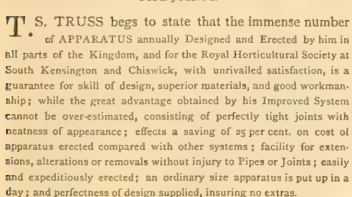
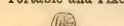
SIZES.			To heat of 4 in Pipe.	Price.
High.	Wide.	Long	Feet.	<i>L. x d.</i>
18 in.	18 in.	21 in.	300	5 0 0
20 "	18 "	24 "	450	5 0 0
20 "	18 "	24 "	600	7 0 0
24 "	24 "	30 "	700	8 0 0
24 "	24 "	30 "	850	10 0 0
24 "	24 "	36 "	1,000	12 0 0
26 "	24 "	36 "	1,050	13 0 0
26 "	30 "	60 "	1,350	20 0 0
30 "	30 "	72 "	2,600	30 0 0
36 "	36 "	96 "	4,500	50 0 0
48 "	48 "	168 "	7,000	75 0 0
48 "	48 "	144 "	10,000	100 0 0

And are kept in Stock and sold only by the Inventors and Patentees,
J. JONES AND SONS, Iron Merchants, 6, Bankside, Southwark,
London, S.E.

Portable and Fixed Hot-water Apparatus

FOR
HEATING CONSERVATORIES,
HOTHOUSES,
CHURCHES, PUBLIC
BUILDINGS, PRIVATE
RESIDENCES, &c.,

WITH
TRUSS'S PATENT UNIVERSAL FLEXIBLE AND LEAKLESS
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BATHS and GAS WORK ERECTED in TOWN or COUNTRY.
The Trade supplied.

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T. S. TRUSS, C.E., Sole Manufacturer,
**Consulting Horticultural Engineer, Iron Merchant, Hot-water
Apparatus Manufacturer, and Horticultural Builder,**
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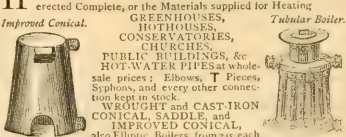
HOTHOUSES for the MILLION.—Medal, 1862.
INVENTED BY THE LATE SIR JOSEPH PAXTON.
Manufactured in London; Ulverstone (Lancashire); Gloucester;
Coventry; Paisley, and Aberdeen, only.



Illustrated Price Lists free. A Pamphlet, with Views of these and other styles of Glasshouses, post free, 3d. Estimates given for Conservatories, &c., to any design in Wood; also for Heating Apparatus.

HEREMAN AND MORTON, Horticultural Builders,
14, Tichborne Street, Regent Quadrant, London, W.

HOT-WATER APPARATUS



Improved and of the strong CAST-IRON TUBULAR BOILERS, with or without Water Bars, from 22 to 64 each.
 of Cast-iron and STEEL TUBULAR BOILERS, on Stand or for use without brickwork, from 600 each.

Portable Boilers. Patent THROTTLE and other VALVES, FURNACE DOORS, BARS, and FURNACE WORKS of every description.

GINIA-RUBBER RINGS for Pipe Joints; Sockets require no other packing, and are perfectly water-tight.

Goods, of the very best manufacture, delivered at Railway or Wharf in London.

LYNCH WHITE,
 Old Barge Iron Wharf, Upper
 Old Barge Street, London E.C. 4, Surrey
 and Blackfriars Bridge, London W.C. 2.

For a list of applications, see page 10.

GRAY'S OVAL TUBULAR BOILER.
INTERNATIONAL EXHIBITION, CLASS IX, NO. 210.

MR. GRAY begs to call the attention of the Nobility, Gentry, Nurserymen, Gardeners, &c., to his
NEW OVAL TUBULAR BOILER.

Acknowledged by practical judges to be a great improvement on every form of Tubular Boiler yet introduced. It has proved itself superior to all other Boilers for quickness of action and economy of Fuel, doing its work with one-third less the amount required by any other.

Extract from Report in GARDENERS' CHRONICLE of International Exhibition, May 24, 1862, page 476.

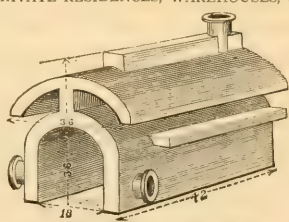
"The upright form of Boiler is usually made on a circular plan, but the oval form given to Mr. GRAY's variety of it is said to be preferable in consequence of its bringing the tubes in closer contact with the fire. The usual form of a furnace being a parallelogram rather than a square, it seems feasible that the Boilers on the oval plan should bring the tubes more completely within range of the burning fuel; and this being so, the change, though a slight one, is no doubt an improvement."

 They are made of all sizes, which, with prices, may be had on application.

JAMES GRAY, HORTICULTURAL WORKS,
DANVER'S STREET, PAULTON'S SQUARE, KING'S ROAD, CHELSEA, S.W.

J. C. & J. S. ELLIS,
HORTICULTURAL ENGINEERS,
NORFOLK FOUNDRY, SHEFFIELD,
MANUFACTURERS and ERECTORS of HOT-WATER APPARATUS

The fire acting directly under the flow pipe, the water begins to circulate immediately.



PATENT DOUBLE-ARCH BOILER

TESTIMONIALS

"DEAR SIR,—After using your Patent Double-Arch Boiler for the past 12 months, I feel me to speak with a practical knowledge of its merits; and I have no hesitation in saying, out of many Boilers of all sizes of construction, that I have never used one so simple and so efficient, and I believe it to be the best Boiler extant; neither do I think there is another that exposes so much surface to the direct action of the fire, its efficiency, economy in fuel, and the minimum of maintenance, I think, renders it the most desirable of all Boilers. It reflects great credit on your good sense in designing it. I shall be glad to show the one I have in use to any person calling at Chatsworth.

I remain, dear Sir, yours truly,
THOMAS GREY.

"DEAR SIR,—Your Patent Double-Arch Boiler, which you have put down for us lately, to heat the whole of our houses, answers admirably. Its heating surface exceeds all others which I am acquainted with. The small amount of fuel required, the way it is set, and the arrangement of the pipes, render it a most complete and economical Boiler I have had to do with.—Believe me, Sir, yours truly,
W. H. BIRD.

"MR. LEO, Norfolk, England, writes, 'I have used your Patent Double-Arch Boiler for the past 12 months, and I have no hesitation in saying, out of many Boilers of all sizes of construction, that I have never used one so simple and so efficient, and I believe it to be the best Boiler extant; neither do I think there is another that exposes so much surface to the direct action of the fire, its efficiency, economy in fuel, and the minimum of maintenance, I think, renders it the most desirable of all Boilers. It reflects great credit on your good sense in designing it. I shall be glad to show the one I have in use to any person calling at Chatsworth.'"

CARSON'S ORIGINAL ANTI-CORROSION PAINT,

PATRONISED BY HER MAJESTY THE QUEEN,
AND SEVEN THOUSAND OF THE NOBILITY AND GENTRY.

IT IS EXTENSIVELY USED AT HOME AND ABROAD FOR ALL KINDS OF

OUT-DOOR WORK,

VIZ.,

IRON, WOOD, BRICK, STONE, COMPO;

And has been proved, after a Practical Test of Seventy Years, to surpass any other Paint.

ALL COLOURS.

The ANTI-CORROSION is LOWER in PRICE, and LASTS TWICE AS LONG as the Best White Lead; at the same time it is economical in application, as ANY PERSON CAN LAY IT ON.

IT IS A POWDER, REQUIRING NEITHER GRINDING NOR TINTING, AND WILL KEEP ANY LENGTH OF TIME.

Prepared Oil Mixture for the Anti-Corrosion.

2 cwt. Free to any Station or Port in the United Kingdom.

Detailed particulars, with PRICES, TESTIMONIALS, and PATTERN CARDS, Post Free on application.

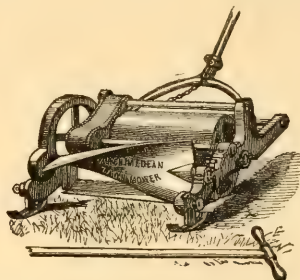
THE ORIGINAL ANTI-CORROSION PAINT IS ONLY TO BE OBTAINED OF

WALTER CARSON AND SONS,
LA BELLE SAUVAGE YARD, LUDGATE HILL, LONDON, E.C.;
and 21, BACHELOR'S WALK, DUBLIN.

THE "ARCHIMEDEAN" LAWN MOWER.

LATEST IMPROVEMENTS.

REDUCED PRICES



FOR 1871.

10-inch, suitable for a Lady or a Boy	...	...	£3 0 0
12-inch, " a Lady or a Boy	...	...	4 0 0
14-inch, " a Man	...	...	5 0 0
16-inch, " a Man	...	...	6 0 0

DELIVERED CARRIAGE FREE TO ALL RAILWAY STATIONS IN THE UNITED KINGDOM.

No Charge for Packing Cases, which are most convenient for storing the Machine during the winter.

THE MOWER IS WARRANTED TO GIVE SATISFACTION,

And if not approved of may be returned within a month and Exchanged for a Machine by any other maker, or the amount will be refunded.

ILLUSTRATED CATALOGUES and TESTIMONIALS Post Free on application.

WALTER CARSON & SONS,
LA BELLE SAUVAGE YARD, LUDGATE HILL, LONDON, E.C.;
and 21, BACHELOR'S WALK, DUBLIN.

AGRICULTURAL GAZETTE.

No. 21.—[1871.] SATURDAY, MAY 27. { Registered at the General Post Office as a Newspaper. } Price 5d. POST FREE, 5 1/2d.

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B. S. WILLIAMS has recently rebuilt and enlarged his PINE HOUSES, and can now offer splendid grown PLANTS of all the best kinds. Prices on application. Victoria and Paradise Nurseries, Upper Holloway, London, N.	
PINES. —The Subscriber can now supply fine clean healthy Pine Plants, both Fruiting and Succession, including the best variety of Smooth Cayenne, Jamaicas and Queens. Terms on application.	
W. THOMSON , Tweed Vineyard, near Galashiels.	
ORCHARD HOUSE TREES , Fruiting in Pots.—Peaches, Nectarines, Plums, Apples, Figs, Apricots, Cherries, Mulberries, and Oranges.	
CHOICE ROSES. —The finest sort of Tea, Noisette, China, and other Roses to select from, all strong and healthy, in Pots. Descriptive Price List on application to RICHARD SMITH, Nurseryman and Seed Merchant, Worcester.	
CHOICE DWARF ROSES , in pots (Tea and Hybrid Perpetual, at per dozen or 100. BEDDING PLANTS—a fine assortment. CATALOGUES free on application. G. DAVIDSON, White Cross Nursery, Hereford.	
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WEBB'S NEW GIANT POLYANTHUS , Florist Flower, and GIANT COWSLIP SEEDS also Plants of all the varieties, with Double PRIMROSES of different colours; Auriculas, both Single and Double; with every sort of Early Spring Flower, on application. Mr. WEBB, Calcut, Reading.	
New Catalogue.	
JOHN H. LEY , Exotic Nursery, Croydon, S.E., will send, free of postage, his NEW CATALOGUE (price very low) of PALMS, FERNS, STOVE PLANTS, &c.	
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M. R. J. FILMER , Temperance Nursery, Acton, W., begs to call attention to his splendid stock of GARDENIAS, in 60 pots, 48s. 3d. and from 1s. 6d. upwards. Use first-class condition. Prices on application. The Trade supplied.	
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ROBERT SMITH will send, post free, for six postage stamps, Part I. (British Ferns) and their varieties, 16 pages, including prices of Hardy Exotic Ferns, of his PRICED DESCRIPTIVE CATALOGUE of BRITISH EXOTIC FERNS, No. 7. Foot's Cray Nursery, Sidcup Hill, Kent.	
WANTED , for cash, or in EXCHANGE for other plants, a few old plants of POINSETTAS, EUPHORIA JACQINTEA, DRACENAS, EUPHURAS. M. J. TOWNSEND, Windmill Bridge, Croydon.	

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JAMES HOLDER'S unrivalled Collection of French, Fancy, and Show varieties is now ready, at the following low prices:—100 plants, distinct sorts, for 50s.; 50 plants for 30s.; or 25 plants, distinct sorts, for 20s., ligger and package included. Crown Nursery, Reading.	
First-class New Geranium, 1871.	
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SILVER CORD (Variegated).—A simple white and green foliage, with great proportion of white, very pure. A striking new variety. Plants now ready, 2s. 6d. each, or 10s. per 100. EDWARD SHENTON, Botanic Nurseries, Biggleswade, Beds.	
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FOR SALE , a large stock of SURPLUS BEDDING PLANTS, including the leading varieties of PELARGONIUMS, CALCEOLARIAS, &c., nearly all autumn-stock. G. THOMSON, 10, Drury Lane, Farnworth.	
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J. SCOTT , Merriott Nurseries, Somerset, has now ready for sending out, his usual extensive stock of the above. The Nineteenth Edition of FLOWER GARDEN, ANNUAL, DIRECTORY and CATALOGUE will be sent prepaid on application.	
STRONG BEDDING PLANTS , by the dozen, 100, or 1000—Golden Lobelias, Gold and Bronze, Silver Variegated, Double, Double Noisette, Gold and Silver Hellebore, Amarantus, Heliotropes, Golden Paeonies (Golden), Iresines, &c.; all in single pots, hardened off, package free. A LIST, with prices, free on application to W. FOTTE, Seedman and Florist, Shinsington, Staplehurst, Kent.	
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CARTER'S New Seed Warehouse, 237 & 238, High Holborn, London.	
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LONDON. As supplied to the Imperial Commissioners, 1867. PARIS, 1867.—LONDON, 1871.	
JAMES CARTER and CO., the Royal Seedsmen, 237 and 238, High Holborn, London, W.C.	
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B. S. WILLIAMS' SPRING CATALOGUE of NEW and RARE PLANTS will be ready in a few days, in which will be found a selection from all the best plants of recent introduction; and in addition, descriptions of some very fine plants, which B. S. W. now offers for the first time. Post free to all applicants. Victoria and Paradise Nurseries, Upper Holloway, N.	
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PETER LAWSON and SON will be glad to forward to the Trade, on application, their NEW Catalogue of Summer Flowering and other Ornamental Plants, which will be found a selection from all the best plants of recent introduction; and in addition, descriptions of some very fine plants, which B. S. W. now offers for the first time. Post free to all applicants. Victoria and Paradise Nurseries, Upper Holloway, N.	
F. and A. SMITH'S SPRING CATALOGUE , containing many NOVELTIES for the present season, is now ready, and may be had on application. The Nurseries, Dulwich, London, S.E.	
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C. J. BLACKBURN and CO. , late BETHAM & CO., 1, Blackfriars, Cox's and Hammond's Quay, Lower Thames Street, London, S.	
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RAYNBIRD, CALDCOTE, BAWTREE, DOWNING and COMPANY (Limited), CORN, SEED, MANURE, and OILMEAL MERCHANTS. 56, Fleet Street, London, E.C. 4, or Basingstoke. Samples and prices post free on application. Royal Medal, 1870, for Wheat; 1869, for "Excellent Seed Corn and Seeds."	
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SPLENDID DIANA —A new best kind, in bloom; CAMELLIAS, fine plants, best sorts; choice RHODODENDRONS, named kinds, fine and bushy, in pots. A few RHODODENDRONS of the above to spare. W. JACKSON, Blakedown Nursery, Kidderminster.	
STRONG DRUMHEAD or OX CABBAGE PLANTS , per 100, 25s. per 100. GREEN KOHL RABI, 3s. 6d., and 5s. 6d. per 100. Remittances to accompany orders. CHRISTMAS QUINCE, Seedman, Market Place, Peterborough.	
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GIANT ASPARAGUS PLANTS , the best that money can procure, all certain for 25s. 6d. per 100. This excellent Vegetable does not require half the expense usually incurred in planting it. See RICHARD SMITH'S SEED LIST for 1871. RICHARD SMITH, Nurseryman, Worcester.	

In pieces of about 30 yards each, or any longer lengths when specially ordered. Nett cash in 30 days from date of Invoice.

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WILLIAM BADMAN offers well-rooted Cuttings of
VERBENA—Purple, White, Scarlet, Rose, Crimson, &c., at
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LOBELIA SPECIOSA from cuttings, at 3s. 6d. per 100, 25s. per 1000.
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MADAME LEMOINE, Double Pink, and **TRIOMPHÉ**, Double
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AGERATUM, Imperial Dwarf, from stores, 5s. per 100; in single
 pots, 2s. per dozen.
MIXED BEDDING GERANIUMS, turned out of single pots,
 12s. 6d. per dozen, 12s. per 100.
 Package included. Terms cash. Post-office Order on Gravesend.
 Cemetery Nursery, Gravesend.



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JAMES CARTER AND CO.'S LIST OF BEDDING
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ARCHD. HENDERSON'S
 Descriptive and Priced CATALOGUE OF BEDDING PLANTS is
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AGRICULTURAL SEEDS of
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BEDDING and SELECT SOFT-WOODED PLANTS

IN WHICH, AMONGST MANY OTHERS, WILL BE FOUND DESCRIPTIVE NOTICES
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BOUVARDIA, THE BRIDE and BRIDESMAID.
CANNA MUSÆFOLIA SANGUINEA.
TRICOLOR.
CAL CECILIA, CRIMSON QUEEN.
CHRYSANTHEMUM, BISMARCK and ERECTA SUPREMA.
MYLE PINK, CINDRELLA.
FUCHSIA, six splendid varieties.
LANTANA, three new bedding kinds.
LOBELIA, ten, including new colour and varieties in the punia
 and species sections.
MIMULUS, six splendid varieties in form and colour.
PELARGONIUMS, three new varieties, forming distinct features,
 in Prince of Pelargoniums, Hebe the Beautiful, Lapis-Lazuli.
"IVY-LEAVED VARIETY, REMARKABLE.
"GOLD and SILVER, TRICOLOR, and BRONZE ZONED,
 amongst which are "Edward Richard Benyon," with First-
 class Certificate and 1st Prize in best Golden Tricolors of 1869.
 "Mrs. Greive," with First-class Certificate and 1st Prize as
 best Golden Tricolor of the year, "My Goring," First-class
 Certificate; "Mysterious Night," First-class Certificate.

On receipt of four postage stamps a copy of the CATALOGUE to be sent out.

WELLINGTON NURSERY, ST. JOHN'S WOOD, LONDON, N.W.

ÆTHIOPIA GRANDIFLORA.
AGERATUM, WHITE THUMB.
"WHITE IMPERIAL DWARF.
CHERANTHUS PRÆCOX AUREUS.
NIERBERGIA GRACILIS PICTA.
"FALLIDA.
FANSY, QUEEN OF SCOTS.
"IMPERIAL BLUE PERFECTION.
SPIRÆA (Hortia) JAPONICA AUREA STRIATA.
TRIFOLIUM REPENS AUREA.
THALICTRUM ADAMANTOIDES.
CALADIUM, PRINCESS ALEXANDRINA.
"PRINCE ALBERT EDWARD.
PLEROMA MACRANTHA FLORIBUNDA.
VERBENA—Seven splendid varieties, in which V. Basilisk is a
 grand beauty, fine habit, and of V. Melindres.
 A Coloured Plate of this for six stamps.

A Coloured Plate of this for six stamps.

NEW PLANTS



FOR 1871.

JAMES VEITCH & SONS

BEG TO ANNOUNCE THAT THEY ARE NOW PREPARED TO SEND OUT
 THEIR UNDERMENTIONED SPLENDID NOVELTIES.

ADIANTUM VEITCHII.

(Moore.)

A distinct and fine Fern, introduced by us from Peru.
 It is extremely ornamental, attracting the eye by its rigid character
 and the symmetry of its growth; and we recommend it as a most
 desirable evergreen fern for a warm greenhouse or intermediate stove.
 The young fronds are very beautiful, being of a fine red colour—that
 of the mature fronds being of a pale green.
 The largest pinnae measure about an inch in their longer, and
 half-an-inch in their shorter diameter, and are set upon the plane of
 the fronds.
 The full sized fronds attain an average length of a foot.
 It has been frequently exhibited by us, and received Certificates;
 it is also described in the *Gardeners' Chronicle* of October 17, 1869,
 page 1099.
 Price, per plant, 10s. 6d.

BEGONIA CHELSONI.

(Hort. Veitch.)

This is one of the finest of the flowering Begonias. It is a hybrid,
 raised at this Nursery, between B. Bolivensis and B. Sedeni, both now
 so well known.
 It is very free in growth, and of good habit. The flowers are of a
 bright glossy red colour, and of very large size. The plant continues
 in bloom from May to November.
 As a decorative plant it cannot fail to be most extensively grown,
 and will form an excellent companion to the B. Sedeni sent out by
 us last year.
 It has received First-class Certificates both at the Royal Horti-
 cultural Society's Exhibitions and the Royal Botanic, and we offer it
 now as a decided acquisition.
 Price, per plant, 10s. 6d.

CROTON JOHANNIS.

(syn. C. angustissimus—Hort. Veitch.)

Of all the recent introductions of this very beautiful class of plants
 we consider C. Johannis one of the most elegant and distinct.
 The leaves attain a length of 20 to 25 inches, and are of a glossy green
 colour, the centre and margins being bright orange-yellow.
 The plant is of very graceful habit, and we can with confidence
 promise it to be exceedingly valuable both for dinner-table decoration
 and for exhibition purposes.
 It has been named after the late Mr. J. G. Veitch, by whom it was
 discovered during his visit to the South Sea Islands. Whenever ex-
 hibited it has received First Prizes.
 A very excellent woodcut is given in the *Gardeners' Chronicle*,
 May 15, 1871.
 Price, per plant, 42s.

CROTON MULTICOLOR.

(Hort. Veitch.)

One of the most distinct of the many fine varieties of Croton, found
 by the late Mr. J. G. Veitch in the South Sea Islands.
 The leaves attain a length of 7 to 10 inches, are very irregular in
 shape, with serrated margins, and are of a glossy green colour, the
 centre and margins being bright orange-yellow.
 The young leaves are of a light green, blotched with yellow, but
 turning, with age, on the upper surface into a glossy green, marked
 and irregularly blotched with yellow, reddish yellow, and red, the
 lower surface, the secondary veins being yellowish; the under surface
 being red.
 It has received its name from the great diversity of its colouring.
 Price, per plant, 21s.

CROTON HOOKERII.

(Hort. Veitch.)

Another of the beautiful South Sea Island Crotons brought home by
 the late Mr. J. G. Veitch.
 It forms a handsome compact-growing shrub, with broadly ovate
 lanceolate leaves, abruptly tapering or rounded at the base.
 The upper surface of the foliage is of a beautiful dark shining green,
 broken at the base with a broad blotch of golden yellow, and with
 irregular projections of the same colour running from the midrib
 towards the margin, often being golden-yellow, as are also the
 young stems and leaf stalks.
 The Editors of the *Gardeners' Chronicle*, when describing the whole
 of our Collection of Crotons in 1869, thus speak of Hookeri.
 "This variety is marked much in the same way as the Mikmud
 Hookeri."
 It has been exhibited on various occasions, and has received numerous
 First-class Certificates. Price 42s. each.

DIEFFENBACHIA BOWMANII.

(Hort. Veitch.)

This fine plant was discovered by the late Mr. Bowman during his
 trip to South Brazil, and was described by him as being "as far
 superior to all Dieffenbachia, as Maranta Veitchii is to all the
 Marantas."
 The leaves, which attain an immense size, are of a pleasing light
 green colour, spotted with dark green, or rather black green spots,
 thus giving the plant a very distinct and striking appearance. They
 attain a length of from 2 to 2½ feet, and an average width of 1 foot,
 thus proving it to be a most useful exhibition or decorative plant. It
 has received First-class Certificates both from the Royal Horticultural
 and the Royal Botanic Societies.
 It has given us satisfaction to be able to associate with this fine
 introduction the name of its discoverer, who unfortunately lost his life
 whilst carrying out his researches in South America.
 Price, per plant, 21s.

DRACÆNA DENNISONII.

(Hort. Veitch.)

It affords us great pleasure to be enabled to offer quite another of the
 beautiful dwarf-growing varieties of Dracæna, introduced by us from
 the South Sea Islands.
 It is very dwarf and clothed with leaves from 12 to 15 inches in length,
 by 4 to 5 inches in width, of a very dark bronzy colour. The excellent
 habit and striking colouring of this variety will render it very
 valuable for dinner-table decoration, the bronzy hue being most beau-
 tiful by candle light. It has received First-class Certificates.
 Price, per plant, 42s.

DRACÆNA MAGNIFICA.

(Hort. Veitch.)

This fine plant has been exhibited by us so often that we think it
 unnecessary to give here any lengthened description.
 It is probably the most handsome of the Dracænas brought home
 from the South Sea Islands by our late Mr. J. G. Veitch, and we can
 with confidence promise it to be being far superior to any
 variety which has as yet been introduced.
 It is very free in growth, and the leaves, which have a spiral growth,
 attain a length of 2 to 2½ feet, and a width of 8 to 10 inches.
 They are of a beautiful bronzy pink colour, changing when old into a
 somewhat dark steel-blue, and are very purple.
 This truly magnificent Dracæna has been exhibited by us in Paris,
 Hamburg, and at the leading English Exhibitions, where it has
 obtained first class honours, and was universally acknowledged to be
 well worthy of the name it has received.
 Price, per plant, 42s.

NEPENTHES SEDENII.

(Hort. Veitch.)

This really pretty variety is a cross between an unnamed species
 with deep coloured pitchers, and N. distillatoria. The pitchers are
 produced in great profusion, even on very small plants; they are of
 medium size, the surface being light green, and very densely covered
 with dark red spots. It is of dwarf and very neat habit, and we can
 highly recommend it to all lovers of this beautiful class of plants.
 It was awarded a First-class Certificate at the Royal Horticultural
 Society's Exhibition, June 8, 1870.

Price, per plant, 21s. to 42s., according to size.

PANDANUS VEITCHII.

This magnificent Pandanus was discovered by the late Mr. J. G.
 Veitch during his journey through the South Sea Islands, from
 whence he brought so many beautiful and interesting plants.
 We consider it to be one of the best plants we have ever had the
 pleasure of offering to the public, and can, with confidence, recommend
 it as being very far superior, either as an exhibition plant or for decora-
 tion, to any other Pandanus yet known.
 The leaves are slightly serrated, of a light green colour, beautifully
 striped with broad bands and lines of pure white. They average 2 feet
 in length by 3 inches in width, growing erect from the stem, but
 towards the end gracefully curving, thus giving the plant a most
 elegant appearance, and showing itself to be perfectly distinct in habit
 as well as in colouring.

It has been exhibited at St. Petersburg, Paris, Hamburg, and at
 the leading London and Country exhibitions, where it has always
 received the highest awards and been universally admired.

Good plants, 63s.; extra sized plants, 105s.

RHODODENDRON BROOKII GRACILIS.

This is one of the freest blooming of all the yellow-flowering Bornean
 varieties of Rhododendrons.
 It is quite distinct from the species known as R. Brookii, being much
 more graceful in habit, and flowering more freely. The leaves are
 lighter green, contrasting well with the pale yellow flowers, which are
 of large size, and produced in compact masses of from ten to twelve
 flowers in each.

The plant blooms in quite a young state.
 For the introduction of this fine novelty we are indebted to Mr.
 Thomas Lobb, who sent it to us from Borneo.

Price, per plant, 21s. and 31s. 6d.

TODEA WILKESIANA.

It gives us great pleasure to be now in a position to offer this beau-
 tiful miniature Tree Fern for the first time.
 It is probably the correct description of the fern, we feel we cannot do
 better than refer to the woodcut and description published by Mr.
 Moore, in the *Gardeners' Chronicle* of 12 June 17, 1870, where he says:—
 "The trunk is from 18 to 20 inches high, and 4 inch in diameter,
 crowned at the summit by from 10 to 12 spreading fronds, of a broadly
 lanceolate outline, and 2 feet or upwards in length. The pinnae are
 sessile, oblong lanceolate, spreading. The pinnae are oblong obtuse,
 dentate, and pellucid. Messrs. Veitch's parent plant has already a
 stem of a foot or more in height, and about an inch in diameter, which
 slender tree-like habit gives it quite a distinct aspect among its allies,
 which include some of the most lovely of cultivated Ferns."
 It has been exhibited at the Royal Horticultural Society's Shows
 and received a First-class Certificate.

Price, nice young plants, 21s.; larger ditto, 42s.

A NEW ILLUSTRATED DESCRIPTIVE CATALOGUE

Of the above and many Novelties sent out by other houses will be forwarded free on application.

ROYAL EXOTIC NURSERY, KING'S ROAD, CHELSEA, LONDON, S.W.

LEEDS HORTICULTURAL SOCIETY. — The
EIGHTH ANNUAL SHOW.

L EEDS HORTICULTURAL SOCIETY. — The EIGHTH ANNUAL SHOW will be held in the ROYAL PARK, JUNE 7, 8, and 9. PRIZES, FIVE HUNDRED POUNDS. Every Exhibitor of Plants must give Notice on or before Tuesday, May 30; and of Fruit, Cut Flowers and Vegetables on or before Saturday, June 3.

A limited space will be set apart for Horticultural Erections and Implants, Vases, Pots, and other Garden Requisites. No Erections of any kind will be provided. Application for Space must be made on or before June 3; and all Implants must be on the ground on or before June 6.

NOTE.—The North-Eastern, Great Northern, Midland, Lancashire and Yorkshire, and London and North-Western Railway Companies will convey Plants, Flowers, Fruits, &c., at ordinary rates to the Exhibition, and return them free if they remain the property of the Exhibitor.

The Committee undertake to receive Boxes of Fruit, Cut Flowers, and Vegetables for Exhibition.

The Committee provide Assistants and Horses for Exhibition Vans coming by rail; also covered Spring Vans to convey Plants, &c., between the Railway Station and the Exhibition Grounds.
Schedules, with Forms of Entry, forwarded on application.
JAMES BIRBECK, Secretary, Crossgates, near Leeds.

BRADBURY, EVANS, AND CO., HORTICULTURAL
and AGRICULTURAL STEAM and LETTER-PRESS PRINTERS,
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The PRINTERS of the GARDENERS' CHRONICLE and AGRICULTURAL GAZETTE from its commencement to the present time, and possessed of an experienced Staff well acquainted with the use of Botanical and Scientific terms, Messrs. B. E. & Co. offer extraordinary advantages, only to be met with in a large establishment, for the production of CATALOGUES of SEEDS, PLANTS, TREES, BULBS, IMPLEMENTS, &c., with unusual accuracy and

Despatch, at moderate prices.

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Noteworthy Horticulturists and Botanists.

NOTICE.—A SERIES OF PORTRAITS OF
NOTEWORTHY HORTICULTURISTS AND BOTANISTS
is being published in the "GARDENERS' CHRONICLE AND
LITERARY SUPPLEMENT." The following have already
appeared, and copies may be had on application to the Publisher, viz.
Mr. HOOKER, C.B., F.R.S.; W. WILSON SAUNDERS, F.R.S.; Rev.
M. P. BEKELEY, F.L.S.; M. DECAISNE, G. F. WILSON, F.R.S.; and
Professor REICHENBACH, of Hamburg.

Published by W. RICHARDS, 41, Wellington Street, Covent Garden.

Bath and West of England Society's Show at Guildford.
NOTICE.—The GARDENERS' CHRONICLE and AGRICULTURAL GAZETTE for JUNE 3, will contain a FULL and ILLUSTRATED ACCOUNT of the SHOW.
 Copies may be obtained on Friday morning, June 2, at Messrs. W. H. SMITH & SONS' Bookstall, Guildford; or may be ordered of any Bookseller, price 5d.; free by post, 5½d.
 Published by W. RICHARDS, 41, Wellington Street, Covent Garden.

The Gardeners' Chronicle

SATURDAY, MAY 27, 1871.
MEETING FOR THE ENSUING WEEK.
THURSDAY, JUNE 1.—Linnæan 8 p.m.

WE are pleased to find that a Bill has been introduced into the House of Commons for the substitution of new standards of weights and measures on the METRIC SYSTEM, in lieu of the Imperial weights and measures now the legal standards. The new units will be based upon the original standards now (or lately) in Paris, and will be the "Metre" for length, the "Are" for surface, the "Litre" for capacity, and the "Gram" for weight. The following are the Tables proposed in the Bill:—

Systematic Names.	MEASURE OF LENGTH.	
	Metres.	Value.
Myriametre ..	10,000 ..	10,000 metres.
Kilometre ..	1,000 ..	1,000 metres.
Hectometre ..	100 ..	100 metres.
Decametre ..	10 ..	10 metres.
Metre ..	1 ..	Unit of measure of length.
Decimetre ..	$\frac{1}{10}$..	The tenth of a metre.
Centimetre ..	$\frac{1}{100}$..	The hundredth of a metre.
Millimetre ..	$\frac{1}{1000}$..	The thousandth of a metre.

MEASURE OF SURFACE.			
Square Metres.			
Hectare	..	10,000 ..	100 ares, 10,000 square metres.
Are	..	100 ..	Unit of measure of surface.

Centiare	..	1	..	rooth of the are.
MEAS ^{RE} OF CAPACITY.				
		Cubic		
		Decime res.		
Kilolitre	..	1,000	..	1,000 litres.
Hectolitre	..	100	..	100 litres.
Decalitre	..	10	..	10 litres.
Litre ..	..	1	..	Unit of measure of capacity.
Decilitre	..	.1	..	The roth of a litre.
Centilitre	..	.01	..	The rooth of a litre

MEASURE OF WEIGHT.		
Grams.		
Millier or ton ..	1,000,000 ..	1,000 kilograms, the weight of the cubic metre of water, and of the ton.
Quintal ..	100,000 ..	100 kilograms.
Mutragram ..	10,000 ..	10 kilograms.
Kilogram ..	1,000 ..	1,000 grams.
Hectogram ..	100 ..	100 grams.
Decagram ..	10 ..	10 grams.
Gram ..	1 ..	Unit of weight.
Decigram ..	.1 ..	The tenth of a gram.
Centigram ..	.01 ..	The rooth of a gram.
Milligram ..	.001 ..	The rooth of a gram.

The Bill provides for the supply of the new standards to the judges, magistrates, and other authorities that have the custody of the present standards, and authority to issue copies and models of the same. In the event of the Bill being passed, the new weights and measures will be at once recognised as legal, but a sufficient margin of time will be allowed by the Act to effect the transition, before the use of weights and measures, adjusted according to the new standards, becomes compulsory. The Bill has been brought in by Mr. J. B. SMITH, Sir CHARLES ADDERLEY, Sir THOS. BAZLEY, Mr. GRAVES,

Mr. BAINES, Mr. ALBERT PELL, Mr. MUNTZ, and Mr. DALGLISH. It has the cordial support of the Chambers of Commerce throughout the country.

No one but those practically conversant with the want of system, and thorough complexity of our existing system of weights and measures, can fully realise the trouble, vexation and loss of time involved in the use of our present method, varying as it often does in different counties and districts. The ease and rapidity with which calculations of all kinds can be made on the metric system, and the paramount advantage of having the same principle applied to all weights and measures of whatever kind, afford a striking contrast to our own muddle. Of course, some little difficulty will be experienced in familiarising those long accustomed to the old method with the new system, which we may remark is in almost universal use in all European countries except our own; time will, however, remedy this, and our children will learn the new system with far greater ease than they do the present one.

The unit in the case of measures of length is the metre (we purposely omit the French accents), which may possibly be Anglicised into meter, and which is slightly longer than our present yard. The unit of surface measure is the are, which is equal to 100 square metres. The litre, rather more than one pint and a half, is the unit for measures of capacity. The gram is the unit of weight, and is about equal to $\frac{1}{15\frac{1}{2}}$ grains. These units are multiplied by or divided by ten; thus a decametre = ten metres, a hectometre is 100 metres, a kilometre 1000 metres, a myriametre is 10,000 metres; while, on the other hand, a decimetre is the tenth part of a metre, a centimetre the hundredth part, and a millimetre the thousandth part of a metre; and so in the case of the are and the litre. The main difficulty with beginners will be to understand the prefixes. For purposes of multiplication the Greek words *deca*, *ten*, *hecto*, a hundred, *kilo*, a thousand, *myrio*, ten thousand, are prefixed to the metre, are, or litre, respectively; and for purposes of division the latin words *deci*, *ten*, *centi*, a hundred, *milli*, a thousand, are prefixed. These words once known, all the rest is simple enough; it is a mere case of multiplying or dividing by ten; once adopted, there will no longer be any complexity between pounds avoirdupois and pounds troy. A stone, which in some cases is 14 lbs. and in others something else, will no longer puzzle the uninitiated. A definite relation instead of our absurd system of making, say, a stone equal 14 lbs., a quarter (twice 14) 28 lbs., a hundredweight 112 lbs., and a ton 20 hundredweight; or say, reckoning 3 barleycorns to an inch, 4 inches to a hand, 7.9 inches to a link, 9 inches to a span, 12 inches to a foot, 3 feet to a yard, $\frac{5}{8}$ yards to a pole, 22 yards to a chain, and so on. In place of all this we have a definite, unvarying multiplication or subdivision by ten.

Some objections have been raised to the difficulty of dividing equally a number like ten; but practically this difficulty is not felt. Every visitor to the Continent knows that the franc contains 100 centimes, for instance, and is familiar with the 1f. 25c., 1f. 50c., or 1f. 75c., according as a franc and a quarter, a half, or three quarters are intended. So in the case of the metre, the visitor soon gets accustomed to 1.25, 1.50, 1.75, indicating 1 metre 25, 50, or 75 centimes, as the case may be. It is rarely in ordinary usage that it is necessary to use all the measures spoken of in France the metre and its centimetre are the commonest terms used in the case of length, the kilogram in the case of weight. To aid in the comprehension and rapid conversion of metric tables to those now used in England, we published some years since a series of conversion tables, which are very handy for reference, and which can be had on a single sheet on application to our publisher, by enclosing three penny stamps.

Some day we hope to find our present equally absurd thermometric scale brought into accordance with the Centigrade scale used on the Continent. The main difficulties about its adoption are the largeness of the degrees; but this is a difficulty easily overcome by subdividing the scale and adopting the proposal of the late Mr. R. THOMPSON of calling the subdivisions grads; thus 50 degrees might be read as 100 grads, and so on. Among chemists and scientific men gene-

rally the metrical system is now in general use in all European countries, and there is no good reason why the mass of the community should be debarred from the facilities now enjoyed by the men of science. We trust that the Bill will become law, and fully believe that all the difficulties and objections, some real, others fancied, will be overcome gradually, but thoroughly, and that in no very long space of time. What our Continental friends can do in this matter surely we can do also.

— THE following arrangements for exhibiting manufactures, and selected works of fine and industrial art and new inventions, in each of the nine EXHIBITIONS to follow the present one of 1871, have been published:—

1872.—Cotton. Jewellery. Musical Instruments. Acoustical Instruments, with Experiments. Paper, Stationery, and Printing: a. Paper, Card, and Millboard; b. Engraving, Lithography, and other modes of Printing. Machinery for the Group. Raw materials for all the above-mentioned objects.

Any modifications in the classes for the year 1873, or the following years, will be duly announced.

1873.—Silk and Velvet. Steel, Cutlery, and Edge Tools.—Cotton Manufactures. c. Cutlery and Edge Tools. Surgical Instruments and Appliances. Carriages not connected with Rail or Tram Roads. Substances used as food: a. Agricultural Products; b. Dye-stuffs, Groceries, Preparations of Food; c. Wines, Spirits, Beer and other drinks, and Tobacco. d. Implements for drinking and use of Tobacco of all kinds. e. Cooking and its Science. Machinery for the group. Raw materials for all the above-mentioned objects.

1874.—Lace, hand and machine made. Civil Engineering.—Lace, and Building Contrivances, and Tests. Civil Engineering, and Building Construction; b. Sanitary Apparatus, and Constructions; c. Cement and Plaster work, &c. Leather, including Saddlery and Harness: a. Leather, and manufactures of Leather; b. Saddlery, Harness. Artificial Illumination by all Methods, Gas, and Electricity. Manufacturing Bookbinding. Tools and Machinery in general for the group. Raw materials used for all the above-mentioned objects.

1875.—Woven, Spun, Feltsed, and Laid Fabrics (when shown as specimens of Printing or Dyeing). Horological Instruments. Brass and Iron Manufactures, and Hydraulics and Experiments. Supply of Water. Machinery in general for the group. Raw materials used for all the above-mentioned objects.

1876.—Works in Precious Metals and their imitations. Photographic Apparatus and Photography. Skins, Fur, Feathers, and Hair. Agricultural Machinery and results. Philosophical Instruments, and Processes depending upon their use. Uses of Electricity. Machinery in general for the group. Raw materials used for all the above-mentioned objects.

1877.—Furniture and Upholstery, including Paper Hangings and Papier-Maché: a. Furniture and Upholstery; b. Paper Hangings and General Decoration. Health—Manufactures, &c., promoting, with experiments. Machinery in general for the group. Raw materials used for all the above-mentioned objects. c. Arms, Ordnance, and Ammunition. Naval Architecture—Ships' Tackle: a. Ships for purposes of War and Commerce; b. Boats, Barges, and Vessels for commerce, amusement, &c.; c. Ships' Tackle and Rigging; d. (Additional) Clothing for the group. Heating and Ventilation, with materials. Machinery in general for the group. Raw materials used for all the above-mentioned objects.

1879.—Mating of all kinds, Straw Manufactures. Flax and Hemp. Iron and General Hardware: a. Iron Manufactures: b. Tin, Lead, Zinc, Pewter, and general Brazing. Dressing Cases, Travelling Cases, &c. Horticultural Machinery and Products. Uses of Magnetism. Machinery in general for the group. Raw materials used for all the above-mentioned objects.

1880.—Chemical Substances and Products, and experiments. Pharmaceutical Processes: a. Chemical Products; b. Medical and Pharmaceutical Products and Processes; c. Oils, Fats, Wax. Articles of Clothing: a. Hats and Caps; b. Bonnets and General Millinery; c. Hosiery, Gloves, and Clothing in general; d. Boots and Shoes. Ways and means of conveying Goods, Engines, and Carriages. Machinery in general for the group. Raw materials used for all the above-mentioned objects.

— We are glad to learn that a course of six LECTURES ON BOTANY, for medical students, are to be given in the ancient Botanic Garden of the Society of Apothecaries at Chelsea, by the Lecturer, Mr. THOMAS MOORE, on succeeding Wednesdays and Saturdays, commencing on the 31st inst.

— We are informed that Messrs. LONGMANS are about to bring out a condensed translation, adapted to Britain, of MM. DECAISE and NAUEN's excellent MANUEL DES AMATEURS. This is good news for amateur gardeners and botanists, as the work contains just the sort of information, and, more, that intelligent lovers of their gardens require. The translation has been entrusted to Mr. W. B. HEMSLEY, who is specially competent for the task, from his extensive practical and scientific attainments. The beautiful woodcuts which form so attractive a feature of the original work have been secured for the translation.

— A correspondent has forwarded to us a schedule of prizes offered by the West Kent Horticultural Society, from which we are glad to learn that a capital suggestion, made in these columns some time ago, by another correspondent, is to be carried into effect. We allude to that of offering PRIZES for the BEST MANAGED GARDEN, in the Imperial Gardens—CHILLI, Esq., Bramley Palace, Kent, is the founder of the movement, the scope of which will be ascertained from the following conditions, under which the contest is to be carried out:—

For the best managed garden.—Open to head gardeners of subscribers to the Society, resident in the parish of Bromley. For garden, which three or more gardeners have kept (including the head gardener).

First prize	.....	.....	.....	£4	4	0
Second prize	.....	.....	.....	.....	.....	.....
Third prize	.....	.....	.....	.....	.....	.....
Fourth prize, where less than three men are kept.	.....	.....	.....	.....	.....	.....
Fifth prize	.....	.....	.....	.....	.....	.....
Second prize	.....	.....	.....	.....	.....	.....

The judges to be appointed by the acting committee, and, if possible, from a distance, and who are to take into account the extent of hedges and glass used in management, as compared with the number of men employed. The gardens so entered for competition to be open to the inspection of two judges from June 7 to 30. A day's notice of the judges' visit will be given.

— Every reader, we doubt not, will be saddened and horrified at the appalling tales of the destruction, let us hope partial, of the Tuileries, Louvre, Luxembourg, and other public establishments will cause a thrill of despair and horror in all persons of any intelligence, be their nationality or their individual proclivities what they may. For the credit of our common humanity, let us hope the accounts in the daily journals may prove to be exaggerated, and that the disasters recorded may turn out to have been accidental rather than designed. From private sources we learn that Mr. BRONGNIART, who was immured in Paris during the first siege, became ill, and retired to Politiers on its conclusion. His health is fortunately re-established, and the veteran botanist is now at Gisors, in Normandy. His sister, M^{me}. DUMAS, with her husband, the celebrated chemist, took refuge at Geneva. M. DUCHARTRE was in the South of France during the first siege. M. DECAISE, as we have already related, stuck to his post of duty manfully. MM. COSSET and BAILLON were also confined in Paris during the German investment, and availed themselves of its termination to seek rest and change in this country.

— We are requested to state that the remodelling of the ROYAL HORTICULTURAL SOCIETY'S GARDEN at Chiswick is in so forward a state, that it will be possible to resume the very interesting trials of new plants.—BENEDICT PELLAGONIUS especially—if the growers will be good enough to contribute as formerly the novelties which have recently been let out. A fine open space has been reserved near the Council-room for carrying on this work, and a series of beds upon grass have been prepared for the purpose. Those who propose to send plants for this year's trial should forward them at once, addressed to Mr. BARRON, Superintendent, Chiswick Garden, W.

— A French gardener named MORANGE is at present on a visit to this country. He comes with first-rate references, among others from no less an authority than M. DE CANDOLLE, as to his skill and ability in the management of sickly trees, especially those affected with canker, canes, ulcers, &c. M. DE CANDOLLE speaks from personal experience of the success of M. MORANGE's remedial measures, which it appears are specially devoted to the development of the natural form of the tree. It is unfortunate that M. MORANGE speaks no English, but on the strength of the excellent recommendation we have received we advise gentlemen with ailing trees to secure his services.

— We are indebted to the kindness of a lady for specimens of VERONICA TRYPHYLLOS, gathered near Ealing, Middlesex. It is, we believe, the first time that the plant has been recorded in Middlesex, though it has been recorded in the extreme south. It is by no means a common plant in Britain, but we think it not unlikely that it may become more plentiful. The plant is readily distinguished from other annual Veronicas by its deeply-lobed leaves, and it is worthy of remark, that the sepals are often lobed like the leaves, though to a less extent.

— THE MAXIMUM TEMPERATURE in England during the week ending May 20 ranged from 72° 4 at Portsmouth to 57° 6 at Salford, and the mean for all stations was 63°; being but slightly different from the mean of the Scottish towns (viz., 62° 5), where 60° at Perth and 58° 3 at Aberdeen were the extremes. The extreme MINIMUM TEMPERATURES in the midland part of England were very uniform, but the difference between the north and south parts of the country was as large as 9° 9, being the difference between Hull (29°) and Portsmouth (38° 9); the mean for all stations was 33° 7. In Scotland the extreme lowest was 26° at Paisley and the highest 32° 7 at Aberdeen, with a mean for all stations of 29° 8. MEAN TEMPERATURE.—51° 8 at Portsmouth was the highest during the week, 50° 1 at Blackheath and Dublin were next in order; in Scotland

the mean temperatures were generally low—42°-5°, for instance, having been recorded at Aberdeen. In England they ranged from 51°-8 at Portsmouth, 43°-6 at Hull, and 43°-7 at Newcastle; the mean for all stations being 47°, or 1° above the mean of the different stations in Scotland. RAINFALL.—For the third week in succession but little rain has fallen, the largest fall (0.63 inch at Salford) greatly exceeding that measured at any other station; it is, however, the two previous weeks were the same, viz., 0.16 inch. (See Mr. GLAISHER'S Tables in our present issue.) On Wednesday, the 17th inst., a considerable fall of snow took place over the midland counties, extending as far south as Leicester and Norwich. The daily range of temperature on some days has been very large.

—As an example of the EFFECT of a TROPICAL CLIMATE and SOIL on BRITISH CULTIVATED PLANTS and their products, may be mentioned the fact of the introduction of some Pepper-mint plants from the Mitcham fields to a plantation at Singapore. After growing in the British tropics, and in a situation fully exposed to the sun they grew very well, but not to the height they grow in this country; moreover they refused to flower, and almost as soon as they had arrived at full growth they dried up, having an appearance of being burnt. They were also found to yield not more than half the usual quantity of essential oil, and that of a dark claret colour and of an inferior odour. The colour and odour of the oil are, perhaps, the only real drawbacks to the cultivation of plants as a commercial speculation in Singapore, the smaller quantity yielded by one crop being made up by the number of times the plants can be reaped in one year.

The TAMARISK, which has made itself so completely "at home" upon our own southern coast, is equally well established in Madeira, where it spreads over the whole island, and is perfectly acclimated. About Porto Santo it is extensively used for fences and firewood. It owes its introduction to England to Archbishop GRINDALL, who is said to have brought it from Germany, in consequence of its supposed medicinal qualities; and DR. KAKLEY, writing in 1582, says that he had then "so increased their number that there be here thousands of them; and many people have received great health by this plant." The bark is slightly bitter and astringent, but beyond this no particular properties appear to be possessed by this tree.

—A correspondent of one of our contemporaries, writing of ALBINO among the COLD-BLOODED VERTEBRATA, mentions having seen in a fishmonger's shop in the Strand a very fine example of a partially albino Turbot, the coloured and the white portions of the back being almost equal in quantity, and disposed chiefly in large masses. "Many years ago," he continues, "I remember seeing an albino Dab, and in India I have seen an all but albino Snake (Tropidonotus stolidus), the markings of which were only faintly visible. The 'silver' variety of the common golden Carp is a case of albinism, as is the 'golden' variety one of pyrrhonism, of the Chinese Carassius Langsdorffii, which is coloured like so many other of the Cyprinidæ. That melanism, and all kinds of variegation, occur among the 'gold and silver' fish of our seas, is known to every fisherman. The Indian fish of this class was long ago figured by BLOCH, and it is now regularly bred; and Dr. FRANCIS BUCHANAN HAMILTON, in his 'Fishes of the Ganges,' describes an Ophioccephalus auratus, which was simply a golden 'sport,' or variety of the common O. marginatus of India. These Ophioccephali are the Indian fishes *par excellence*, which bury themselves deep in the beds of pools which become dry during the hot season, and repopulate those pools as soon as the rain replenishes them, as noticed by PLINY and others; but various other fishes do the same, as sundry Siluridæ and the non-scandent Anabas scandens, which the late Sir J. TENNENT figured as the 'fossorial mud fish' of Ceylon."

New Garden Plants.

ONCIDIUM WARSCEWICZII, *Rchb. fl.*, *ant.*, p. 560, 1870.

We have just found out, having fresh flowers from Messrs. Veitch, that the *Oncidium bifrons*, Lindl., *Gard. Chron.* 1857, p. 84 (with woodcut), is the same plant in a starved state. It came from Mr. Loddiges, probably being his last contribution to science. The record of its coming from Mexico is, however, most positively erroneous. There is scarcely any doubt that the plant came from the surprising sale of Bridges' Costa Rica plants, when a wonderful Cattleya, that begins to flower neatly after having flowered six weeks, was sold, and which ultimately proved to be the old Epidendrum ciliare, which we had known before the sale. *H. G. Rehb. fl.*

DENDROBIUM ANNULIGERUM, *sp. n.*

Epidendrum caule basi fusiformi multangulo ac multisulcato (ad 10) superne teretibus, interodiis annulis fuscis separatis; foliis—, racematis latis, unifloris; semper vire; sepalo summo oblongo acuto; sepalis inferioribus triangularibus ac perulim extensoriformibus obtusis emarginatis; tepalibus ovatis acutis; labello fimbriato antice trilobis, lobis lateralibus obtusangulis, lobis medio seminato undulato disco bibus cristulis minutis serratis obsoletis; columna apice tridentata, dente medio postico minori, verruca oblonga in basi.

The fusiform, multangulous, shining stem is attenuated towards the upper part, where the limits of the

internodes are marked by obscure bars. The flowers appear singly and laterally, reminding one much of those of *Dendrobium Ruckeri* and *LasioGLOSSUM*, being greenish-yellow. The lip is white, with purplish veins on the lateral lobes; the middle line, the middle lobe, and the calli are greenish-yellow; the callus at the base of the greenish colour is orange. The species comes from Marisa. I have obtained it from Messrs. Veitch, Royal Exotic Nursery, Chelsea. *H. G. Rehb. fl.*

THE AMATEUR GARDENER.

Treatment of Bulbs after Blooming.—An objection is often made to spring bulbs, because, it is said, they have a littery appearance after the blooming season is past, and hinder the bedding-out of the summer exotics. There is some truth in this, and in order to remove the inconvenience gardeners are apt to take up the bulbs prematurely, or to cut off the foliage before it is decayed. Both these processes should be avoided if the bulbs are worth anything, and are expected to bloom well in the following year. Every spring bulb performs an important part in its organisation, and as long as its functions are still in existence the foliage should be allowed to remain to assist and perfect the growth of the bulb or corn beneath. Taking up too early and cutting away the leaves while still green, operate, therefore, prejudicially in the same way; they check the full development of the bulb, and render it less able to produce good flowers in the following year.

Our practice is to take up our spring bulbs every third year, that is, after they have bloomed three times in the same spot. This refers of course only to hardy sorts, all the rest will demand a different treatment, either by annual removal or protection during the winter. We find three blooming seasons not too many for Snowdrops, Crocuses, Tulips, Narcissuses, and Hyacinths, so as to keep the stock in a healthy condition and promote due increase, though it must be remembered that if the requisite time and skill are at hand all bulbs may be taken up with advantage every year. What then becomes of our foliage? We let it remain till it has done all its work, and plant out our bedding exotics among it, and then clear it all away by cutting it off with a sharp knife about half an inch below the surface. There is often an incidental advantage in this plan: the foliage of the bulbs affords protection to young and tender plants from the winds and late frosts. The untidy appearance of the beds is only of short continuance, and it should not be thought much of against the great benefit of giving the bulbs their full spring growth.

But it may sometimes be necessary to clear a bulb bed earlier than Nature would dictate, and it may be done without much injury by taking up the bulbs with the mould attached to them, and putting them thickly together in some unexposed corner of the garden. If the stock is considerable a shallow box should be placed in a barrow, so that the bulbs, being laid thickly in them, may be removed in a mass to the reserve bed—one end of the box being open, so as to allow the contents to slide off without much disturbance. We have found Tulips and Hyacinths perfect themselves nicely in this way. At any spare time in the summer the stock can be looked over, the dead leaves and roots removed, and the whole put away ready for autumn planting.

We must devote a little from the direct object of this paper to observe, that if bedding plants may prove injurious to bulbs in the spring, they are quite as likely to be so in the autumn, though from an opposite cause. In some seasons the summer flowers will remain in their glory down to the beginning of October, and the gardener is tempted to let them remain in the beds longer than usual, so as to prolong the season of bloom as much as possible. This is a dangerous temptation, which must be resisted. No spring bulbs should be out of the ground after October 1, and if planted a week earlier it will be all the better for them. And as before planting the beds should be turned over, and have introduced to them a little rotteleaf-mould to refresh and invigorate them, it is obvious that the eye must not linger too much on autumnal beauties to make one forget the claims of the spring. These hints may not seem very important, but they are. In short, the suggestions of that true gardening philosophy which the amateur should strive to become perfect in. *H. E.*

DRYNESS OF SOIL AN AID TO THE RIPENING OF FRUIT.

I SENT you some notes a few months ago, under the above heading, which you inserted. My object was to show that in the cultivation of Grape Vines in pots, it was sometimes an object to get them stored away for winter before, under the usual treatment, the leaves would have been shed. I advocated the withholding of water from them, believing that this would do no injury, and finding they would shed their leaves earlier. As an illustration, I mentioned the case of some Silver Maples. Three of them were growing in front of my house, and the ground being very dry, they had shed the greater part of their leaves before another tree of the same kind, growing near a well, had shed a leaf. The communication, together with your remarks disagreeing partly with what I said, having received some attention, I again refer to the subject. Soon

after I wrote the former letter came on a heavy rain, soaking the parched ground, and the effect of it on the three Maples, with leaves partly shed, was to infuse, as it were, new life into them, and in the end the one near the well, which had not at the previous writing shed a leaf, was the first to be entirely clear of leaves. The facts to be learned from this seem to be, that the three having a certain amount of duty to perform, could not for a time do it, from lack of water; ultimately obtaining it, the growth of the leaves had doubly duty to perform, which required the presence of the leaves long after the one by the well had dispensed with its foliage. This would seem to imply that the withholding of water from Grape Vines, that they may ripen their wood quicker, is an injury; but is it so much so as to counterbalance the advantage above as desired?

Would not the wood of Roses, some evergreens, Paulownias, and plants of like nature, be killed back as they winter, their place of growth had been tolerably dry one, not favourable to late growth, rather than a wet situation, fostering late growth; or, in other words, would partly tender plants winter better after a wet or dry fall? *J. M., Philadelphia, in "American Gardeners' Monthly."*

PEAR CULTURE.*

In preparing this paper I have confined my remarks entirely to my own practice and experience. The soil in the garden at Killeston is of a light nature, such as is generally known as "old garden soil." It is situated near the base, and on the south-eastern side, of a hill of volcanic origin. I therefore procured soil of a heavier nature, such as is generally termed "good sound loam." In the autumn of 1858 I began with about 40 young trees, planting some against walls and others as pyramids; those against the walls were trained horizontally. In planting, a pit was taken out 6 or 8 feet wide and 12 or 15 inches deep, and filled in with the soil described, the young trees were planted about the same depth as they were in the nursery, and the whole was then firmly trodden over, fine weather of course being chosen for the operation. No manure whatever was mixed with the soil, but in some cases I mulched with half-decayed manure, such as dung and leaves from an old Cucumber bed. In selecting trained trees for the walls, I prefer those with five good shoots, the centre one being a good one, and the side ones of moderate size. If, in fact, as far as possible, so that three courses of bricks are between each branch; the side branches are trained out nearly full length, being shortened to a good bud; the leader is shortened to one bud above the two best adapted for next year's side shoots.

The first year after planting the trees grew very freely, the leader and side shoots being nailed in as required, other shoots being shortened in at the usual summer prunings. In the second year, when the trees had entered after planting, I found that the trees had made a vigorous growth, and being anxious to cover the walls as quickly as possible, instead of shortening back the leader as before, I cut a notch just above each bud which I wished to break into growth, or those nearest the joint of the third course of bricks above last year's side shoots, and shortened the leader three courses of bricks higher, being six courses above last year's branches. The next year (1861) the trees made a great deal of wood, and the trees made two fresh shoots on each side, and the leader grew away very strong. In the winter pruning of that year I notched four, and on some five buds on each side. Those nearest the base of the shoot were cut very deeply, so much so that I have often been obliged to nail the leader up at once, as it could not support itself; the next above were cut less deep, and the others proportionately less, also the top side buds being very slightly notched to ensure their breaking into growth. The growth of 1861 was everything that could be desired each bud broke as regularly as possible, and the side shoots of this year were of a uniform length; the same system was pursued the following year, and the growth of 1860, 1861, and 1862 was for several years afterwards easily discernible; the trees in 1861 reached the top of the wall, and in 1862 completed their number of side branches, having made 14 on each side, some of the lower branches bearing fruit. Each year, since most of the trees have borne good crops of very fine fruit; they generally bear so freely that much thinning is required, or the fruit would be inferior both in size and quality, and probably the crop would be a failure the ensuing year.

My aim is to get a fair crop of fine fruit, which is generally a sufficient strain on the tree to prevent any gross shoots being made. I don't recollect ever having occasion to root-prune, to check the growth of those on the walls, and have only practised it on one or two instances, viz., in the case of a Marie Louise pyramid on the Pear stock, and a Louise Bonne on the Quince. My opinion is, that the tree, from root-pruning, is often overdone with bloom, and little or no fruit is the result; such I thought was the case with the Louise Bonne, as the tree was a mass of bloom for two or three years, but it nearly all dropped off. Since then, as the growth of wood increased the crop has also increased.

* A paper read at an evening meeting of the Devon and Exeter Botanical and Horticultural Society in December, 1869.

In pruning in August I leave many of the shoots 12 or 14 inches long, as the trees are afterwards trimmed, and they serve to prevent the birds from reaching the fruit. In reference to gathering Pears, I always defer this for late sorts as late in the season as possible, that is, if the weather is mild and they do not drop off. I am convinced the later they are gathered the later they ripen, in proof of which I may say that Winter Nelis has usually ripened with me in November; I gathered them this year on November 5, which is later than usual, and none of them have yet ripened. I have had quite a succession from the same tree by gathering some two or three weeks earlier than others. We have generally a large supply of autumn Pears, hence my desire to retard the ripening of later sorts. As regards winter pruning, my object is to keep the spurs as short as possible and close to the wall, therefore I cut those that have fruited close back to the branch; they break freely and form very small spurs the following year.

The pyramid trees were planted in the borders on each side of the walks in the kitchen garden, in the same soil as the others, and were not summer-pruned or pinched—I could not have found time to do this, even if so disposed. They were only winter-pruned, the leading shoots being shortened in proportion to their length, cutting to a bud which pointed in the desired direction; other shoots were cut almost close back, to form spurs. Most of them are now fine trees, 16 or 18 feet high, and handsome pyramids, while a few it seems impossible to grow into shape—the Jargonelle (or the Quince) being the worst I have. It is, however, a most profuse bloomer and a moderate bearer. Comte de Lamy is also a sort of a good habit, although a great bearer, and the fruit superior to those grown against a wall.

The following 12 dessert varieties I should recommend for succession in ripening, quality of their fruit, and free-bearing capabilities:—Doyenné d'Été, Jargonelle, Williams' Bon Chrétien, Louise Bonne of Jersey, Comte de Lamy, Conseiller à la Cour, Doyenné du Comice, Pascal Colmar, Winter Nelis, Josephine de Malines, Easter Beurré, and Bergamotte d'Espérance. For late sorts I would add the above, Beurré Giffard, Beurré Superfin, Thompson's, Gloa Moreau, Knight's Monarch, and Ne Plus Meuris. *John Garland, Gr. to Sir T. D. Atland, Bart., Killerton, Exeter.*

BOTANY FOR BEGINNERS.—VIII.

THE Laburnum (*Cytisus*), with its graceful drooping clusters of clear yellow blossoms, is so beautiful that it seems sacrilege to talk of "dissecting" it. But when the dissection reveals new beauties, unseen by the casual observer, and unfolds many means to one end, and that end the welfare of the species, it is clear that the sacrilege is rather with those who admire and pass by than with those who with equal, or greater admiration for the beautiful, yet seek, by something more than superficial glances, to ascertain its significance. Not unduly to lengthen these articles, however, let us proceed to notice some of the main points in the structure of the Laburnum, and to call attention to the principles of plant construction they serve to illustrate. In all cases we presume the beginner to have followed us step by step, plant in hand; or, failing that, to have made use of the woodcuts, and hence we are saved the necessity of much repetition.

In the Laburnum we have first of all a form of leaf different from any we have yet seen; for the Ash, which in some respects has a similar leaf, had not at the time we wrote concerning it expanded its leaves, and hence we made no mention of them.

The Laburnum leaf has a stalk with two little stipules at the base. So far there is nothing peculiar about it; but the pupil will notice at the upper end of the stalk what he might take to be three leaves, one central, and one on either side. But these three apparent leaves are really only segments of one leaf,—*leaflets of a compound leaf* as they are called. The blade of the leaf, instead of being in one piece, is here represented by three leaflets, each articulated to the stalk at a little joint so that they may readily be separated. The Ash has a similar compound leaf, but the leaflets in that case are more numerous than three. The Rose is another good example of a compound leaf.

The inflorescence of the Laburnum is a raceme (see p. 645), the lowest flower opening first, though from the pendulous character of the raceme it would seem to be the uppermost flower which opened first. The flower has a double perianth, the outer row consisting of a cup-shaped calyx of five sepals imbricate except at their extreme tips. Notice also that the calyx is not quite regular in form, but a little larger on the lower side, D, E (fig. 136). Two of the tips or teeth are at the upper or back part of the flower, three others at the lower or front part. The inner perianth or corolla consists of five yellow petals, irregular in form. Thus at one side of the flower, that nearest to the common flower-stalk, the back of the flower, as it is called, we have one petal marked A larger than the rest, bent backwards and marked by purplish or brownish streaks in the centre. Then on each side there are two side petals, B B, projecting horizontally, with their edges directed upwards and downwards, not sideways, as usual, and each with a short stalk. In the front of the flower are two more oblong petals, C, with their edges in the same direction and coherent at their tips, so as to make



FIG. 135.—INFLORESCENCE OF LABURNUM.

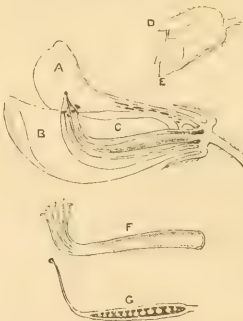


FIG. 136.—FLOWER SEEN IN SECTION AND WITH ITS COMPONENT PARTS DETACHED.

A, Standard; B, Wing; C, Keel, enclosing pistil and stamens; D, Four-cleft calyx, with one of the lower segments a little larger than the others at E, showing a tendency to be five-cleft; F, Longitudinal section of tubular stamen-sheath; showing ovules attached to the placenta.

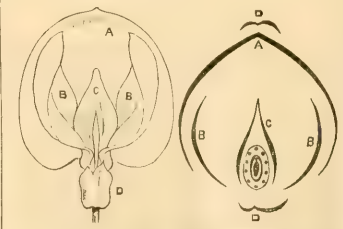


FIG. 137.—DIAGRAMMATIC SECTION.

A, Standard; B, Wings; C, Keel, enclosing the stamens and pistil (with position of ovules); D, Calyx.

a boat-like cavity. The two side petals and the two lower petals thus completely enclose the stamens and pistil, and if a bee or other insect visit the flower, bent on obtaining honey, he is first of all attracted by the perfume of the flower, then directed in his course by the large petal at the back with its purple stripes; and having landed on the flower, he has to thrust his snout amongst the petals to get at the honey, and in so doing is pretty sure to brush out the pollen from the anthers.

The stamens of the Laburnum are 10 in number, coherent below into a tube (F), which at its free end bears 10 anthers. If a young flower-bud be opened it will be seen that five of the anthers are smaller than the others, though this irregularity of proportion is scarcely visible in the expanded flower. Within the tube of the stamens is the pistil (G), in this case consisting of a single carpel tapering at one end into a style, which is bent upwards, and ends in a small stigma. Now, if the busy bee, already referred to, after having ransacked one flower for its honey, and thereby become well dusted over with pollen, now visits another flower, attracted thereto by the perfume, and guided—nay, almost forced to go in a certain direction, owing to the regular arrangement of the parts of the flower, it will be seen that almost with certainty he must come in contact with the upturned stigma and deposit the pollen thereon, and thereby "set the fruit." Surely no clearer evidence of design could be wanted! The carpel, after being thus fertilised, will ripen into a pod like that of the Pea. In point of fact the Laburnum, though a tree, belongs to the same group as the Pea, Bean, Scarlet Runner, &c., a group for the most part characterised by the possession of compound leaves, *papilionaceous corolla*, and *legume* pods. A *papilionaceous corolla* is such a one as we have just described, an irregular five-petaled corolla, with one large petal at the back, sometimes called the *standard*, two side petals called the *wings*, and two front petals more or less united to form the *keel*. All the *Papilionaceae* have such a corolla. The *legume* is a carpel, which when ripe splits into two valves, as any beginner may exemplify in the process of shelling Peas. Most of the *Papilionaceae* are poisonous, many of them our gardens owe much to this family, some valuable for food or other purposes, and some few poisonous. The Laburnum comes under this latter category. It is more or less acrid in all its parts, but specially so in its seeds, which should never be allowed to get into the possession of children endowed with that common juvenile propensity of putting things into their mouths. Our object, however, is not to write on "economic" or medical botany, but simply on structural points; let us then sum up by saying that our Laburnum flower is *complete*, inasmuch as it has all the organs which constitute a complete flower; that its sepals deviate from the simplest type in not being separate, and in being irregular in dimensions; that its petals manifest *irregular growth* to a much greater extent than the sepals, that its stamens are coherent, that its pistil is remarkable for being solitary, though all the other organs of the flower are in fives, hence probably four *carpels* are *suppressed*, at any rate we often see seed-pods of Beans with two carpels, and there are foreign *Papilionaceae* in which the flower is regularised by the production of five carpels. Hence, then, hypothetically at least, our Laburnum deviates from the regular standard, of which we shall have more to say by-and-by, in the fact that *suppression* has taken place in its pistil to such an extent that only one out of five carpels is present.

CANNELL'S COMPLETE SYSTEM OF HOT-WATER CIRCULATION.

SINCE the publication of your article concerning my system of heating, I have been put to so much inconvenience at this busy season both by letters and personal inquiries respecting it, that I should feel obliged if you would insert this explanation and the annexed woodcut, fig. 138. I am sure most of the readers of the *Gardeners' Chronicle* will at once see its mode of working, and its value over the old system. Some years ago I was specially engaged by a gentleman to assist in carrying out a new Polmaise mode of heating, which at that time was being agitated by the late Donald Beaton, and after my employer had spent several hundreds of pounds in constructing two houses, with flues of all sorts, shapes, and forms, the system had to be abandoned, to the regret of all, and a tubular boiler and piping were put on the most modern principles, was substituted. The genial temperature which it produced as compared with the scorched dusty atmosphere of the Polmaise convinced me that the circulation of hot-water was the proper method of warming horticultural and other buildings; and from that time I have pondered much and deeply about boilers, pipes, and all our present systems of heating, in order to ascertain what real improvements might be effected. I have waited in vain for hot-water engineers to bring forth something which would lessen the consumption of fuel—an item which undoubtedly holds in check the progress of horticulture; but beyond cutting and fixing the pipes, their knowledge of what is really required for gardening purposes seems to be very limited. I have erected several houses and pits within the last few years, all of which are heated more or less differently from the old system. One apparatus is so constructed that the steam or hot water dips down 18 inches directly after leaving

the boiler to save the depth of stokehole; it does its work to a certain extent like most others of the present day, but is far from doing it so satisfactorily as I should wish, with the same amount of fuel and attention. There are other serious objections to it. It is perfectly contrary to Nature in the first place, and in any place wherein this occurs there is sure to be more or less imperfection in its working. This determined me to adhere as much as possible to the natural rising and working of heated water.

Three years ago I seriously questioned whether our hot water circulated in the proper manner, although the system has now been in vogue for upwards of 40 years; and the more I thought the more I became convinced that the existing plans were faulty. I accordingly erected (nearly two years ago) two houses—one pointing towards the west, the other to the east, with a separation of 8 feet between them and the boiler in the centre. Both houses were on the same level, and the pipes arranged somewhat as in the annexed engraving. The hot water is supplied to both from the same boiler, each taking a contrary direction when entering and leaving the house, so that there can be no doubt in the matter.

There are many advantages derived from this system of hot-water circulation, which from two years' experience I have every reason to believe is the proper method, and the one which should have been adopted from the commencement of the hot water era. It is an old saying, and a true one, "the wrong way is sure to come first." The old system is contrary to the natural upward course of hot-water, the flow-pipe being far too short; it ought undoubtedly to extend the whole length and breadth of the house. What is wanted in our heating apparatus is simply this, that we can apply intense fire-heat to the boiler with the least possible waste, the boiler and piping being so constructed that it can send forth its heated water to warm any given space to a certain tem-

peratures. We merely state the facts as communicated to us, and must leave their impartial discussion to those concerned. Through a defect in the drawing our artist has omitted to show the position of the supply cistern, which we may mention is similar to all others. Ebs.]

Home Correspondence.

Fruit Setting in the late Wet Weather.—In answer to Mr. Simpson's inquiry (p. 646), I am sorry to say that all the fruit trees in bloom here during the very wet weather in April have not set their fruit well. Pears, Plums, and Cherries on the walls are thin of fruit, but the same kinds, as standards in the borders and orchard, that flowered later, have plenty of fruit set. I believe some of the blossoms of Pears, Plums, and Cherries on the wall trees were injured before expanding, by the severe frosts on the mornings of 7th and 8th April, and this may have had something to do with the thin crop. As well as from the natural syringing they got from the 15th till the end of the month. The Apricots here are crammed with fruit on every branch, and I never remember to have thinned more fruit from the trees. The Apricot wall, however, is covered with long glass lights, which prevent either snow or rain from reaching the blossoms when setting, and no frosts either in February or March are severe enough to injure the trees. The great bulk of the Peaches and Nectarines grown here are on a permanent glass-covered wall, and being independent of the weather, the trees never fail in producing a full crop. The only season they ever failed in setting their fruit thickly was in March, 1869, but even in that year plenty were left for a good crop. Applies

not proved in practice, going "the whole hog" with the syringe, as Mr. Simpson seems to recommend, although during some very hot days, while our Muscat was in flower, in addition to keeping the paths continually flooded with water from morning till night, I dipped several branches in a glass tube of water, when they were in full flower, with no bad result; and as the whole house of Muscats has set like Black Hamburgs, I can see no difference between the dipped and the undipped ones. Melons I treat in the same way, with the same successful results. Our Figs and Strawberries seem to flourish with the same generous treatment, and at all times I avoid as much as possible all uncertain extremes; but in many cases, perhaps through different attention, the cultivation of some things has altered considerably since our early tuition, though the whole system of cultivating fruit or plants artificially hinges upon a three-fold sliding scale, viz., heat, air, and water, used at different times and with different effects, according to the judgment of the cultivator. Now, a word on the outdoor fruits: Apricots and Cherries are plentiful; Peaches and Nectarines a fair crop, on some trees as thick as the Apricots; some of the Plum trees are thin, others a fair crop; Pears on the walls thin; standard Pear trees some very thickly set with fruit, others very thin, underneath the trees the ground is now covered with fallen fruit, from the effects of early frosts or imperfect setting during the wet weather. Upon the whole, if the Pear maggot and other insects keep away, we shall have a very good sprinkling of Pears. Gooseberries and Currants are an average crop; and, with very few exceptions, Strawberries are going to flower well. Damsons will have a hard fight to recover from the green-fly; but now, as the east wind has gone, and more genial weather set in, we shall soon perceive a marked effect on vegetation. The above is a faithful account of the fruit crops here, which, I trust, will be highly satisfac-

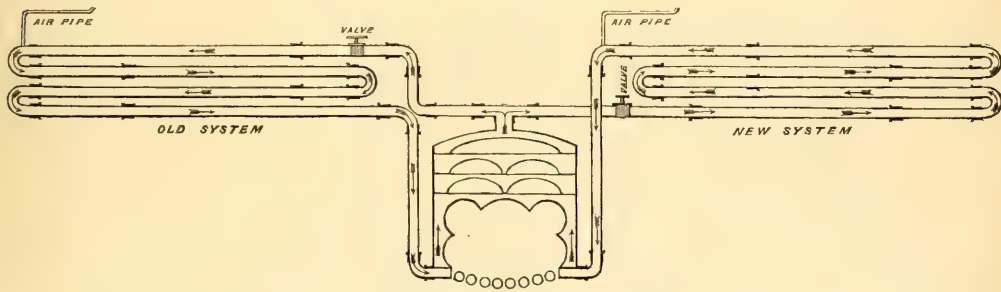


FIG. 138.—THE OLD AND NEW SYSTEMS OF HOT-WATER CIRCULATION ILLUSTRATED.

perature. To obtain this with economy, a rapid circulation must be created, so that all the pipes may become alike warm. It will be seen, by glancing at the engraving, that in my system the hot water gradually rises until it comes again near to the boiler for re-entry. Thus all the pipes required for heating purposes are flow-pipes, and in consequence there is no return circulation is obtained. Under the old system many of the return-pipes very rarely become hot, so that half the size would answer for the purpose of returning the water into the boiler to supply the top or flow-pipe only in the ordinary way. All this is reversed under the new system, and the advantages to be derived from it are more than I have yet ascertained.

The circulation is more rapid, causing the pipes to become nearly all of the same temperature, so that the house and hence the plants are supplied with a milder and more uniform heat throughout, the flow-pipe being at the bottom. Where there are from four to eight pipes in large structures, this is of immense importance to the plants, which are generally placed just above them. This plan also undoubtedly prevents unequal expansion and contraction, so that the whole apparatus is not so liable to leakages, fractures, and sudden break-downs. There is besides no pressure of fire-heat required in the boiler to cause the lower pipes to become warm, as in the old system. It has many other advantages which I must defer mentioning until another opportunity. I must however observe that how Mr. Dunbar could have made this valuable discovery years ago, as he affirms, without adopting it or even making it generally known, I am wholly at a loss to understand.

Henry Cannell, F.R.H.S., Woodwick. [We are informed that the late Mr. Edward Weeks, of Chelsea, fixed an apparatus on a similar principle in the Royal Exotic Nursery, Chelsea, then the property of the late Mr. Knight, some 35 or 40 years since. We learn also, from another practical authority, that the plan has been well-known to, and tried by hot-water engineers for many years, and that though it is admitted to answer in a simple form, it is not suitable for an extensive apparatus fixed on different levels, with many

are now in full blossom, and promise well, but the continued cold east winds have kept vegetation back, and given insects a chance of injuring the foliage and young fruit to some extent. A favourable change in the weather occurred here yesterday, May 20, the wind changing to the west, and with some more moisture, a rapid growth may be expected. William Tillery.

I beg to inform Mr. Simpson that from my system of cultivating the Peach and Nectarine, I have plenty of fruit, in all conscience, in my Peach-houses; in fact, they are a trouble to thin, with one exception, and that the Noblesse, in my early house. Singular to say, Mr. Simpson wished to purchase this individual tree last autumn, when here at the Workshop Horticultural Flower Show. I admit that this tree is more suitable varieties for an early house than the Noblesse, and this was the reason of my mentioning to him at the time that I intended to take it out, and bring in another variety more suitable for forcing. Judging from the verdicts of the learned jury of gardeners who were kind enough to honour the gardens with their presence during the day, one and all of which passed the same opinion upon the Peach trees: "What beautiful short-jointed wood, with buds well up!" The secret was attributed to the soil; but, be that as it may, Mr. Simpson's sagacious eye fell in love with this particular tree, and he could see at a glance that it was well up for its work for another year. But as we did not agree to certain preliminaries, and I had not a tree large enough of the sort I wanted to fill the space required, I felt disposed to let it remain for another season, and from a premeditated alteration it will come in well for another purpose. At the same time I cannot help thinking that Mr. Simpson bewitched the tree, as it only showed 24 flowers, and set about 19 fruit, which are now in their last stage of swelling. My other divisions of forcing, when in flower, are treated similar to my Peach-houses, with the exception of the difference in their respective temperatures. At all times during growth the atmosphere is kept moist and nourishing, with free ventilation; but I have

tory to Mr. Simpson; if not, I would say, come and see. F. Miller, Workshop Manor.

Orchids v. Cacti.—It appears to me that Mr. Croucher has wandered from the point at issue (p. 581)—an example that I will not follow, as I have not, and do not, intend to attack Cacti in any way. I cannot, however, allow the Orchids to be under the imputation of being "fagacious;" and, with your permission, I will bring forward a few examples to prove that they have permanent foliaceous beauty. There are the variegated Orchids, *Oncidium Kramerianum* and *O. papilio*; *Phalenopsis Schilleriana*, many of the *Cypripediums*, the genera *Phrysus*, *Goodyera*, and the beautiful *Anacanthoclis*. After these the fine evergreen kinds, such as *Arphipodium* *gibbum*, many of the larger *Cyclops* and *Laelias*, as well as *Aerides*, *Saccaballum*, *Vanda*, &c. Surely there is beauty here all the year round, provided the plants are properly grown. Then, again, has your correspondent seen an *Odontoglossum* house where the plants are grown under the genuine "cool treatment?" If he has not, I can assure him that there is permanent beauty there, both in bloom and foliage. We have here about 400 *Odontoglossums*—more than 30 distinct species—and the colour of the foliage varies from the light greens, through all shades of green, then a ruddy brown, and the deepest tints are equal to the colour of the Copper Beech—thus making a contrast that few have an idea of, unless they have seen it. I can assure Mr. Croucher that I make these remarks in no hostile spirit, and that my love for plants is as catholic as his own. I well know that he has a thorough knowledge of Cacti, and beg to offer my thanks for his advocacy of a very neglected but beautiful class of plants. As it is very probable that some of your readers may think that the above reference to the colour of the Copper Beech is an exaggeration [There is none whatever. Ebs.], I inclose a few leaves for your inspection. *Ex-Cantab.*

Nightingales and Cuckoos.—When your correspondent, T. Wynne (p. 646), remarked that he was

not cognisant of the nightingale being a visitant of Warwickshire, I presume he intended to imply the northern division of the county, as in the greater part of the southern division, especially in the district of five miles south of Stratford-on-Avon, "sweet Philomel" is numerously represented, inasmuch as from four to eight and even ten of these nocturnal songsters may frequently be heard simultaneously pouring forth their inimitable notes. I am not, however, in a position to affirm how much further north of this neighbourhood the nightingale's haunts extend, though, I believe, not north of Birmingham. I would also add that the cuckoo is likewise numerously represented in this neighbourhood this season, in proof of which I may state that a few days since, as I was riding along the highway leading from the aforementioned classic town to Oxford, I saw no less than four pairs of cuckoos threading the hedges in close proximity to the road, evidently exercising their predatory proclivities amongst the smaller birds' nests. *William Gardiner, Lower Edington Park.*

The Weather and the Crops.—I send you some branches of Pear, Plum, and Apple, to show you how very much we have suffered in the locality from the untoward spring frosts and hail which we had in April, aided by a cold, bleak May. Up to the 19th there was hardly one night free from frost; on the 10th it was 7° below freezing. The effect upon vegetation has been great and retrograde, I may say that I never knew such havoc amongst fruit as we have experienced this season, thousands of trees that were loaded with fruit will hardly now produce anything. You will see by the samples I have sent you that although we had hundreds of sorts well set, yet the destruction caused by hailstorms and severe night frost about the middle of April riddled the leaves and destroyed the fruit, many of which show two, three, or four holes forced into their sides by the hail. The vital forces of the trees were checked, and conditions unfavourable for the production of a remunerable crop. Apple and Pear will be middling crop here, especially the late flowering sorts. With regard to these sorts I may mention that there are in this neighbourhood some orchards entirely graced with such kinds. These nearly always escape, and generally have good crops. Passing one of these about a fortnight ago I could hardly see a blossom, whilst other orchards were teeming with gay flowers, and falsely promising great results. I have never known such a difference of gay colouring, and no doubt will bear abundantly, whilst their more precocious neighbours will have nothing to show but the remembrance of their gaudy flowers. There are many of these late flowering Apples that might be cultivated with greater advantage than the earlier flowering kinds; such would be, for cider, the Handgren or Horner, also the Late Jersey, with many others not worth particularising. I have sent you some branches of my Pomme de Paradis, to show you that it, at least, although the very earliest flowering kind, is as hardy as itself. I was going to say an Oak, but I know no tree harder than the true Pomme de Paradis, for which I had to do battle against some doughty foes, who I suppose will now own themselves *hors de combat*. *J. Scott, Merriott.*

I went to bed last night thinking what "a lucky fellow I was to have got all my seedling plants out, with Potatoes on a south border 18 inches high, French Beans just peeping out, and other things looking well for time of year. I had every reason to think that we were going to have a thorough wet night, to give them all a new start. To my grief, however, when morning came, instead of rain, I found that we had a frost which literally swept every thing before it. Potatoes, Dahlias, Ageratum, Heliotropes, Tagetes, and French Beans were just half-boiled Spinach; in fact, it was a real November frost. Pelargoniums, Lobelias, and Chrysanthemum Sensation suffered very much. Calceolarias that had been exposed for one month at least were quite blackened, and even the Box edgings had not escaped. It is dreadful to contemplate the amount of mischief which this one night's frost has done. *Jos. C. Nicholson, Thirsk, May 17.*

We had here this morning (May 17) 5° of frost (glass not reliable), very unexpected, doing a great deal of damage, every one inquiring, "How's your 'tatoes looking?" Gardeners may sometimes hide their little misfortunes, but not this; so the sorrowful answer must be, "As black as my hat." The Apple and early Strawberry blossom very much injured; young Pears appear as if they had been boiled; the young shoots of the Walnut common Beech, and the Asparagus are quite black, particularly upon the side where the sun first fell upon them. Nasturtium, Dielytra, and Tropaeolum canariensis very much cut up. The previous evening we had a nice rain, wind N.E., which made us decide upon covering the bedding plants, which proved fortunate. Heliotropes and Ageratum slightly injured through double hexagon netting, but the great extent of the injury must be attributed to the dampness of the previous evening and a bright early sun next morning. *J. Taylor, Rose Hill, Carlisle.*

Rabbits.—I have a summer flower garden that from its position, cannot be fenced from rabbits. I should be very much obliged if you could give me a list of effective bedders that I could use without fear of

the nibblers, and also say if the 10 plants named below could be safely planted. Centaurea ragusina, Cerasium tomentosum, Dactylis glomerata variegata, Eragrostis grande, Golden Feather Pyrethrum, Iresine Lindenii, Nepeta tucurifolia, Perilla nankensis, Tropaeolum varieties, or Verbena venosa. E. D. H. [Mr. Gibson, Superintendent of Hyde Park, to whom we forwarded your letter, kindly replies as follows:—"E. D. H." should omit Nepeta tucurifolia from his list of ten, and add the following to select from:—Centaurea gymnocarpa, Pelargonium, Iresine Herberti, L. acuminata, Tussilago Farfara var., Amaranthus melancholicus ruber, bedding Dahlias and others, Saxifrage, Sempervivum, Veronica incana, Euonymus radicans var., variegated Ivies, Delphiniums, Hollyhocks, Cuphea cordata, Gnaphalium lanatum, Stachys lanata, Myosotis, Funkias, Gazetia William, Polyanthus, Tulips and Hyacinths, Saxania splendens, Tagetes, Zinnias. These have stood unmolested where rabbits abound." EDS.]

Frost among the Hardy Shrubs.—According to your wish (p. 670), I send you the following short report on the effect of the past winter upon the hardy shrubs. Some of the results are curious and unexpected. The following are all more or less tender, and this winter are quite uninjured.—Magnolia, Canthorus azures, Tetraneura californica [?], Sytax officinalis, Helianthemum rugosum, Bignonia capreolata, Garrya elliptica, Pomegranate (killed in 1860-61), Akelia quinata, Laurustinus, Yucca aloifolia variegata, Yucca macrocarpa, and Hydrangea hortensis variegata. The following are very much injured, and in some cases killed to the ground, but are recovering:—Olive, Garrya macrophylla, Colletia horrida, Olearia filicifolia and O. eminenis, Leyerstera formosa, Myrtle, Canthorus rigidus, Fabiana imbricata, Smilax aspera and laurifolia, Holböllia latifolia, Calycotome spinosa, Arundo Donax, Bambusa fastata, Bridgesia spicata, Rousseaulea Cupressina, Gomena, Day, Myrtus, Ledebourii, and Veronica salicifolia. The following are hopelessly dead.—Passion-flower, Yucca aloifolia, Brugmansia sanguinea, Veronica Andersoni (all the varieties), Spiraea Lindleyana, Convolvulus Cneorum, Pentstemon cordifolius, and Arundo Donax variegata. If you wished it, I could send you a similar list of hardy herbaceous and bulbous plants, but I fear it would be too long for you. *H. N. Elcombe, Bolton Abbey, Lancashire.* [Please send it—it will be valuable. EDS.]

—With respect to the injury done by the frost of last winter to the trees here, I am happy to say I have not suffered any loss or injury, save the death of two Pinus insignis, 5 feet high, killed to the ground. One, 30 feet high, quite as much exposed or more, has only its leaves a little browned to the height of 10 feet, the rest of the tree being quite green. Singing with my foot that tree entirely escaped the severe frost of 1859-60. It is a little elevated, on a clay subsoil 33 yards deep. Cedrus Deodara, 30 feet, not a leaf browned: the same in 1859-60; Cupressus macrocarpa, which I had always considered tender, the same; Cytopteris japonica, do.; C. elegans, do.; C. viridis, do. Retinospora obtusa, do.; R. pisifera, do.; R. plumosa aurea, do. Eucalyptus variegata, both killed to the ground: this I regret to report. I have never seen any of the trees of Slough, had pronounced it hardy. A new bed of Rhododendrons of the best kinds, uninjured, and now coming into flower. This place is only 7 miles from the German Ocean; to this, perhaps, I owe my safety from severe frost, though there is scarcely a tree between me and the sea, save near the house. The west winds I have always found to be the most injury: it is a dead flat to the sea. *J. Deane Waite, Rector of Manby.*

The Granary Weevil.—It may possibly be of interest to some of your readers to mention that the granary weevil, the granary weevil, may be easily caught in the following manner:—Mix with dry food that attracts it, in its haunts. A few weeks ago I noticed a great quantity of these destructive beetles infesting a potting shed and other garden premises in the neighbourhood of a granary, and finding that large numbers had been drowned in a shallow dish, left accidentally full of water, I had the plan tried on a large scale, and have caught great quantities. I enclose you a little part of the beetle, to show the quantity taken from a common-sized dish at a single clearing of the dish. The most attractive part appears to be the saucer in which the cat's daily meal of bread and milk is placed; this is filled with water, and the few crumbs of bread left uneaten by the cat are bait enough to attract the beetle; but the flat covering lids of Seakale pots, or any shallow vessel, answer well for the purpose. Or, on a covered bed of straw, scale afterwards, or they revive rapidly when dry. *E. A. O.*

Heating by Hot Water.—Your leading article (at p. 578) on this subject is full of promise, and I think and if followed out by wise experiment cannot fail to lead to great improvement in the efficiency and simplicity, and therefore economy, in heating plant houses and other buildings. Yet I would observe at the same time, if you will kindly allow me to point it out, that there is an erroneous statement in that article involving the first principle of hot-water circulation, which, if it be accepted by your readers in their endeavors to carry out your suggested improvements, may lead to failures. When the motive-power is said to be "not the cold water but the expansive power of the hot water," there is, I believe, error to this extent, that while there is expansive power and expansion by that power, it is not motive, spreading itself by simply expanding the water. The expansive power of heated water could not act as a force unless that force be resisted, in one or more directions, by an immovable fulcrum or base; in others by a resisting object which yields to the pressure. Now, while these conditions exist in the steam boiler, they do not, I apprehend, exist in a heating apparatus. We may regard the whole inner surface of the horizontal pipes as the immovable base or fulcrum, but there is no pipe leading therefrom through which the pressure of the fluid can act on a yielding body, for this simple reason, that the two orifices are connected together by a single channel of pipes; and the expansive power, if allowed to act as a power upon the fluid in this pipe, acts through the two orifices in opposite directions, and so only compresses the fluid in the pipe, each pound of pressure on one orifice neutralising each corresponding pound of pressure from the other. Expansive power in the boiler would act equally in all directions, and prove therefore obstructive to the return in the same degree as promotive of the flow. I do not think we can state with confidence that the expansive power is motive unless we can show that its pressure upon the upper orifice is greater than its pressure or recoil upon the lower one. But I am not an expert in this question, the correctness of the principle you have laid down, because I conceive that the true principle of motion will amply justify your remarks on the proposed new arrangement of the pipes and the value of boilers in general use. The motive-power, I believe, is gravitation, and that the new arrangement of pipes in a modified form will promote the effect of gravitation to a high degree, and secure rapidity of circulation, *water falling*, to the utmost. The old arrangement, likewise, tested by this theory, seem fully to account for the slowness of the circulation. I assume that water in a highly heated state and yielding to the "expansive force" is expanded (if room be allowed for the expansion), and as a necessary consequence rarified. The difference therefore, between the density of cold water and hot water is as real as that between water and air; and as will be evident by the weight of displacing oil, so will cold water displace hot water. If, now, the circulating pipe (fig. 139),

A, B, E, be filled with oil in the left limb, from C to E, and water from D to E, and a valve at E be then opened, the oil will be driven up the left limb towards the upper part of the gravitation, and if the two limbs be full enough of the first instance of the two limbs, the oil will be driven along the flow-pipe, A, B, just as the hot water is in the heating apparatus. Now, this force of gravity must act forth cold and hot water are placed in a condition to call forth this action. Such condition exists in common apparatus, and in a highly favourable degree in Mr. Cannell's, as described in your leader. The next time you apply the principle of the left limb, the water is rarified and its gravity diminished, whilst flowing along the pipe A, B, it cools; and, its gravity being restored by condensation, it bears the same relation to the water continuously heated at C, as the cold water did to the oil in similar positions. This force of gravity, I feel assured, must act decidedly under these conditions, and form a motive-power. It may be modified, possibly, or become a secondary motive-power, but the power of gravity, which, at greater power exists, but I think it does not. There is an expansive power, it may be said, and what becomes of it? The reply would be, I think, that as a motive-power it is perfectly neutral. As an expansive power, it actually expands the water, rarifies it thereby, disturbs the balance of the fluids in the apparatus, subjects the water to the pressure of the pressure of the heavier fluid or the rarified fluid or parts of the pipe in communication, which it is free to act downwards and bring gravity into operation. It appears to me that means should be taken to prevent expansion from operating as a power in hot-water heating, in order that actual expansion in bulk of the hot water may be fully developed. For since it is by the rarefaction and consequent decrease of gravity in a given bulk of heated water that the motion is moved, the more the difference that expansion can place the greater the difference between the pressure of the cool water and the resistance of the heated portion, and the greater this difference in favour of the cooled water or motive-power, the more rapid will be the circulation. Let not any suppose that gravity can be too trifling a power in this case to produce such results as are described by the writer. The machine called a Barker's Mill is a witness of the great power of a small column of water. Only let them bear in mind (and this seems to me the great point in the Woolwich apparatus) that the higher they can take the rarified water, and the higher the elevation at which its weight by condensation returns to it, the more powerful will be its operation, and the more rapid the motion. In the Barker's Mill the weight of the column of water is wholly available as a motive-power, but no resisting power is required to overcome the effect to be effected. It stands to reason, therefore, that in order to attain the highest amount of motion, the resistance of the hot-water column in a boiler should be diminished as much as

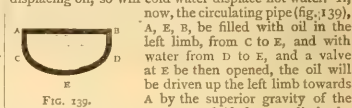


Fig. 139.

possible, were the object similar to that of a Barker's Mill. Now, in cases where the hot water must soon return to the boiler, less time being given, as in small plant houses, for the cooling of the water and its restoration to the density necessary for efficient pressure, a less rapid motion seems advisable; but in cases where thousands of feet of piping are used, care should be taken to make the descending column of cooled water a motive-power of great energy. If these remarks, grounded as they are upon a long study of the theory of draught (or atmospheric pressure), appear to you of value, I will forward you a second paper, pointing out such arrangement as the theory thus described seems to require, and in what manner Mr. Cannell's successful invention harmonizes with them. *John M. Taylor, Sea Green Vicarage, near Beaconsfield.* [We shall be glad to be favoured with your further remarks. Eds.]

Referring to the subject under discussion in your pages, of converting what is generally used as the return pipe into the flow, we beg to state that this system has been employed by us for the last 20 years, which of itself is a proof that the principle is not new. With regard to your more important observation, that "stokeholes can be dispensed with altogether," permit us to observe that we have a system now in use by which a boiler, say 5 feet 6 inches in height, can be fixed in a stokehole only 2 feet deep, thus making the boiler to stand out of the ground at least 3 feet 6 inches, and rendering the top of same, this latter dimension, higher than the pipes forming the apparatus. *J. Weeks & Co.*

Champhignons.—I beg to ask your opinion on the accompanying Fungi. I have pronounced them to be Champhignons, and good edible food. I forwarded some to a friend, who has taken a fit into his head that it was my intention to poison him and his family. I have eaten large quantities of them, and not having found that they disagreed with me, I knew at once they must be edible. *D. C.* [We quite approve of your friend's caution. Fungi should not be eaten unless the partaker be sure from his personal knowledge, or on excellent authority, that what he is eating be safe. In your case there is no danger. Your Fungi are true Champhignons, of which we add a woodcut (fig. 140). Eds.]

Pyrus spectabilis.—An old tree of this species, growing on the north side of a somewhat irregular bank of shrubs here, has this spring been a great object of admiration. It was, literally speaking, a mass of bloom for about three weeks, every twig having its bunch of pinky-white flowers. This tree for several years bore a very serene appearance, and I think would have been cut down except for the sake of the little shade it gave to a gravel walk running in front of it. The roots being in a very unfavourable spot at the bottom of a bank, and under some portion of the walk, where the sun's rays never rested, may account for its shabby appearance. The recollection, however, of its beauty this spring will in future cause us to think highly of it, and we have already had the gravel walk removed, and the ground around its roots made good, and this we hope will much benefit it. *T. Wynne, Gr., Holbrook Rectory, Suffolk.*

Tree Fern with a Branching Crown.—By last mail I sent you a sketch of a Tree Fern throwing out lateral branches (see fig. 12, p. 610). I named it by mistake as *Asplenium excelsum*, which allow me to state is incorrect. It is a variety of *C. Moorei*; *D. squarrosa* of Swartz, "Hooker's Synopsis Filicum." Now, Mr. C. Moore informs me that *D. squarrosa* is a native of New Zealand, whereas this Dicksonia (*D. Youngie*, of Moore) is only found in the warmest parts of New South Wales; and when these Ferns are seen growing together, as they are in the Sydney Botanic Gardens, they have a very distinctive character. This Fern (*D. Youngie*) has only as yet been found growing in one locality on the Richmond River, New South Wales, only occurring in a few acres. *George Bennett, M.D., F.L.S., &c., Sydney, New South Wales, March 22.*

Blue Polyanthus.—A correspondent in last week's "Journal of Horticulture," speaking of Polyanthus, &c., &c., writes that some of the seedlings had flowers approaching nearer to that blue which it has been the ambition of breeders of Roses and Dahlias to attain, viz., blue, than anything of the kind he had before seen. Blue Polyanthus have, however, been known to me from a boy, and in the autumn of 1864 I took the only two plants then in my hands to Kew. After my return from India I inquired for these plants, and Mr. Smith obligingly showed me them, returning

one; this plant I placed in the hands of Mr. W. Bull. The colour is as nearly as may be that of the *Ageratum* (out-of-doors), but varies according to exposure, &c. The original plants were, I believe, hybrids raised by my grandfather, but of this I am not certain. I never saw them elsewhere, but as he distributed great numbers, perhaps your correspondents will say if they know or have seen blue Polyanthus at any time, anywhere. I never knew the plants to seed. *J. McPherson.*

The Weather in Yorkshire.—We have had a continuance of cold northerly winds for several weeks, which have considerably retarded vegetation. The crops in many places have a yellowish, sickly appearance for want of heat and light. The nights have been very cold, owing to the winds, though we have had no frost since April 11 until Wednesday morning, the 17th inst. Tuesday, the 16th, was very cold, with a heavy, thick atmosphere, having the appearance of rain, which fell heavily in places, but here we only had light showers. Towards 10 o'clock at night it rained still, the wind being full north and bitter cold. At about 1 o'clock on Wednesday morning there was a fall of snow, which cleared the atmosphere, and a nipping frost set in towards daylight. The sun rose bright and clear before the frost was off the vegetation, and the injurious effects are to be seen everywhere. Except in sheltered or favourable situations Potatoes

extension was possible, the above facts may be extended over many years. If Mr. Ruffett makes these remarks, perhaps he will kindly say if the statement I have made is correct. *Wm. Earley.*

Sarracenia variolaris certainly was not named in reference to its use by the Canadians as a remedy for small-pox, for the species is unknown to the Canadians, being found only in a district at least 600 miles further south, and its specific name was given by Michaux, in allusion to the marking of the leaf, 50 years before this idea had been heard of. It is not improbable that the name suggested the use as an antidote, in accordance with the "doctrine of signatures;" but the more common and only northern species, *S. purpurea*, was the plant employed; and in this the varioloid markings are wanting. *A. G., Botanic Garden, Cambridge, Mass., U.S.* [The plant has been tried, and found wanting, in cases of small-pox—quite inert. Eds.]

Douglas Firs.—I have noticed both this year and last, in the case of some of my Douglas Firs, that the terminal buds, which appear perfectly healthy outwardly, have failed to put out in spring when the others do. On pinching the buds they appear soft, and on putting them in pieces the embryo shoot is discovered quite dead. This occurs usually, if not entirely, in the terminal buds either of the branches or leading shoot (often the latter), and not in the buds of minor importance. I am myself at a loss even to imagine the reason, as the plants seem in other respects perfectly healthy. *G. F. M.*

Early Peas.—Mr. George Green, gr. to the Venerable Archdeacon Fitzgerald, gathered his first dish of early Peas on Wednesday, May 10. This is the third year in succession that Mr. Green has produced fine crops of Peas by the 10th. This early variety of Peas is Sutton's Ringleader. They were sown on November 19 last, in an open border, and received no shelter whatever until after January 25, when they were for a time partially covered at nights with a few rough boards. They were in blossom by the first week in April, and even on May 8, Mr. Green informs me, he might have gathered a fine dish. *B. Thomas, Charlton Mackrell, Somerset.*

Dinner-table Decoration.—I was glad to hear from "W. T.'s" communication (p. 614), that he uses glass baskets for both cut flowers and fruit with good effect for dinner-decoration. The glass baskets I have used are opal and reddish coloured, and are made in Lancashire, so the hawkers of them inform me. They are made of different shapes, but the best shapes for cut flowers are those which are curved down in front and behind. The prettiest of cut flowers, when in season, for these baskets, are Indian Azaleas. The cut sprigs of bloom must not be crammed in them, but placed loosely, with the foliage and the colours blended according to taste. To see a glass basket of these flowers with their delicate stamens projecting, and waving with every breath of air, is a charming sight; and I challenge any dinner-table decorator to furnish

any other kind of cut flowers to surpass them, not even excepting Orchids. *The Original W. T.*

Those who are interested in table decoration must feel pleased to see that this subject has been brought into notice by your correspondent "W. T.," and others, who are evidently well acquainted with the matter. None of them have yet, so far as I can learn, offered any practical hints by which persons unacquainted with such matters may be guided. Perhaps some of your correspondents will afford us the benefit of their experience in this direction. As a small contribution, I venture to give a few hints which may possibly be of some use to the uninitiated. I find the general fault to be the use of too elaborate and costly ornaments, and the crowding, and consequent heaviness in the arrangement of the flowers and their adjuncts. Glass, to my mind, is the most chaste material that can be employed; and if used in simple and graceful forms, I do not think it can be surpassed. Edgings of narrow trays, carefully arranged, and filled with a variety of flowers and foliage, the latter predominating, are, in my opinion, a great addition to the appearance of a dinner-table, but when composed of one or two varieties or colours, this style produces a monotonous pattern, after the present fashion of ribbon gardening, and is decidedly objectionable. Then, as regards flowers and foliage, we can find amongst our hardy garden varieties almost everything that will meet our requirements in an ordinary way. Such as are graceful in form and decided in colour are the most useful. What can be more beautiful than the common



FIG. 140.—THE CHAMPHIGNON MARASMIUS OREADES.

have everywhere been cut off to the ground, the early crop will not in consequence be either as good or as early as was anticipated. I do not perceive any injury done to fruit; the Apples are in full blossom, and are, I think, uninjured. Tender plants put out to harden off, where not protected, have been injured. Nettles in hedge-bottoms are as black as the Potato tops. The weather during Wednesday was bitter cold, the wind still continuing north. This morning (Friday, 19th) the wind is full west, with slight showers, and the atmosphere much warmer. At present the barometer is too high to have much rain, but until we have some rain and warmer weather it will be prudent not to be in too great hurry to bed out. Should these north winds continue much longer the season, which at one time promised to be early, will be a late one. *M. Saw, Stourton.*

On Forced Sempervivence.—As bearing on Dr. Hoffmann's theory, referred to at p. 641, allow me to remark that at Brocket Hall Gardens a Muscat Vine, growing under the management of Mr. Ruffett, the former gardener there, produced fruit and growth almost incessantly for, I believe, a term of nine years. Trained over the path of a Pine-pit, it seemed to be always in full growth, and always bearing fruit in some stage or other. I believe it was cut back once if not more during that time, but I think no actual rest beyond that required to obviate excessive bleeding was afforded it. I knew it through my frequent visits by the name of "The Perpetual." So fine were the last fruit I saw upon it, that I am constrained to think, if

white Lily, a very old and universal favourite? *Spirea japonica*, and the deciduous shrub *S. Lindleyana*, *Myosotis*, *Navelwort*, and many others are equally good. In arranging, note of course, depends upon the skill of the artist, the size of the table, and the materials with which he may carry out his plan. In purchasing articles for the purpose, care should be taken to choose such as may be used in more than one form, so as to give as much novelty of design as possible. I suggest the following simple design as suitable for an everyday dinner-table.—Procure three tall, slender glass vases, with a few flowers in each, the others in a bowl less. These are to be placed round the middle of the table. Fill the centre glass with *Lilium candidum* and some common *Arum* leaves, the side pieces with leaves of the *Barrenwort* (*Epidemium*) and variegated *Ribbon-grass*, and mix with them some straws of scarlet *Pelargonium*. Around these arrange a number of specimen glasses, in each place a single Rose or other suitable flower, with a few flowers of *Myosotis* or Fern. Ornamental or wild grasses interspersed have a very pretty effect. The whole could be arranged in half-an-hour by any person possessing ordinary taste. Simplicity, with attention to graceful outline and judicious detail, should, I think, be the chief aim of all who wish to excel in table decoration. *W. F. B.*

Setting Grapes and other Fruits.—Every season I read is written about artificially setting Grapes and other fruits, and the present one is no exception. One person uses the tail of a rabbit, another a camel's hair brush, another a syringe, and another something else. Each thinks his own method the best, and publishes it to the world accordingly. Beginners must often be puzzled about which method to adopt, fearful lest they should not obtain a rabbit's tail of the right colour, a brush of real camel's hair, and many things of like importance, but I would beg of them not to be alarmed, the only penalty they will probably have to pay if they neglect them all, will be a little more thinning to do. Dame Nature makes such ample provision in the flowers of most fruits to bring about impregnation, that although you make half the pollen into paste, or brush three parts of it off the plant, there is then a hundred times as much left as is needed for setting the fruit, hence the wonderful accounts from the patrons of syringes and rabbit tails. Perhaps but few people are aware of the very short time it takes a flower to set; those who are do not should try their hand at crossing one variety of Grape with another, not in a hap-hazard way, but in the way so well described by Mr. Pearson, of Chilwell, a year or two back. It would be very instructive, even if the result was a failure, as it probably would be 19 times out of 20; but it would teach them that a very much older lady is not so yet so impotent as many would have us think, for it would often be first in the race. I believe the reason many varieties of Grapes are thought to be shy setters, is that they are started in too high a temperature; they burst into full leaf, and rapid evaporation goes on before the roots begin to move, for notwithstanding the dictum of some of your most eminent correspondents, "the tops will ripen," vines will move before the roots do; at least I never yet found a healthy one do otherwise, and I have potted a good few thousands. On the contrary, if allowed to make only one shoot, this will be from 9 to 15 inches in length before growth at the root can be seen, and I have no doubt that where the vapour bath treatment, so often recommended, is fully carried out, the flowers are very much advanced before root action commences. *Wm. Taylor, Loughat.*

Chamærops excelsa.—Is this the same as *C. Fortunei*?—a plant (which of the two unknown) which stands the winter here well; though, as a matter of precaution, it has been covered. It will probably do without covering. *G. Bath.* [*C. Fortunei* is considered distinct, and is hardy. *Eds.*]

Foreign Correspondence.

MOGADORE.—On April 14 we left Tetuan for Ceuta, 30 miles to the north (opposite Gibraltar), being assured that the Spanish courier would take of us to Algeciras in the morning, and then to Tangier. We traversed a low flat country of stony soil, cut into gulleys by the rain, meeting on the way numbers of country Moors, bringing vegetables and fodder to market, on asses', mules', and women's backs. Much of the route was along the seashore, amongst small trees of *Tamarix africana*, an occasional Mulberry, and bushes of *Juniperus phœnicea*, which grows on sand-hills close to the water. Often we passed large pools of brackish water, with *Artemisia* growing by the side, and at one place a river, which we had to wade across, as the sand was of so quickly a nature that it was as much as the muleteers could do to get the baggage animals across.

Passing Cape Negro, the promontory of Ceuta appears, ending in a knoll crowned with forts, the town lying on a narrow neck of land joining the said knoll with the main body of Ceuta, a still a Spanish town, and the hills around it are cultivated by the Spaniards, as soon as we entered Spanish territory we came on magnificent crops, bounded with good stone dykes—a marvellous contrast to Morocco

agriculture. The town is quite surrounded by massive walls, and we entered by a drawbridge and portcullis.

On the following day we left, with a fine south-west breeze, in a felucca, carrying the mails from Ceuta to Algeciras, where we arrived at noon. The Tangier boat we found was taken up with carrying people to Cadiz, for a bull-fight at Seville; so we took quarters at a small boarding-house on the quay, and started to the hills west of the town, to botanize and observe the differences between the vegetation of this and the opposite coast. A walk of a couple of miles through lanes and over cultivated slopes led to the foot of the hills, which are covered with a scanty forest of fine cork Oak trees, with trunks 1 to 3 feet in girth; 6 to 8 feet of the lower part of the trunks dark brown from the outer layers having been removed, the upper part still clothed with cork, and here and there festooned with a beautiful Fern (*Davallia canariensis*). The undergrowth was of *Bracken*, *Brambles*, *Genista*, *Ulex*, *Cistus*, *Heaths*, &c., much as in Morocco; but we also found plants which have not hitherto occurred in the latter country—*Rhododendron ponticum*, *Erica ciliaris*, and *Sibthorpia europæum*. Higher up the hills became very stony, with several grasses that we had not found in Morocco, and a splendid yellow *Helianthemum*, not seen before. Altogether the vegetation was further advanced than in Morocco, the climate being probably drier. The scenery was very pretty; the white country houses with red roofs, forming a civilised contrast to the flat-topped cubes that do duty as houses on the opposite coast.

On the 16th we crossed to Gibraltar, and found no boat to Tangier, all being taken up for the bull-fight; and the wind being south-west, no sailing-boat would undertake to carry us to Tangier. We at last found a steamer, which was to cross the straits on the morning day, in which we accordingly returned to Tangier.

On the 18th we walked along the beach, crossing sandhills ornamented by a beautiful Broom with silky pendulous branches and white flowers. A pretty purple *Malcolmia* grew in the sand, with a very small flowered *Scrophularia*. Thence we proceeded to some hills to the south-west, where we collected many plants; amongst others two fine Umbellifers, whose flowers were loaded with brilliantly coloured buds, one striped red and white like a harlequin. Mr. Ball walked to the sea rocks to the north of the town, and found *Osmunda regalis* in the moist clefts—a sure sign of the humidity of the climate.

On the 20th the *Vénitè* arrived from Marseilles, bound for Mogadore *via* the ports on the coast; we embarked in the afternoon, and found the accommodation on board very comfortable. The ship stopped at various places on the coast, which is a horrid one; no lights, no harbours, always hazy or foggy, with a north-east wind most of the year, and a current setting also from the north. Sometimes the steamers are unable to communicate with a single port, and the mails and merchandise are carried on to the Canaries, and delivered on the return voyage!

We went ashore at Casa Blanca, landing in a small boat, and then to the castle, the gate of the town, and went to the Consulate to breakfast; it was a poor house, with a little court in front that presented a most refreshing thicket of Roses, *Geraniums*, *Orange trees*, &c., so dense that you could not see across it. After breakfast we took a soldier from the Consulate, and walked some miles to the southward, over flats of red hard argillaceous soil, and here and there badly cultivated fields, the whole studded with stony plants, but still of Mediterranean types. All were two to three fathoms forward than at Tangier, and also different. Of the plants that carpeted the ground at Tangier we saw here no *Daisy*, *Pyrethra*, large orange *Calendula*, *Borage*, *Anagallis cœrulea* or *Cistus*, little *Pistacia*, no Oaks, few *Erodia* or *Genista*; and it was too dry for *Laurustinus*, *Arbutus*, &c. We saw abundance of *Daucus*, yellow *Anacyclus*, sand *Chrysanthemum*, *Diplopentia*, many *Treffails* and *Medicines*, *Antirrhinum* *Narbonense*, many grasses, two *Franklinia* one (*corymbosa*) very pretty indeed, as a remarkable *Celsia*.

In the town are plots of small cottages 5 to 6 feet high, of mud or sticks, thatched, and surrounded by fences of tall, dry Fennice stems, 5 to 6 feet high.

We reached Mogadore on the 26th. The town was built about 120 years ago, and is much less healthy and better, and with broader streets, than any we have seen. The coast is terribly barren, consisting of lofty bare sand dunes, with scanty bushes at the very top; an old low Portuguese aqueduct stretches to the south of the city, and a ruined Portuguese fort is in the same direction. The island of Mogadore was joined to the mainland at low tide, within the memory of living men, who used to drive cows across; it now consists of two small islets of calcareous stone, covered with drift sand, on which we found *Stapelia*, *Chenopodium*, *Atriplex*, beautiful *Statice* (very rare), *Picramnia*, *Sonchus*, &c., also goats and doves. *J. D. Hooker.*

Societies.

CRYSTAL PALACE. May 20.—We have seldom had the pleasure of recording such a successful exhibition here as the one held on Saturday last. The various productions—perhaps exhibiting the finest and most uniformly successful desertation; and as there were plenty of them, Mr. Wilkinson, the indefatigable manager, had

little difficulty in adorning the centre transept—where plants are always seen to the best advantage—with a great display of floral beauty. In a great measure, the success of the exhibition was due to the fact that at no previous exhibition held in the metropolis this season prizes for large collections of plants were offered, and the "elephants" were reserved for this occasion. Well they looked, too, after their season's rest,—fresh and beautiful, and bearing no traces of travel-stain. It is no wonder then that the "elephants" commanded the popular verdict, as it is probable the always, and when they are—to use a popular gardening phrase—"done well." The great champion of the "elephant" cause, Mr. Baines, gr. to H. L. Micholls, Esq., never came out in greater force than he did on this occasion. 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The appearance of this little book at the moment when the planting of the flower garden is engaging general attention, is very opportune. It is written, the author tells us, with a view to assist the newly awakened taste for something more than mere colour in the flower garden, by enumerating, describing, indicating the best positions for, and giving the culture of the materials available for "subtropical gardening"—a designation which is described as not very happy, nor very descriptive, but which is adopted because it is popular. In these three parts these objects the book is divided into three books. The first is general and introductory, containing both criticisms what has been done, and suggestions as to what may be carried out; and here, we think, most readers will agree with us in deprecating the tone in which Mr. Gibson's subtropical gardening at Battersea is alluded to throughout, some of its features being sketched only to be derided, especially the raised beds, which, however, it is well known were

Obituary.

WE have to announce the death, at Hampden, Jamaica, on March 27 last, of Mr. JOHN DOWDIE, Jun., youngest son and only surviving child of Mr. John Dowdie, West Coates Nursery, Edinburgh, aged 23 years. Mr. Dowdie, Jun., was a young man of considerable promise, intelligent and painstaking, and a zealous and persevering florist.

Miscellaneous.

THE WHORTLEBERRY of MADEIRA (*Vaccinium madrense*) is, according to Mr. LOWE, strictly confined to that island, where it forms thickets of vast extent. In the exposed parts of the mountains, it becomes stripped in winter of nearly all its leaves, but in more sheltered spots they hang on until the young leaves appear. The peculiar Russia-leather redness of the foliage in winter gives a remarkable appearance to large mountain tracts. The same author tells us that vast quantities of the root-stocks or stems, cut up from the roots, are brought to London by the Funchal and all the villages of the island for fuel or brushwood; and the taller stems are used as rods or poles for French Beans, in default of the more durable heath-branches, which are yearly becoming scarcer. The fruit is also in much request for making a conserve or jelly, being a favourite and wholesome remedy in colds and coughs, and mixed with sugar and water, making a pleasant, cooling, and refreshing drink.

THE AMERICAN ASPEN (*Populus tremuloides*) is abundant in the region east of the Cascade Mountains and Sierra Nevada, forming a marked feature of the vegetation of the slopes of these mountains where the forests of the higher lands border the Sage plains of the central desert. Here it is seen in long lines of trees of small size, marking the courses of the many mountain streams which are in summer absorbed by the arid surfaces of the plains soon after leaving the mountain sides. Dr. NEWBERRY says:—For a time we were often deceived by the Poplars and Willows, regarding them as indications of the presence of water, but we learned that they were not, when a sign that water was to be found in their vicinity at some time during the year. Alders we found to be much better guides to water, as they will only follow the courses of the streams just so far as they are permanent, and no further; and we never failed, even near the close of the dry season, to find the roots of the Alders washed by living water."

THE OREGON CEDAR (*Thuja gigantea*), which is generally diffused throughout the Washington territory, grows to an immense size, being often from 12 to 15 feet in diameter. Its trunk is often straight and branches for 20 feet, but the top is so knotty as to be of scarcely any value. In lighter softness, and durability its wood excels any other, but is deficient in strength and elasticity. It is used chiefly for shingles, rails, and fine inside finishing. For most purposes for which the red wood of California (*Sequoia sempervirens*) is used it is superior, and is therefore much exported from the Washington territory. A backwoodsman can in a few days, with his axe, make for himself a comfortable cabin from one of these Cedar-like trunks, as it can be split into timbers and boards with the greatest ease. This fact has long been known to the Indians, who used to split it with stone hatchets and wedges of the Crab Apple (*Pyrus rivalaris*). They also make from its trunk their celebrated canoes, which are lighter and more elegant than any save those of Birch bark, used farther north. The wood is wonderfully durable. The thin bark, which comes off in long ribbon-like strings, is manufactured by the Indians into bags and articles of dress, and has been suggested as suitable for employment in paper-making.

Garden Operations.

(FOR THE PLANTING WEEK.)

PLANT HOUSES.

THE early flowering *Heaths* (*Ericas*), such as *E. hyemalis*, should now be well inured to the action of the air out-of-doors on all occasions when the weather is favourable, as the next season's supply of bloom depends greatly on the early growth and maturity of the plants. Continue to stop any growth shoots which are likely to flourish at the expense of the lesser ones. So treat the general stock of *Heaths* in the matter of giving air as to carefully harden them preparatory to standing them out-of-doors altogether about the third week in June, which will quickly arrive. Artificial shading, it must be mentioned, they have a decided aversion to. They require, primarily, a moderate temperature; a uniformity of root moisture, and, in connection therewith, as much fresh air as possible, and the freest exposure to light, bright sunshine, &c. An attack of mildew may be anticipated at this time—even under the most judicious system of treatment, but more especially after a damp, moist, close period. It is necessary, therefore, to be constantly looking through the stock; more particularly so because the attack commences mostly upon some of the

smallest old branchlets, which are underneath the younger growing ones, and to which the air does not so readily as to those to other parts. Flowers of sulphur is the only remedy, and an occasional dusting over of these parts with it is the best preventive aided by fresh air in abundance. Constant watchfulness will now be required in regard to watering such as are in small pots, or otherwise at all pot-bound. A good soaking is frequently an absolute necessity twice a day in very dry weather. *Fuchsias* must now be frequently pinched back. To produce nice bushy specimens each young shoot should be pinched back so soon as it has made two pairs of young leaves. *Fuchsias* may be grown along quickly and well in a good high temperature, if proper intervals to ripen the growth be afforded alternately with the quick-growing periods. Aim at a moderate night temperature. Do not go below temperate (55°), and with the early morning springing secure a close growing period for an hour or two, or until the sun runs the temperature up some 10°, when air must be given with freedom. Close again, if cloudy, by 2 o'clock P.M., or before 4 P.M. if the sun shines brightly, and syringe copiously. It should be needless to state that during the whole period of growth, every individual bloom should be pinched off as quickly as they are perceived. Spring sown *Primula* and *Camellia* should be pinched as soon as the third or fourth leaf is formed, using a light, rich, sandy soil, and potting them as lightly as possible. Give strong young *Balanis* their final shift—a moderate one only, if fine blooms and not large plants are a desideratum. A good, rich, fibrous, yellow loam, with leaf-mould and silver sand added liberally, will meet all their requirements. If large plants are required, the growing shoots must be pinched off, more liberal shifts be given, and all lateral shoots encouraged; they may by these means easily be grown as large as Gooseberry bushes. Seedling plants of "Slipper-works," or herbaceous *Calceolarias*, should be removed into a cool moist frame, where immunity from heavy showers is secured. Here they will thrive better during the whole summer than when exposed more fully to the vicissitudes of a sunny aspect. Continue to pinch back the growing shoots upon *Claytonia* specimens which are intended to form bushy specimens. They may now be placed upon a proper worm-proof bottom out-of-doors.

FORCING HOUSES.

Vines now ripening their crop of Grapes must be kept in a nice buoyant atmosphere, obtained by artificial warmth and its co-existent dryness. Particularly attend to the pinching back of all lateral shoots of the third, fourth, or fifth ranks following the first pinching back. This will, as a rule, however, only be necessary during the early stages of growth, as when berries begin to swell in earnest the strain upon the resources of the plant will quickly exhibit itself in a greatly reduced aptitude for forming young shoots. Encourage one or two shoots at the apex of each rod to grow a foot or two above the back water, the extended leaf surface formed thereby will prove a benefit to the existing crop. It may be as well again to state that when Grapes are thinned and are swelling freely subsequently it is advisable not to syringe the berries, owing to the fact that most water is greatly impregnated with sedimentary matter, which, becoming deposited in successional layers upon the fruit, whitens thereon, to their irremediable disfigurement when ripe. It is therefore advisable that during the first swelling, which takes place previously to the "stoning" process, a superabundant supply of humidity be maintained in connection with the increased supply of air. In instances where Grapes are stoning, which is known by the fact that they appear to be at a standstill in the matter of growth, following the first rapid swelling, treat them moderately possible, to induce a new growth and advance to ease them over their hardest work. In other words, give the severely taxed roots every opportunity to collect the necessary material for their support, and to gather it upward, rather by anticipation than to supply a want. In regard to *Pines*, give every encouragement now to the forward successional intended for early fruiting in the ensuing year. To this end any promising (*Queen*), &c., intended for this should be picked out, and receive their final shift into their fruiting pots. Induce these subsequently to well fill their fresh pots with roots by the first week in November, and "good way" will have been made. Be careful not to use soils made too rich by the use of an excess of stimulating manure in admixture, but rather use a moderate supply of manure-water, which you can the better give in a more acceptable time. Do not forget indoor borders, whether they contain *Vines*, *Peaches*, and *Nectarines*, or *Figs*. They will require copious supplies of water. Where there is a tank to catch the soft water from the roof as, there always should be in the house, it is an excellent plan during heavy rains to pour out abundantly on to the borders, the rain-water running in. This often saves a great waste at the water pit, and it is generally sufficiently warm at this time of the year to be appreciable by the roots. I do not suggest that the cultivator should wait while his trees suffer for such an opportunity, but should simply use the means when opportunity offers, as a saving of labour at the time when the men may be occupied under shelter.

HARDY FLOWER GARDEN.

Should the fine weather continue which exists while I write, it will be necessary to give all newly bedded-out plants a thorough good watering. I refer to this in opposition to a too general practice, and one much followed by our amateur friends, viz., that of frequently sprinkling over the surface of the borders, without often affording a supply where it is most needed, at the roots. Slopping water about upon the surface, I would have it understood, becomes of positive injury to the plants if persisted in, as I have often seen it. It induces the surface roots only to grow, and these receive a check again immediately the soil becomes dry, besides causing the soil to become baked and hard upon the surface. Give, therefore, a thorough root-soaking when water is required at all.

HARDY FRUIT GARDEN.

Finally thin out the crop of *Apricots*, and tack the young growing shoots to the wall. Regulate the growth of outdoor *Vines* by removing all small, unnecessary shoots, and tack in all that are to be retained. Place clean straw amongst *Strawberry plants* to maintain the fruit above the ordinary gritty soil, which gets attached to the fruit during showers if not thus prevented. Be particular to give the soil amongst the plants a good hoeing before putting down the straw, which saves much future trouble in regard to weeds. Cut away all weakly young shoots from red and white *Currants*, and in instances where these are attacked by aphid, thoroughly wash them off with the garden engine. Nail in young branches upon *Peach* and *Nectarine* trees, being careful to retain no more than will form just sufficient wood for bearing next season without a resort to too much pruning in the winter. Thin the fruit upon these also as early as possible.

KITCHEN GARDEN.

Thin out the *Beet* crop, each plant to 9 inches apart. Plant out finally the strongest plants of *Broccoli*, *Borecole*, &c., during a showery period. Top the forward crop of *Broad Beans* when in flower, and the early *Pas* as soon as they have fairly commenced to pod. Increase the stock of *Herbs* by slipping off next side-shoots, and dibbling them into a moderately moist shady situation. Water off the *Tomatoes* and *Chilis* well which are planted at the foot of sunny walls. Plant out now *Vegetable Marrows*, upon some little artificial heat if possible. Keep up the heat in *Cucumber beds* by an occasional addition of fresh fermenting materials, and do not let the heat relax greatly for a few more weeks, as cold ungenial periods may yet visit us. W. E.

Notices to Correspondents.

AMATEUR OR TRADER: *D. L. Coventry*. It is clear enough, according to rule 5, that the person in question is not an amateur in the sense intended in the schedule. Again, in rule 4 it is announced that the committee reserve to themselves the right of decision as to this point.

ASPARAGUS: *A. B.* This owes its white colour to the absence of light. There is, however, in France, a variety the young shoots of which do not become thoroughly green when exposed to light.

CAMELIAS: *Old Sab*. Before growth commences; or, as the intended will be past, when the new growth gets pretty well matured.

DOUBLE SCOTCH PRIMROSE: *O. S.* Send your name and address, and we will forward your letter to the gentleman alluded to.

FORSYTHIA: *Brabe*. They are beautiful Chinese and Japanese shrubs, now well known. *F. suspensa* or *Fortunei* being one of the best deciduous wall plants known. They belong to the Linnaean class Diandra.

FUNGUS: *W. K. T.* You have sent two distinct species. The one in buff paper is a form of *Agaricus fabisilis*, certainly not esculent; the other is a small specimen of *A. arenis*, esculent, but not equal to *A. campestris*. M. J. B.

GLAZING IRON CONSERVATORIES: *W. C.* We do not know of any firm which makes a thread kind of putty for fixing glazing in iron conservatories. The best putty for such structures is that made from white lead and oil.

INSECTS: *W. P.* *Calandra granarea*. Best remedy, soap and water, whitewash, and plenty of scrubbing in chimneys and corners. See a letter in our Home Correspondence of this day. *A. M.*—*C. W. S.* Although many sent us insects upon their plants, few twigs, we have no doubt that their buds and the inserted buds were devoured by one of the weevils. Look out for them after dark with a lantern. *I. O. W.*—*C. H.* The green beetles, which swarm on your Roses, are the common *Cotinis aurata*, which last summer's dry weather allowed to propagate in extra numbers. We know no better remedy than catching the beetles and hunting for the fat white grubs in your rich garden soil. *I. O. W.* LAWN-MOWERS AND WIREWORK: *H. S. Jun.* We do not undertake to recommend dealers, but our advertisement column. The answer to "E. L.", at p. 652 of our last, will perhaps give the information you want on the latter subject.

MEALY-BUG, ORANGE TREES, &c. *R. J. S. H.* The only effectual way to get rid of mealy-bug is to make a determined onslaught upon them, and to continue your efforts; never to let one live where known to exist. By these means I entirely eradicated them from a stove. Unless for the purposes of early bloom and fruit—these being especial desiderata—it is a waste of valuable room, and an unnecessary expenditure of fuel, to grow

Oranges and Lemons in a stove. They would succeed enough, if not better, in ordinary cold greenhouses, treated as you say, H. E.

MULBERRY: W. E. There may be many sorts of Mulberries; there is only one, however, worthy of cultivation for the sake of the fruit—the black, or common Mulberry, *Morus nigra*. The plant, as soon after the fall of the leaf as you like. The Mulberry may be propagated by seeds, layering, &c., and requires no particular management.

NAMES OF FRUITS: John Barnett and Wm. Fowler. At this late period of the season, when Apples have almost lost all their characteristic colour, it is difficult to name them with any degree of certainty.

NAMES OF PLANTS: C. W. S. We cannot see that this is other than a small variety of *Cattleya Mossie*, *C. Trianae*, *C. labiata*, or *C. quadricolor*, by whichever name you prefer to call it, for they are all varieties of one and the same species. The lip is very prettily coloured.

PEACH TREES GUMMING: H. S. The gumming of your Peach trees is probably the effect of some unfavourable condition in the past year. Like the gumming in Apricots, it may be the effect of previous heat or cold, which has destroyed a portion of the albumen, the circulation being kept up for a time through that portion which was not affected. This in turn gives way, and the whole branch perishes. The only remedy is carefully to prune out the affected shoots or branches. **M. J. B.**

RAIN GAUGE: A Young Learner. You do not say what form (whose pattern) of gauge you employ. The scale is graduated in inches and tenth-parts of an inch.

ROSE PARASITE: H. S. The parasite on your Rose is *Lecythis Rose*. The spawm of this parasite impregates the whole plant, and it is therefore impossible to touch it with any chemical. A tree watered with solution of the infected leaves will sometimes become diseased. **M. J. B.**

SPOT ON PELARGONIUM: W. C. B. Judging from the leaves of your Pelargonium, we should say that the disease is a case of mildew, a spot which usually arises from alternate drought and profuse watering. The double Pelargoniums are gross feeders, and perhaps would be better treated by keeping them apart from single varieties. The best way to prevent spot is, we believe, spraying through the winter. Whether the decayed spots on the stem arise from the same cause, it is difficult to say, for they occur on plants on which there is not a trace of spot. In one case we have seen portions of the stem become hard and sticky, which, passing through the winter, the shoots were apparently healthy, but the decayed tissues in the inside of the stem are diseased. We shall endeavour to strike the specimen, and if it becomes healthy we shall then believe that it is a local affection. There is certainly no Fungus. **M. J. B.**

SYRINGING VINES: Amateur. It is not advisable to syringe Vines after the fruit is set, excepting with clear rain-water, as mostly all waters are sure to spot and dirty the berries in some way; keep a thoroughly moist and humid atmosphere in the house by continued dripping of the waters, pathways, &c. To fumigate gently will do no harm, only there is much mismanagement to require to do so.

TEA-SCENTED ROSES: Col. Puckle. The proper name of this group of Roses—tea-scented, not tea—of itself answers your query. It was given long ago to the Chinese R. and Fragrant, and is the name of its most delicious perfume, which "strongly resembles the scent of the finest green tea"—that scent, it must be remembered, having been artificially imparted to the tea. The race of Roses now cultivate under this name—a numerous one—springing from the above and the yellow tea-scented varieties, and has retained the popular name of the parents. There is no very close resemblance between the leaves of tea-scented Roses and those of the Tea plant.

VINE BORDER: J. Thompson. If it would not be too unsightly, you may cover your outside Vine border with a moderate layer of good rotten manure. Put it on as the Grapes are commencing to swell.

VINES: W. M. Your Vine leaves and young shoots were so mouldy on their arrival that we could make nothing of them. The patches on the leaves look as if they had been burnt by little nodules or inequalities in the glass, a very frequent cause of mischief, especially if the plants are weak. **M. J. B.—D. T. F.** As in the last case, the specimens were mouldy when they arrived. We have, however, seen precisely the same condition in Vines planted on an outer border, and believed that they were unnaturally pinned in passing them into the house. When one was cut down beyond the point of entrance, it sprouted vigorously, and bore fruit on the clusters of the house the same season, and one of the shoots introduced in the place of the old one is perfectly healthy. Nothing, however, is more difficult than to form a correct judgment without optical inspection. **M. J. B.**

CATALOGUES RECEIVED: James Dickson & Sons, Catalogue of Bedding-out and Border Plants, New Roses, &c.

COMMUNICATIONS RECEIVED: W. M.—G. G.—E. Cribb.—F. M. J. B.—P. P. C.—Kappa.—W. P.—A. W. D. F.—W. F. M.—P. C.

new Potatoes. Large consignments of very good new Potatoes are to hand from Guernsey, at from 10s. to 14s. per cwt. Large stocks of old Potatoes are still on hand.

FRUIT.

	s. d.	s. d.		s. d.	s. d.				
Apples, per doz.	1	6	to 3	0	Oranges, per 100	6	0	to 10	0
Grapes, per lb.	6	0	—12	0	Peaches, per doz.	11	0	—36	0
Lemons, per 100	6	0	—10	0	Pine-apples, per lb.	6	0	—10	0
Nectarines, per doz.	15	0	—30	0	Strawberries, p. lb.	5	0	—12	0

VEGETABLES.

s. d. s.		s. d. s.					
Asparagus, p. bundle	4	0	5	Lettuces, per score	1	6	0
Beet, per doz.	2	0	0	— French Cobs, each	0	9	0
Broccoli, p. doz.	1	0	0	— Calabage,	0	2	0
Carrots, p. bunch	0	8	0	Each	0	2	0
— French, per	1	0	0	Mushrooms, p. pott.	1	0	0
Cauliflowers, p. doz.	1	6	0	6	0	0	0
— spring, doz.	2	6	0	Parsley, p. bunch	0	4	0
Celery, per p. bun.	1	6	0	Peas, per quart	2	0	0
Chicory, per doz.	1	0	0	Radishes, long, p. bun.	0	12	0
Cucumbers, each	0	9	0	— round, doz.	0	12	0
French Beans, p. 100	3	0	0	Rhubarb, p. bundle	0	3	0
Green peas, p. 100	3	0	0	Shallots, per lb.	0	2	0
— quart	0	9	0	Spinach, per doz.	2	6	0
Herbs, per bunch	0	2	0	Turnips, French, p.	1	6	0
Onions, per doz.	1	0	0	— bunch	0	1	0
Potatoes, Regents, per ton	70s.	0	0				
Rocks, 50s.	10s.	0	0				

POTATOS.—Southwark, May 22.

During the past week the arrivals both coastwise and by rail have been very much in excess of the demand; there are also large supplies of new Potatoes from Portugal, Jersey, and Cornwall. The following are this day's quotations, which are made nominal:—Yorkshire Regents, 40s. to 45s.; Yorkshire Regents, 40s. to 45s.; Lincolnshire 60, 45s. to 55s.; Dunbar and East Lothian 40, 60s. to 70s.; Ferth, Forfar, and Fifeshire 40, 40s. to 50s.; do. Rocks, 35s. to 45s.

WANTED, a WORKING GARDENER, as Business-Manager, in a small Nursery, Jobbing, and Florist's Street, Kingston, Surrey. Good Letter—J. 35, Rotherfield Street, Kingston, N.

FARM PUPIL.—The Manager of the celebrated Steam Cultivated Farms of Messrs. Allwood, of Bedford, has a VACANCY. Apply to Mr. WALTER J. REAVER, at Britania Farms, near Bedford.

DERBYSHIRE ASSOCIATED DAIRIES. THE FARM LIMITED number of YOUNG MEN to LEARN CHEESEMAKING on the Factory System, as now being carried out in Derbyshire. Application to be made to Mr. GILBERT MURRAY, Estate Office, Foston Castle, Derby.

WANTED, an active, competent, and trustworthy Gardener, to take charge of the garden and to stand the Propagation and Treatment of a general collection of Hard and Softwooded Plants. Good references indispensable. Apply by letter, stating age, wages required, &c., to the FOSTER & SONS, Nurseries, Pimlico, Devon.

WANTED, as Head Gardener, a Single Man, well up in the profession, of exceptional talents, as to character and ability will be required.—Address, by letter only, to the Editor of the *Chronicle*, 10, Abchurch Lane, London, E.C.

WANTED, by June 15, a good practical, energetic Gardener, who thoroughly understands the Management of Vines, Melon Pits, and Peach Trees, as well as the best treatment of the various kinds of flowers, &c.—Address, by letter only, Rev. A. J. RIDDELL, Bengie, Fenzance.

GARDENER.

WANTED, a Gardener, for Edwards Square, Kensington. He must have good character for industry and sobriety. Married Man, without incumbrance, preferred. Wages 15s. per week, and board by letter. Apply by letter to Mr. A. J. SHIPLEY, 12, Lower Pall Mall East, Kensington, W., or on before May 27.

WANTED, a very respectable MAN, who thoroughly understands a Garden, small Conservatory, and Vine; also have a Horse under his charge, and will occasionally have to take a pair of Horses to the office. He must be a sober, steady, and reliable character. Will be required—Apply, stating wages, age, &c. B. 2, Brighthelm, Yorkshire.

GARDENER.

WANTED, at Edgbaston, near Birmingham, a GARDENER and his WIFE, without incumbrance. The Gardener to undertake the Management of a Conservatory, Greenhouse, and Kitchen Garden, &c. He must be a sober, steady, and reliable character. Will be required to attend to—Apply, by letter only, 314, Bradford Crescent, Huddersfield, Yorkshire.

WANTED, as GARDENER and LAUNDRESS, at Stamford Hill, a Man and Wife, without incumbrance, both well qualified.—Apply personally or by letter to C. C. Manor Offices, 10, Abchurch Lane, London, E.C.

WANTED, an UNDER GARDENER, for North of England.—Age 35, married, no incumbrance; must understand Kitchen and Flower Garden, and be a good Laundress.—Apply by letter to T. M. 1st, Cannon Street, E.C.

WANTED, an UNDER GARDENER (where several are kept), who has been accustomed to Grapes, Pines, and Orchids, and is well up in the management of the same. A steady, active, married Man, of good character, to live in the house, and to be a good Laundress, &c. Apply by letter to the Editor of the *Chronicle*, 10, Abchurch Lane, London, E.C.

Assistant Packers.

MESRS. JAMES VEITCH AND SONS are desirous of ENGAGING TWO or THREE ASSISTANT PACKERS. Application to be made, either personally or by letter, stating references and wages required.—Royal Exotic Nursery, King's Road, Chelsea, London, S.W.

WANTED, in a Provincial Seed Shop, a SHOPMAN, of good address, and who thoroughly understands the business in all its branches. No application will be entertained unless applicant can give first-class testimonials for honesty, sobriety, and industry. To a practical Man a good opening; none others need apply.—Address, stating wages required, &c., to L. 101, Gardiners' Chronicle Office, 10, Abchurch Lane, London, E.C.

WANT PLACES.—Letters to be Post Paid.

Gardeners.

B. S. WILLIAMS has much pleasure in stating that he has been up his GARDENERS' REGISTER many Men of character, integrity, thoroughly qualified to undertake the duties of HEAD GARDENERS, and of the highest quality, in the profession. GARDENERS. Ladies or Gentlemen requiring such may rely upon B. S. WILLIAMS' selection, and will be well satisfied, and able to do so. Victoria and Paradise Nurseries, Upper Holloway, London, N.W.

EXPERIENCED GARDENERS (or as GARDENER and BALIFF), of various qualifications, recommended to Gentlemen.—Further particulars given on application to Messrs. G. H. DICKSON and Sons, 21, St. John's Street, London, E.C.

GARDENER (HEAD).—Age 30, married, one child (age 5); thoroughly understands the profession in all its various branches. Good character.—J. C., Post Office, Loughton, Essex.

GARDENER (HEAD), thorough.—Age 30, married, no family. Good character.—WILLIAM CARTER, 27, May Street, North Ealing, Middlesex.

GARDENER (HEAD).—Age 27, married; understands Vineries, Pines, Greenhouse, and Fruit, Flower, and Kitchen Gardening. Would not object to good single-handed place.—W. C. M., 10, Rotherfield Street, Kingston, Surrey.

GARDENER (HEAD).—Age 34, married, without family; thoroughly experienced and practical Man. Eight years with a Noblemen. Will not treat for a single-handed place.—Reference to Rev. C. R. Reid, Hawthorn, Hallowell.

GARDENER (HEAD).—Age 38, married; has a thorough practical knowledge of the profession, including the Management of Houses, and Flower and Kitchen Gardening. Good character from present employer.—J. J. Post Office, Loughton, Essex.

GARDENER (HEAD), to any Lady or Gentleman requiring the services of a thorough practical Gardener.—Three years as Foreman in present situation. Character will bear the investigation.—GEO. COULSON, Wrotham Park Gardens, Barnet, Middlesex.

GARDENER (HEAD).—Age 33, married; has a thorough knowledge of the profession in all its branches; 10 years' experience in single-handed place. Testimonials for 18 years, five of which with last employer. Can be highly recommended.—A. L. P. P. Office, North Ealing, Middlesex.

GARDENER (HEAD), age 27, married, no family.—J. H. Ley, Exotic Nursery, Croydon, will be happy to recommend WILLIAM MORTIMER, who is about leaving his present situation the best and most experienced Gardener, and has the knowledge of all branches of the profession—Apply as above, stating wages, &c.

GARDNER (HEAD).—H. DOWNING, Gardener to T. Grissell, Esq., Norbury Park, will be pleased to recommend to Noblemen or Gentlemen his Foreman in the present situation, who has lived here three years, and has been employed in other first-class places. Can give an excellent character. Address, to T. Grissell, Esq., Norbury Park, near Dorking, Surrey.

GARDENER and BALIFF, to any Lady or Gentleman.—Age 43, married, no children, and understands the profession in all its branches. Testimonials for 18 years, five of which with last employer. Can be highly recommended.—A. L. P. P. Office, North Ealing, Middlesex.

GARDNER (SINGLE-HANDED, or where two or three are kept). The Advertiser will give £1 to anyone who will procure him a good situation. London or vicinity.—A. L. P. P. Office, North Ealing, Middlesex.

GARDNER (SINGLE-HANDED, or otherwise).—Age 31, married, no family, respectable; thoroughly understands all branches. Wife can undertake Washing, or as Plain Cook, or assist in Housework.—A. A. Clavering, 3, Abchurch Lane, London, E.C.

GARDNER (UNDER, or IMPROVER).—Age 25; G. R. E. 10, Abchurch Lane, London, E.C.

GARDNER (UNDER, to improve), where several are kept.—Age 30; three years' good character.—W. KETTLIE, Hopton Farm, Hopton, Wiltshire.

GARDNER (UNDER).—Age 23, has had excellent practice in first-class Garden and Forcing establishments. Can give good references as to character and ability from present and late employers.—A. A. Clavering, 3, Abchurch Lane, London, E.C.

GARDNER (UNDER), in a Gentleman's Garden or Nursery.—Age 30; has been Groom and Assistant Gardener, Four years' good character. State wages, &c.—T. ELDRIDGE, Fulham Cottage, Fulham, London, S.W.

FOREMAN, in a Noblemen's or Noblemen's Establish-ment.—Age 30, married, good character as Foreman from last situation.—A. B. M. Gunner, Great Baddow, Essex.

FOREMAN.—Age 25; understands Early and Late Forcing and Kitchen and Flower Gardening. Good character.—G. D. Orchard Street, London, E.C.

FOREMAN, in a good Establishment, where Forcing and Plant Growing are carried on with spirit.—Age 25; has held a situation as above. No objection to go abroad. Good character from present employer.—J. J. Post Office, Loughton, Essex.

PROPAGATOR (FOREMAN), Hard-wooded, chiefly indoors.—Age 25; 10 years in the Trade. Three years and nine months with present employer, in one of the leading establishments in the country. State full particulars.—H. L. 1, Hampden Villas, Waddon, New Road, West Croydon, Surrey.

PROPAGATOR (FOREMAN), in a Nursery.—Has had great experience in Growing and Propagating Stove and Greenhouse Plants (Hard and Soft-wooded), Small and Specimen Stuff, Fruit, Camellias, &c. Good character.—G. Gardner, Cranford, Surrey.

PROPAGATOR (Hard-wooded) of Conifers, Rhododendrons, Roses, Clematis, &c.—H. Y. T. Cripps & Son, Frank Road, Tottenham, Middlesex.

To Growers or Intending Growers of Beetroot. BEETROOT CULTIVATOR.—A Gentleman, native of France, who has for many years devoted himself to the Manufacture of Beetroot, and is well prepared to give instruction as to the Cultivation of the Beetroot, seeing the position of the grower in the market.—Apply to H. R. F. Mr. Golder, Stationer, Market Place, Reading.

To Noblemen and Gentlemen. STEWARD, or MANAGER of an Estate.—A Person of good education and of high character would be happy to take any position, either at home or in the Colonies, and is prepared to give the highest references.—Can draw and prepare plans. It is a large and important office.—Apply to the Editor of the *Chronicle*, 10, Abchurch Lane, London, E.C.

ESTATE AGENCY, or the MANAGEMENT of a LARGE FARM.—A Gentleman, of good family (married), wants a situation as above; has had considerable experience in every department of Agriculture, including the Breeding and Management of all kinds of Stock, and has some practical knowledge of the various kinds of Farming, and is well up in the use of the various kinds of Agricultural Machinery. He is a good Accountant, Correspondent, and Draughtman. Moderate salary, but a high quality of security can be given if required.—GEO. STRICKLAND, Longmarket, Perth.

IMPROVER, in the Houses.—Age 22; has been in the Kitchen and in the Nursery of a small establishment.—J. PITCHER, Walton Gardens, near Warwick.

To the Seed Trade.

WAREHOUSEMAN.—Over seven years' experience with present employer. Messrs. J. S. & Co., Stock Exchange, 10, St. Paul's Church, London, E.C.

SHOPMAN.—Age 24; eight years' experience in first-class London and Provincial houses. Good references.—L. 1, 53, St. George's Road, Regent's Park, N.W.

Markets.

COVENT GARDEN.—May 26.

The attendance of buyers has this week been a little better, the supply being about equal to the demand, at very irregularly. Continental supplies have been received in very fair condition, including very good samples of

verses' in Rome, the discontent and bitterness which, according to Mr. KEMBLE, led to the defeat of the English at Hastings, followed by the Norman subjugation of the kingdom; and again appeared as one of the main causes of the first French Revolution. It must, however, be obvious to everyone who looks fairly upon the phenomena described, that they are of spontaneous growth, and that the hostility of class feeling to which they have given rise in every country, is, so to speak, a kind of blind passion, like that of birds or animals that fight because they are caged, or squeezed together, each taking his neighbour for an adversary, while in fact a cause external to them both is producing the apparent wrong. No man throws up what he has inherited, be it land or money, or any other possession, because others are without it: and he who asks him to do so would probably be the first to refuse such a demand, if he, conversely, were the party in possession. The remedy cannot be found by violence, except through Revolution, which only reproduces the same evils, *mutatis mutandis*, with infinitely augmented national loss and suffering. The wise English people will take note of this, and deal with this question as they have successfully dealt with every other, by patient constitutional action, that has never yet failed in setting right those ills which the survival of obsolete law and custom, or the growth of centuries, has occasioned.

We have spoken hitherto of causes which are common to every country. It remains to show how they have operated in our own, and how they have been dealt with: that is, how the natural laws above described have been acted upon by the *national* laws of this country, such as they have been from time to time. For we need not be reminded that the hand of legislation has been always busy with the Land: and it is most important to watch how far its action has either *exaggerated* or *restrained* that cumulative tendency above described, and what are the results which, in our case, it has produced. The survey is, historically, a long one, but shall be shortened to the utmost that is consistent with clearness, and the tracing of effects to causes, sometimes so remote.

Every one knows that when the Romans invaded this country they were at the height of their civilization. During nearly four hundred years while they remained, they introduced their own Laws, the most perfect code which the world has ever seen;* and though, after their departure, a long period of semibarbarous reaction supervened, under the various Saxon, Danish, and other settlements, yet there were many features in the home systems of those tribes that were of German origin, which (as attested by Roman writers†) were well suited to amalgamate with the Roman civil code, especially in relation to the Land. The result was that, in spite of all drawbacks during the six centuries that elapsed between the Roman departure and the Norman Conquest, the land laws of England became advanced to a degree of excellence that we, even at this distance of time, with our present materials of judgment, estimate: and there is no reason to think that had that system remained uninterrupted, there would ever have arisen any 'land question' in England even to the present day. This sounds a bold statement, but it will bear investigation: and every addition to our knowledge of that period (which has recently been very considerable, from such writers as PEARSON, FREEMAN, PALGRAVE, Sir EDWARD CRESSY, Mr. MAINE, and others) will bear out the statement. All the elements of what may be called Land Freedom had been realised. The holding was secure, registered in the County Court, the transfer was free, simple and public, the testamentary power was unshackled, and, in the presence of sufficient witnesses,‡ might even be made by word of mouth, the inheritance (in case of intestacy) was impartial—in accordance with the Roman civil code which regarded the Family as the unit; looking with the utmost dignity and justice of public Law no further into the subordinate question of age, or sex;§ and lastly the public land ('Folk-land') could only be granted to private use ('bolk-land') by the King with consent of his *Witan*, or public council of the realm.|| The boundaries were

defined with scrupulous accuracy, and a Register of Deeds and decisions, including Mortgages, was kept in the Superior Courts. Perhaps the best testimony of public estimation in which these laws were held by the English people is, that for more than a century and half after the Conquest they never ceased to remand them from those who occupied the throne.

These laws were not at once abolished at the Conquest. On the contrary WILLIAM swore repeatedly to observe them, and even granted a special charter to the City of London to confirm them. But he had to reward his followers by English 'Fiefs,' taken from his English subjects, and the insurrections that took place gradually led to an almost general dispossession: and twenty years after his landing, the compilation of 'Domesday Book' by his Commissioners—a general 'Terrier' of the Kingdom—attests the almost universal confiscation that had been wrought of *all the larger estates*. Strange retribution! if Mr. KEMBLE's words on the defeat at Hastings be true.

Then, by degrees, came England's 'Feudal Period'; not, be it observed, the feudalism of the Continent,—a system comparatively mild, well suited to the time, and which secured the rights of the tenant, so long as he performed his duties, as firmly as those of the lord,—not even the feudalism which the Normans had at home,* but a conquering despot's version of crown feudalism so oppressive and intolerable, so robbed of all the reciprocity of rights which subfeudation implied, upon the Continent, that happily it drove the very recipients of the spoil, now partially united by marriage, and otherwise, with the English people, into conflict with the Crown, as 'English barons,' who tore from the first weak monarch of WILLIAM's line a concession which laid the foundation of the *personal* freedom of Englishmen, by the Great Charter of Runnymede. From that day the nobles of England became and have remained part and parcel of the People. We have no class 'nobles,' no 'paysanterie,' in England: the advocates of 'peasant proprietors' should remember this, and talk better English.

It is unnecessary to enter into the history or the 'incidents' as they are called, of Feudalism: especially of that spurious version of it forced upon this country which, as Mr. HALLAM has shown,† was little more than the name applied to a few of its most odious and exasperating features. Its fundamental principle was an indissoluble tie between the 'lord' and the 'vassal' in the tenure of land by services rendered, chiefly military, especially in its higher grades. England had been parcelled out by the Conqueror into 60,000 'Knight's Fees,' all held absolutely and solely of himself; and in contemplating this system, all idea of land in its agricultural, or usufructuary sense, both as it existed before the Conquest, and as understood in its modern character, disappears from view, supplanted by a military structure the very essence of which was such as to forbid all alienation, or testamentary power, the 'fiefs' descending from father to son, like an office, or the command of a regiment, in primogeniture succession. It is unnecessary to point out how essentially primogeniture, confined to course to males, would form the back-bone of such a system; female heirs being at once disposable in marriage by the lord of the fee to whomsoever he chose to assign them.‡

Secret alienations however did take place; and produced in the reign of EDWARD I. two important statutes, whose object was to recover to the 'lords' the rights they had been deprived of by those who had disposed of their lands, assuming to themselves the feudal *status* of their superiors. To accomplish this (in the language of the statute *De Donis*), the Fief was '*entailed*,' that is, divided into two 'estates' or interests, in such manner that the possession was severed from the reversion, which still remained with the grantor, and his heirs, from whom in fact it was inseparable. Thus arose the idea of an *Entail Tail*, a word that has ever since figured pretty conspicuously in our law language, and began that cruel labyrinth of complicated interests, England's saddest inheritance, the 'Law of Real Property'; in tracing whose recondite lines the maze-stricken life-toiler is sometimes startled when he thinks that 'no Englishman who fought

at Hastings had ever heard of primogeniture, nor did any Anglo-Norman Knight for two centuries afterwards ever hear of the law of entail.¶

(To be Continued.)

THE paragraph in the *Agricultural Gazette* for May 13, 1871, on poisoned cattle, calls to mind an exactly parallel case which took place a few years since at Apethorpe, in Northamptonshire. In the previous year two or three beasts had died with very similar symptoms, from eating, as it was supposed, too largely the strong bents of the Italian Rye-grass. But in the following year, some other cases occurring in an old pasture, there was strong suspicion that there had been some foul practice, and accordingly we were ourselves consulted on the case, and an intelligent analyst was summoned to make a *post mortem* examination, which led to no certain result. We examined the pasture very carefully, but we could find nothing at all likely to prove poisonous; and as the principal part of the herbage consisted of the False Bromegrass (*Brachypodium pinnatum*), a grass which is not in general eaten by cattle, except in the absence of something less harsh and nutritious, we were driven to the conclusion that this had acted the part of the bents of the Italian Rye-grass. The main symptom was intense constipation and consequent inflammation, the coats of the maniples shelling off exactly as described by Mr. SHERRATT, the pain being so severe as to give the appearance of madness in the sufferers. On close examination of the compact mass of food, which was caked almost as closely as an oil cake, we detected small quantities of filmy blue paint, but not in sufficient abundance to account for the symptoms, though we have known cattle suffer from licking off paint which had been lately applied.

We can scarcely conceive that the leaves of the Arum could have been taken in sufficient quantities to cause death, except the pasture was so bare as to leave little choice. It is certain, however, that cattle will occasionally consume a great quantity of the leaves of Crowfoot and Pilewort when so intermixed with the grass as to make it a matter of great difficulty to avoid it, but we do not think they are ever eaten by choice. It was a favourite theory of the late Mr. WHITLAW, that both milk and meat became unwholesome in consequence of cattle eating Buttercups, and had he known the fact which we are about to mention, he would undoubtedly have made the most of it in support of his views. The butter from a particular pasture in the parish of Nassington, Northamptonshire, was absolutely uneatable from its acidity during six weeks in spring. We were requested to examine the pasture, to see if we could detect the cause. This was plain enough, as the common Pilewort was in such abundance that it was impossible for the cows to graze without consuming a great deal, and in consequence, so long as the leaves were green and succulent, the quality of the butter was impaired. The case lately reported, like those mentioned above, is a very curious one, and calls for further inquiry. It is a matter of importance to ascertain whether some unusually dry food was the cause of mischief, or whether there is good reason to believe that some noxious herb had been consumed in sufficient quantity to cause death. M. J. B.

THE management of the BATH AND WEST OF ENGLAND SOCIETY has long been in the hands of men who look for a more than merely utilitarian result from their labours. The social influence of the Society, as well as its strictly professional character, has been cared for, and its meetings seem to have always more of a holiday character about them than those of any other agricultural association. Perhaps there is something in the fact that it is not so unwieldy in the mere dimensions of its showyard—that it is not so rigid in the grasp which, by means of stewards, managers, and judges, it lays upon its exhibitors—that it is not so exclusive in its regard for the merely material improvement of the art which it desires to foster—as our great national societies necessarily are. It opens large rooms for the exhibition of works of art, as well as sheds for cattle, sheep, and pigs—it always has what our English Society seems unable to obtain, a good poultry show—and it has a large tent for flowers.

There is every prospect that next week's show will blossom all over with even more than the grass

* See CROCEY'S 'History of England,' vol. i.

† See T. A. DE M. 'Germ.' c. 16.

‡ Ten or twelve were commonly required: but see HALLAM, *Med. Hist.* ii. 313.

§ In some parts of the country females were excluded, by local custom.

|| See KEMBLE'S 'Domesday Book,' p. 742, note 1.

* Still partially surviving in the Channel Islands. See an able and temperately written pamphlet on these laws, by Mr. TURNER, of Guernsey, published in London.

† Mid. Ages, ii. 415.

‡ 'Reliefs,' 'Wardships,' and 'Marriages' were the three great engines of oppression.

usual grace and beauty which the Society seems always to command. There never was a more beautiful showyard than the one lying hard by the picturesque old town of Guildford, in the valley of the Wey. From any point in the 30 acres of its extent you have the richest English landscape. Standing under the shelter of the noble Elm trees with which the ground is shaded, you look out on green hill-sides, crowned with the ruins of ancient abbeys or of castles; and dark masses of Scotch Fir, mingled with the bright spring green of other foliage, are broken up by peeps of chalk cliffs seen here and there in different directions, while church spire and Poplar tree and gabled house vary the sky line, here running along the undulating crest of the wooded hills on either side of the valley. It certainly is a very charming spot; and there is ample provision also made for the strictly agricultural character of next week's exhibition in it. The plan given below, reduced, by Messrs. CLOWES' kind permission, from their large map accompanying the catalogue which will be sold in the yard, gives full information of the arrangements that have been made. The trial grounds, of 40 or 50 acres, including sufficient extent for the exhibition of steam cultivation, and the trial of reapers, mowers, horse-rakes, &c., lie on the other side of the road which bounds the length

the general meeting held last Monday, that Sir WATKIN W. WYNN, Bart., has been elected President of the Society for the year ensuing. The report states that since the last general meeting in December, three governors and 37 members had died, and the names of 132 members had been removed from the list; on the other hand, one governor and 210 members had been elected, so that the Society now consisted of 72 life governors, 74 annual governors, 1580 life members, 3866 annual members, 17 honorary members, making a total of 5648. The ordinary income of the Society for the year 1870 exceeded the expenditure by £1501 19s. 7d.; but the showyard receipts at Oxford fell short of the expenses by £2504 4s. 8d., leaving a nett deficiency on the year of £1002 5s. 1d. This fact may rather be taken to prove the utility of the Society than supposed to illustrate any failures in its year's proceedings. It is by its expenditure, and not by its accumulations, that the Society is useful. It will be seen that in mentioning the successful candidates for the Society's prizes in connection with their education committee, due credit is given in the report to the Royal Agricultural College as the place of their agricultural education.

At this period of the year NEW VEGETABLES and FRUITS are beginning to make their appearance in our markets, and the foreign produce is always before our own; large quantities of foreign Peas and Potatoes and their way into this country in early spring. Of the latter, the *Gracer* tells us, it is estimated that as many as 400 or 500 tons are weekly brought into the London market during the season. These Potatoes are

The returns from the central dépôt at Paris (which had been transferred to Creil owing to the disturbed state of the capital), and those from the western dépôt at Rouen, had not been received. A balance of about £2000 was held over until the autumn, as well as a Swedish fund of more than £4000, which M. DROUVIN DE LUCY, president of the "Société des Agriculteurs de France," had requested the committee to distribute. In addition, a fund of railway charges in France, amounting to about £1500, was expected, partly from the railway companies and partly from the Government of M. THIERS.

The Chairman described the impediments which the hostile occupation of the districts requiring relief caused at the earlier period of the operations of the fund, and the holding back of subscriptions in consequence. He said that when the preliminaries of peace were signed the difficulties were removed, and then, instead of the occupation of the country by the German armies constituting a difficulty, it facilitated their operations, and they were enabled to send seed-corn to the district of Amiens and elsewhere, with the certainty that it would not be requisitioned, and he tendered the best thanks to the German authorities for the valuable assistance they had given. The executive committee at home had laid down but one principle, viz., that the corn should be distributed amongst the largest possible number of people, and that no occupier should receive more than sufficient to sow four English acres. He calculated that they had relieved at least 80,000 occupiers in this way; and taking the average number of persons in each family at three or four, of course the total number relieved must

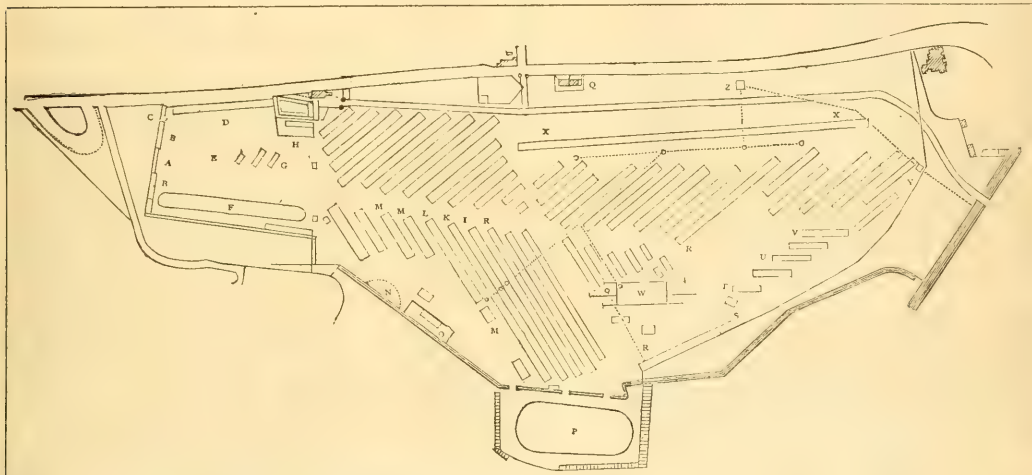


FIG. 141.—PLAN OF BATH AND WEST OF ENGLAND SOCIETY'S SHOWYARD AT GUILDFORD.

REFERENCES:—Road on east of Showyard from Guildford to Stratford. A, Entrance; B, Offices; C, Exit; D, Seed stands; E, Catalogues; F, Poultry tent; G, Post-office; H, Council tent; I, Cattle sheds; K, Cattle and sheep; L, Sheep; M, Pigs; N, Cattle ring; O, Fodder; P, Horse yard; Q, Horse shoeing; R, Refreshments; S, Ladies' cloak-room; T, Pictures; U, Art store; V, Arts building; W, Horticulture; X, Machinery in motion; Y, Pumping engine; Z, Tank. All other sheds are implement sheds, including 217 stands.

of the yard. The index letters explain the arrangements within the yard. If the weather should be fine, visitors cannot fail to reap great pleasure as well as profit from their Guildford journey. H.R.H. the PRINCE OF WALES is expected to visit the yard on Wednesday.

At Mark Lane on Monday, factors demanding more money for English Wheat, scarcely any sales were effected. On Wednesday the anticipation of a revival on French account prevented any material reduction in prices.—Though the supply of beasts at the Metropolitan Cattle Market on Monday was very short, trade was dull. For sheep, prices were considerably reduced. On Wednesday trade was again dull, and on the average prices were lower.—Wool continues in good demand; and for English Hops the demand is firm, at advanced prices for all descriptions.

The eighth annual METROPOLITAN HORSE SHOW takes place at the Agricultural Hall, Islington, during the ensuing week, opening on Saturday with the judging in public. The total number of entries approaches 400.

The ROYAL AGRICULTURAL BENEVOLENT INSTITUTION holds its anniversary festival on Wednesday next, at Willis's Rooms, St. James's, the Marquis of HUNTLY in the chair; and the election of a large number of pensioners will follow on June 12.

It will be seen from the REPORT of the COUNCIL of the ROYAL AGRICULTURAL SOCIETY to

chiefly grown about Lisbon, and are packed in boxes containing about 1 cwt., and half boxes of ½ cwt., nett. They are brought by steamers making rapid passages, and two, three, and sometimes four of these vessels arrive weekly. At the present time, it appears, large quantities are arriving, all in excellent condition. We are told that the whole of these Potatoes are sold at the Green Fruit Sale Rooms, constituting part of that trade. London was formerly the only market for them, but now large quantities find their way into the country, and many country grocers sell them.

At a meeting, on Tuesday, the executive committee of the French Peasant-Farmers' Seed Fund rendered their report in reference to the distribution of seed corn to the FRENCH PEASANT-FARMERS ruined by the war. Lord VERNON presided, and the following is a brief summary of the results reported:—

"The subscriptions received to May 18 amounted to £41,955 2s. 2d., of which £13,000 had been voted by the Mansion House French Relief Fund. The committee had sent to France, for the relief of the peasant-farmers, 3695 qr. of Wheat, 3836 qr. of Barley, 5387 qr. of Oats, 250 qr. of Vetches, 700 tons of seed Potatoes, 500 bush. of Haricot Beans, 250 bush. of Turnip seed, 800 lb. of Carrot seed, 1000 lb. of Onion seed, and 500 sacks and bags of miscellaneous seeds. The committee had also distributed large quantities of seed corn and Potatoes for several other funds at home and abroad. The returns as to the number of peasant-farmers who had received relief were not yet complete; but from the northern dépôt at Amiens about 26,000 occupiers had been relieved in the departments of the Somme, Aisne, and Pas de Calais; and from the southern dépôt at Tours nearly 30,000 occupiers had received seed-corn, Potatoes, &c.,

be multiplied to that extent. Taking each sack of seed Wheat to yield 40 bush., or 10 sacks, of Wheat, or 7 sacks of flour, it would give 600 quarter loaves, or about two a-day, for each family for 12 months. He expressed a hope that Englishmen generally would view the work with approval, seeing that it had been in all respects successful. He was satisfied that it would produce not only material results in alleviating the misfortunes of a large number of people who were in no degree responsible for the state of things in France, but from the expressions of gratitude which had reached the committee he had no doubt that the benefit conferred would produce a decided increase of goodwill and amity between England and France.—On the motion of Mr. T. GATES DANTON, seconded by Mr. M. SUTTON, the report was adopted, and votes of thanks were passed to the various societies and other bodies who have assisted in the operations of the fund at home and abroad; to the representatives of the fund abroad, and the local committees who have assisted them; to Mr. ODAMS and the Mark Lane Committee; and to the honorary secretaries, and to the chairman.

We extract from the Journal of the Farmers' Club the exact words of Mr. CLAYTON READ'S speech after Mr. MECHI'S PAPER, so far as the subject of the agricultural lease is concerned; because it has been represented to us that our remarks at p. 621 have been founded on a misapprehension of Mr. READ'S intention:—

"I perfectly agree with Mr. MECHI, that in a business point of view leases seem the best. I know, however, that there are many estates which are well managed and well farmed where the tenants prefer holding from year

to year, and where the rent is, generally speaking, moderate. If I were a landlord and wished to increase the rental of my estate, I should, as a matter of course, graze less. I have known no estate where long and liberal leases have been granted that has not increased in value; and, on the other hand, I have never known an instance in which, where the tenant has farmed from year to year without any tenement right whatsoever, the estate has been much improved either in rental or cultivation. I think that what Mr. MECHI has said about building leases has nothing whatever to do with farming. The comparison which he drew will not hold water at all. The large houses in Dublin which he talked about are places in which to spend money, and what we want, as farmers, is to find places where we can, if possible, make money."

At a recent meeting of the Banbury Chamber of Agriculture, Mr. W. MILLER read a paper on "Chap or Custom Money." He illustrated the amount of the tax upon the sellers of grain in this country by applying the rules of the Banbury market to the estimated corn crop of Great Britain as follows:—

The amount of Wheat grown last year was 3,247,973 acres, the average yield supposed to be 3½ q. per acre, will amount to 11,367,905 q. Banbury custom, 1s. on 5 q. amounts to £2,744 4s. 4 q. per acre, is 7,854,976 q. Custom, 1s. on 5 q. amounts to £78,549 15s. 4,299,647 acres of Oats, at 6 q. per acre, is 8,943,882 q. Custom, 1s. on 5 q. is £89,438 16s. 4,299,647 acres of Rye, at 2½ q. per acre, is 184,481 q. Custom, 1s. on 5 q. is £18,448. 503,520 acres of Beans, at 3½ q. per acre, is 1,737,420 q. Custom, 1s. on 5 q. is £17,723 4s. 311,544 acres of Peas, at 4 q. per acre, is 1,246,172 q. Custom, 1s. on 5 q. is £12,461. Total custom or chap money on corn, £330,291 16s.

Mr. MILLER proceeded to estimate in like manner the charge on live stock; but he is, we presume, wrong in supposing that the live stock of the country, like its corn produce, all passes through the market in the course of the year. The total custom on corn, £330,291 16s. is, however, a serious enough charge, and the following very practical resolution was adopted by the Chamber:—

"That it is the opinion of this Chamber that the time has come when the obnoxious custom of paying chap-money or custom on the sale of corn, sheep, and cattle, should be abolished; and they propose that lists be prepared by the secretary for the signature of farmers and others attending Banbury Market, pledging themselves that on and after July 1 they will not allow custom any more; and that copies of the resolution be sent to every Chamber in England, and every parish within 10 miles of Banbury for signature."

Now that the last chapter of the frightful history of the FRANCO-GERMAN WAR is, we may hope, concluded, we draw the attention of our readers once more to Mr. H. ALLNATT's "Record Maps" of the territory invaded. The concluding labours of the Committee charged with the work of distributing agricultural seeds among the ruined French peasant-farmers, give these maps an additional interest in the eyes of English agricultural readers. There is, moreover, a certain loyalty due on their account to Mr. ALLNATT, on the ground that all his publications on this subject, as well as on many more strictly agricultural subjects, proceed from "The Agricultural Library." Those of his maps which were purchased on the outset of the war, and have been properly used since, have had a direct educational effect on the buyers, enabling them more perfectly than they otherwise could to realize the wonderful history which has since transpired. Purchased now they give not only the geography but the history of the struggle, and are proportionally interesting and instructive.

OUR LIVE STOCK.

CATTLE.

MR. WILLOUGHBY WOOD, of Holly Bank, has sold a very fine bull calf by DUKE OF LANCASTER (the Birmingham bred) and out of the 17th, to Mr. Charles North, of South Thoresby, Leal, Lincolnshire. Mr. Wood has also just bought a promising young Wild Eyes bull, BONNY DUKE by 6TH GRAND DUKE, at the Spreatley Rise sale.

At the Spreatley Rise sale on the 17th inst., Mr. Stafford sold 28 cows for £46 16s. apiece, 13 bulls for £27 4s. 4d. each, and 41 animals for an average of £40 11s. 10d., and a total of £1604 5s. The price of the day (150 sgs.) was given by Mr. Cheney for *Duchess of Clarence* by DUKE OF CLARENCE (19,611), and of the *Duchess Nancy* by 2D DUKE OF OXFORD (9045), tribe; *Grand Duchess* 2d by LABLACHE, was sold for 70 sgs. to Mr. G. Bland; *Queen of Alton* by ROYAL BUTTERFLY 3d (18,754), for 77 sgs. to Mr. Turner; *Duchess of Clarence* 4th by CHERRY DUKE (25,753), 65 sgs., Mr. W. Ashburner; *Duchess of Clarence* 5th by CHERRY DUKE, 70 sgs., Mr. Nevitt; *Duchess of Clarence* 6th by KING OF THE ROSES (22,043), 50 sgs., Mr. G. Ashburner; MAY DUKE by 6TH GRAND DUKE (19,876), was sold at 71 sgs., Mr. Betts; and the remaining bulls at from 12 sgs. to 34 sgs. each.

On Thursday, the 18th inst., the entire herd of the late Lord Walsingham was disposed of by Mr.

John Thornton. The sale of 57 animals realised £2308 19s.; 46 cows made £141 19s.; 11 bulls brought £340 11s. 2d. each, and the general average was £236 11s. 2d. The cattle were brought out in good condition, and the sale was considered successful. Great uniformity characterises the list of prices, no high figures being given, but a steady demand being kept up throughout. The prices and purchasers are given below:—

Name of Animal.	When Calved.	Price.	Purchaser.
<i>Cones and Heifers.</i>		Gs.	
<i>Manchester Lass</i>	1861	48	Lord Chesham.
<i>Dauntless</i>	1861	38	Mr. C. Ambrose.
<i>Milk</i>	1862	40	Mr. C. Bayes.
<i>Three Days</i>	1862	50	Sir G. K. Philips.
<i>Lady Anabel</i>	1863	35	Mr. T. Allen.
<i>Genia</i>	1864	62	Sir G. R. Philips.
<i>Queen</i>	1867	62	Mr. Kingsthorpe.
<i>Signora</i>	1864	32	Rev. J. M. Micklethwaite.
<i>Fredie</i>	1865	35	Mr. G. Jacobs.
<i>Yuccunda</i>	1865	48	Mr. G. B. Botcher.
<i>Hebe</i>	1865	40	Sir G. R. Philips.
<i>Windsor Lass</i>	1866	40	Mr. T. Allen.
<i>Three Days</i>	1866	50	Mr. T. Botcher.
<i>Swallow Tail</i>	1867	40	Mr. T. Allen.
<i>Yuccunda</i>	1867	40	Not offered.
<i>Kewdale</i>	1867	40	Dr. J. R. Chapman (Australia).
<i>Cannondale</i>	1869	80	Mr. Hugh Aylmer.
<i>Three Days</i>	1869	51	Sir G. K. Philips.
<i>Maid of Salford</i>	1868	35	Mr. W. How.
<i>Yuccunda</i> 2d	1868	41	Mr. E. Botcher.
<i>Yuccunda</i> 3d	1868	31	Mr. J. K. Chapman.
<i>Yuccunda</i> 4th	1868	52	Mr. E. Botcher.
<i>Heliotrope</i>	1868	34	Mr. J. Howard.
<i>Yuccunda</i> 5th	1868	32	Lord Chesham.
<i>Yuccunda</i> 6th	1868	40	Mr. Welcher.
<i>Yuccunda</i> 7th	1869	38	Mr. E. Botcher.
<i>Yuccunda</i> 8th	1869	37	Mr. T. Allen.
<i>Yuccunda</i> 9th	1869	37	Mr. H. Saunders.
<i>Oxford Belle</i>	1869	75	Mr. J. White (Australia).
<i>Yuccunda</i>	1869	40	Mr. C. Ambrose.
<i>Yuccunda</i> 4th	1869	35	Mr. T. Kingsthorpe.
<i>Shalade</i>	1869	35	Mr. J. T. Mott.
<i>Duchess of Dilly</i>	1869	38	Mr. W. C. Green.
<i>Dale Royal</i>	1869	35	Mr. W. Cox.
<i>Oxford Rose</i>	1869	40	Mr. D. A. Green.
<i>Oxford Dale</i>	1869	35	Mr. D. A. Green.
<i>Oxip</i>	Sept., 1870	20	Mr. Ahrens.
<i>Mitvalde</i>	Oct., 1870	20	Mr. C. Ambrose.
<i>Summitdale</i>	Nov., 1870	30	Rev. J. M. Micklethwaite.
<i>Yuccunda</i> 3d	Nov., 1870	25	Mr. C. L. Saunders.
<i>Yuccunda</i> 4th	Nov., 1870	20	Not offered.
<i>Yuccunda</i> 5th	Nov., 1870	25	Mr. W. C. Green.
<i>Yuccunda</i> 6th	Dec., 1870	16	Mr. Ahrens.
<i>Yuccunda</i> 7th	Dec., 1870	25	Mr. Kingsthorpe.
<i>Yuccunda</i> 8th	Dec., 1870	36	Mr. W. Botcher.
<i>Yuccunda</i> 9th	Feb., 1871	18	Mr. H. Aylmer.
<i>Yuccunda</i> 10th	Feb., 1871	29	Mr. H. Aylmer.
<i>Yuccunda</i> 11th	Feb., 1871	21	Mr. C. Ambrose.

Bulls.

GRAND SIRE .. 2d 26,310 ..	1869	48	Mr. R. Simpson.
JOHN O'DALE	1869	32	Mr. E. Botcher.
EARL OF OXFORD	1869	66	Mr. A. Grant.
OXFORD LEVEL	1869	38	Mr. W. R. Green
OXFORD ROYAL	Aug., 1870	40	Mr. J. Wellingham.
JOULIFER	Sept., 1870	32	Mr. C. R. Welcher.
MASTER BUTTIE	Nov., 1870	26	Mr. C. Beart.
MUNSLINGER	Dec., 1870	39	Mr. M. Pate.
DEFIANCE	Feb., 1871	26	Mr. T. Kingsnorth.
CHESTER	Feb., 1871	20	Mr. Ahrens.
MERTON	Mar., 1871	25	Mr. Ahrens.

— Mr. G. Kersey Cooper's herd was sold by Mr. Thornton, at Thetford, on the 18th inst., when 18 animals realised an average of £37 18s. *Silence* 5th by COMTE DE VERMADOIS (19,507), and descended from *Secret* by SHORT TAIL (2621), was sold for 54 sgs. to Mr. G. Barton. *Nelly* by BUTLEY BUTTERFLY (21,348), was purchased at 50 sgs. by Mr. C. Sturgeon; *Christine* was secured by Mr. Hugh Aylmer at 76 sgs., and HOGARTH 2D (24,148), became Mr. Rose's at 54 sgs.

The present season seems quite likely to be as fertile in remarkable events connected with Shorthorns as the last. "On the day of the Havering Park sale, on the 3d, Mr. McIntosh had a *bona fide* bid of 2000 sgs. for an eminent breeder presenting a large and most valuable herd of Shorthorns, for his *Grand Duchess* 21st, due to calve in a fortnight to the Havering Park 3D DUKE OF GENEVA (23,753). This cow is the dam of the young bull GRAND DUKE OF HAVERING, for which Mr. Brassy gave Mr. McIntosh 600 sgs. last year. She was calved at Preston Hall when the Shorthorns were the property of Mr. Betts, on March 15, 1864, and was sold to Mr. McIntosh at the Frost's Hall sale on May 1, 1867, for 330 sgs. The crosses in the lineage of *Grand Duchess* 21st up to *Duchess* 51st by CLEVELAND LAD, were Colonel Townley's *Baron* OXFORD (23,375), and her dam was *Grand Duchess* 17th by IMPERIAL OXFORD (18,084). Her grand-dam was *Grand Duchess* 10th by 3D GRAND DUKE (16,182); her great-grand-dam by *Grand Duchess* 5th by PRINCE IMPERIAL (18,095); and her great-great-grand-dam *Grand Duchess* 2d by GRAND DUKE (10,264)."

HORSES.

We extract the following practical remarks on soiling and pasturing horses from a late number of the "Live Stock Journal," Buffalo, U. S.:

"Those farmers of our acquaintance who have adopted the method of soiling their teams and keeping them in the stable when not at work, during the summer months, are for the most part satisfied that it is an economical practice. The

teams are not so liable to colds or sprains, are always ready for work, and the cost of keeping is less than when they are pastured. It is a good plan to have a small field or spacious yard, where the cattle can graze, occasionally have exercise, and it is not objectionable to give them two or three weeks' run in a pasture, even in June, after the heavy spring work is done, and before fly time, and while the grass is fresh. The Elmira Farmers' Club had this question under consideration recently, and we quote the remark of some of its members on the subject:—

"Mr. Armstrong said: Those of us who have kept up horses in the growing season and carried to them their green feed, have observed a great saving in the ground required to produce their food. And there is also a gain in condition when horses are so fed, because while at pasture, or confined, no more than full feed is required, and in the latter condition there is not the waste resulting from annoyance by flies, and the uneasy and aimless wandering of the animals. I have for the last two seasons kept two colts of similar character, disposition and race, and of the same age, the one at pasture and the other soiled. The cost of labour alone stands in the way of the adoption of soiling for the market of stock where the land and situation favour it. But the benefits to be thus secured are far more than enough to compensate that labour. In fences alone the saving would be immense from soiling, and would enable farmers to dispense with the extra share of manure."

"Several other members agreed that it was cheaper, easier, and better for the teams, to keep them stabled, and carry the food to them from the field, than to allow them to roam over the pasture. One man had tried for some time on hay and green feed, also on cutting and cutting grass, and of all these cutting and carrying grass was the cheapest."

POULTRY.

POULTRY MANAGEMENT.—We extract the following remarks from the *Massachusetts (Cincinnati) Country Gentleman*:—

"I have little faith in high-priced fancy fowls for common farming. I do not believe they lay any more eggs, and think them not as good for raising chicks as the mixed breeds. I select in the first place a lot of size, say 1½ lb. to 5 lb. hens, bright and handsome single-combs, yellow legs,—all topknots and feathered legs I discard. Age, say two years. Cocks, 5 lb. to 7 lb., of same age, no relationship,—about one cock to ten hens. Those hens I let set soon after February 1—the earlier the better; none later than April 1, in this latitude,—and raise the chicks; coupling up the hen, allowing chicks to run till weathers set,—say the middle of May. I then select the finest of the young pullets, disposing of the poor ones and cocks when weighing 1 lb. to 1½ lb. Being early, they bring good prices. I take good care of the selected pullets, and they will begin laying soon after September 1, and on through the winter. The young stock, I may say, is my first commencement. In the meantime I kill off most of the old hens, and all the cocks, getting other cocks early in the season to start the new stock, in no case allowing any relationship. Fowls of two years bring the best chickens, and these hatch chicks as hardy and healthy; those hatched in warm weather, sickly, droopy, and lousy. I manage to keep the fowls inside the main building on all rainy or snowy days. And when the weather is very cold, or ground wet and muddy, I go to another house, and the fowls are crowded in there, down from the roost, and having previously scattered over the feeding floor fine gravel, some burnt bones, and oyster shells, I then throw on the floor the feed for the day,—a mixture of 3 parts corn, 1 Oats, 1 Barley, and 1 wheat screenings, the proportion of corn being eight or nine fowls depending somewhat on the size of the stock; also filling four pans with pure clean water; lock the door, and leave them for the day. About twice a week I give copious Cabbage, Turnips, and the like; and twice a week more, I turnips, and the like; and in warm weather I give, in lieu of vegetables, grass, Clover, weeds, &c., in the outer yards,—sometimes a little sweet corn on the ear. I seldom feed meal, boiled Potatoes, and slop feed, believing they are more conducive to fat than to eggs, and giving very little water. I look anxious to get the fowls to fill their crops with food. When I do feed this for a change, I add a little salt and pepper, to warm them up."

THE NITROGEN SUPPLIED TO THE SOIL IN MANURE, AND NOT RECOVERED IN THE INCREASE OF CROP.

By J. B. LAWES, F.R.S., F.C.S., and Dr. J. H. GILBERT, F.R.S., F.C.S.

REFERRING to that part of Dr. Voelcker's lecture, "On the Productive Powers of Soils in relation to the loss of Plant Food by Drainage," in which he gave the results of his elaborate investigation into the composition of drainage waters from differently manured experimental plots at Rothamsted, it has occurred to us that a *resumé* of some points of our own part of the inquiry might be of interest at the present time. It is proposed, therefore, to give a brief account, chiefly in the form of quotations, of the results and conclusions which relate to the question of the amounts of the nitrogen of manure found to be recovered, and not recovered, in the increase of crop obtained.

In the early years of our experiments, indeed more than 20 years ago, we directed attention to the fact that when, especially in the case of graminaceous crops, nitrogen was supplied to the soil in the form of papers, or other concentrated manures, a large proportion remained unrecovered in the increase of produce obtained. It would, of course, not be expected

that the whole of the nitrogen, or indeed of any other constituent of manure, would be gathered up by the crop which immediately succeeded its application. But it was found on calculation that, when a given amount of nitrogen was supplied year after year, and the same description of crop was grown for a series of years in succession, generally less than half of that which had been supplied was recovered in the increase of crop; whilst, if the application were discontinued, but a very small proportion of the missing amount of nitrogen would be recovered each year in the succeeding crops.

At first we were disposed to consider that this loss of nitrogen might, in part at least, be explained by reference to the vital actions of the plant itself, it having been supposed by several experimenters that plants evolved nitrogen from their leaves during growth. Thus, De Saussure,* Daubeny,† and Draper,‡ concluded from experiments with plants, that such an evolution did take place. Mulder, again, from purely chemical considerations, supposed that there was a constant evolution of nitrogen during the growth of plants, and that the source of it was the compounds of nitrogen it already existing in the plants. For a fuller account of our treatment of this subject at the time, we must refer to our early papers, and especially to one published in the *Journal of the Horticultural Society*, London, vol. v., part 1, 1850.§

After showing, in a paper in the *Philosophical Transactions*, part 2, 1861,|| the relation of the increased yield of nitrogen to the amount supplied in manure, in some particular cases, we submitted the following questions:—

"Is the unrecovered amount of supplied nitrogen, or at any rate a considerable proportion of it, drained away and lost?"

"Are the nitrogenous compounds transformed within the soil, and their nitrogen, in some form, evaporated?"

"Does the missing amount for the most part remain in some fixed combination in the soil, only to be yielded up, if ever, in the course of a long series of years?"

"Is ammonia itself, or nitrogen in the free state, or in some other form of combination than ammonia, given off from the surface of the growing plant?"

Or, lastly—

"When nitrogen is supplied within the soil for the increased growth of the graminaceous crop, is there simply an accumulative distribution of it, considered in relation to the distribution of the underground feeders of the crop? the leguminous crop, which alternates with it, gathering from a more extended range of soil, and leaving a residue of assimilable nitrogen within the range of collection of a next succeeding cereal one?"

Briefly enumerated, the three main sources of loss of nitrogen were suggested as these—drainage, accumulation within the soil in a state of combination, or of distribution unfavourable for being taken up by immediately succeeding crops, or evolution in some form from the surface of the growing plant.

From some of the results reported upon in the same paper, and also from other considerations, we were led to conclude, in opposition to the view we had previously entertained, that the last named of these, that is, evolution from the plant, did not take place.

With regard to drainage, the previous results of Professor Way*, and especially the subsequent ones of the experiments conducted at Rugby under our superintendence for the Royal Sewage Commission,** led us to attribute great importance to that part of the subject. In the course of that inquiry we arranged for the collection of samples of drainage water, the partial analysis of which was conducted by Professor Way; and comparing the results with those on the corresponding samples of sewage, it was concluded that but a small proportion of the nitrogen of the sewage which was not obtained in the increase of produce, was recovered in the drainage water in the form of ammonia. We, therefore, arranged for the collection of some special samples, for a concrete analysis; and, especially for the determination of the nitric acid, if any, in both sewage and drainage water. The results showed considerably more nitrogen in the drainage in the form of nitric acid than in that of ammonia. Indeed it was obvious that a large proportion of that important manurial constituent of the sewage was drained away and lost. Satisfied for the time with this indication, it was not contemplated to follow up that part of our own general inquiry until the question of the accumulation of nitrogen within the soil itself had first been investigated.

When, among other field experiments made at Rothamsted, Wheat had been grown year after year on the same land for more than 20 years, on some portions

without any manure, and on others with farmyard manure, or with various descriptions of manure, and the results obtained in the field during that period had been published, the question of the varying composition of the crop, according to season and manure, was resumed, and that of the accumulation of the nitrogen in the soil was taken up; and the results of the latter investigation were given at the meeting of the British Association for the Advancement of Science, in 1866. After considering the difficulties of sampling, preparing for analysis, and analysing soils, in such manner as to yield results applicable to the purposes of the inquiry, and describing the methods adopted, the results themselves, arranged in Tables, were discussed. The percentage of nitrogen, and calculated average amounts of nitrogen existing in such condition as to be determinable by burning with soda lime were given for the soil of the first, of the second, and of the third 9 inches in depth, of eleven differently manured plots, showing, therefore, both percentage and actual amounts to the depth of 27 inches in all.

In the short abstract only that was published, the results and conclusions were summarised as follows:—

"The accumulation of nitrogen from the residue of manure, in some cases, was considerable and profitable; but even with equal amounts supplied it varied, both in total amount and in distribution, according to circumstances, the depth to which the unused supply had penetrated being apparently influenced by the character of the soil, and the associated manurial conditions. The general result was that, although a considerable amount of the nitrogen supplied in manure which had not been recovered as increase of crop was shown to remain in the soil, still a larger amount was as yet unaccounted for. The results indicated that some existed as nitric acid in the soil, but it was believed that the amount so existing would prove to be but small. In fact, it was concluded that a considerably larger proportion would remain entirely unaccounted for within the soil to the depth under examination than was there traceable, and the probability was, that at any rate some of this had passed off into the drains, and some into the lower strata of the soil. Finally, it was shown, by reference to field results, that there was not more than one or two bushels of increase in the crop per acre, due to the accumulation of the large accumulated residue of nitrogen in the soil, notwithstanding its amount was many times greater than that which would yield an increase of 20 bushels or more, if applied afresh to the soil otherwise in the same condition. On the other hand, the results showed the effect of the large residue of certain mineral constituents was not only very considerable in degree, but very lasting."

Thus, then, it was established that there was a considerable accumulation within the soil of nitrogen supplied in manure, and not recovered in the increase of crop, but that there remained a considerable quantity not so accounted for, and it was concluded that some of this had passed off into the drains, and some into the lower strata of the soil. Being fully occupied at the time with other subjects, and finding that Dr. Voelcker was desirous to investigate the question of land drainage, we gladly provided him with samples of the drainage water from the differently manured plots in the experimental Wheat field, and also with full particulars of their history for the purposes of inquiry.

The results of the 70 complete analyses of drainage water, of accurately known history, which he has published in his lecture, will, we doubt not, prove a most valuable contribution to our knowledge, and an important aid to the future study of the subject, not only in its agricultural bearings, but also in relation to the question of the influence of the sources of potable and other waters upon their composition and quality.

Referring to Dr. Voelcker's own paper for any detail of his results, it may still be of interest to found one or two illustrations upon them. Thus, in several cases he found as much as three parts of nitrogen, in the form of nitrates and nitrites, per 100,000 parts of drainage; and it may be stated that, for every inch of rain passing away by drainage, and carrying with it that amount, there would be a loss of nearly 7 lb. of nitrogens. Again, one of his results showed 5.33 parts of nitrogen per 100,000 parts of drainage, after recent application of a heavy dressing of nitrate of soda; and, provided an inch of rain then passed away, this would be equivalent to a loss of about 13 lb. of nitrogen per acre.

The difficulty is, however, to determine what proportion of the rainfall probably on the average drains away beyond the reach of the roots of the growing crop. The amount must, of course, vary much with soil and season. In a recent paper† we have directed attention to such evidence as is at command relating to this point. Thus, from direct experiments Dalton concluded that 25 per cent., Maurice that 39 per cent., Gasparin that 20 per cent., Dickenson that 42½ per cent., and Risler that 30 per cent. of the rainfall of their respective localities passed away by drainage. Experiments are now in progress on this subject at Rothamsted, and although they are at present only initiative, it may be stated that during a period of eight months, from September 1, 1870, to the end of April, 1871, drainage equal to about 7 inches

of rain passed below 40 inches, and an amount equal to about 4 inches below 60 inches from the surface.

In conclusion, from what has been said, it will be obvious that it becomes a matter of great practical importance, not only to estimate approximately the probable average proportion of the rainfall which may pass as drainage from different descriptions of soils, but also to consider the power of different soils to retain the nitrogen supplied to them as manure, and to determine, accordingly, the best modes, and the best periods of the year, for the application of nitrogenous manures. These latter questions also are now receiving attention at Rothamsted. Rothamsted, May 20.

AN ACRE OF TURNIPS.

[Mr. Arras, Fodderite, lately read the following paper on this subject before the Western Ross Farmers' Society.]

FARM operations are so strung together that it is very hard to isolate the cost of any one crop.

But I will aim at having as good a crop as I can grow, on the footing that rent and labour are the same, whether I have a 50-ton crop or a 10-ton crop—labour at the same of course, in preparation, sowing, and hoeing, if not in storing.

By the end of September we obtain access to our acre of land, from which we hope to obtain a crop of Swedish Turnips equal to the labour, anxiety, and expense lavished upon it. We will suppose the land to be good friable loam, of ample depth to allow the topsoils to bury themselves beyond the reach of even the average drought, rather than full of Couch-grass, to suit the tastes of an economical estimator. The first subject of consideration is whether we ought to manure it on the surface before ploughing, or manure it in the drill in spring. Out of deference to generally existing custom, we resolve to defer the manuring till spring. The next matter to consider is how to plough it. Whether to give a single furrow, of 10 inches deep, with two horses; or two furrows, 7 inches deep each, the one plough following the other, the last one having the mouldboard removed; or a single furrow, 12 or 13 inches deep, drawn by three horses. We reject, on this occasion, the double furrow, as the benefit of such deep stirring would not be reaped from one crop, and to the cost of one crop we are to confine ourselves at present. The same plea holds good in the future.

Having got that point settled, we proceed to have our acre ploughed by two stout horses 10 inches deep. They manage to turn over four-fifths the first day, finishing the remainder next forenoon. Calculating 10s. a day as a fair average value of a pair of horses and man, and the cost of our first ploughing has been 12s. 6d. Leaving the frost to mellow and sweeten the unturned land, and leaving the care of our wintry friend till spring calls for its more multitudinous labour. During winter, and when frost sets in, we take the first opportunity to cart out manure from the folds to a large heap, conveniently placed for spring work. We fix on 25 loads of rough manure as a suitable quantity, the filling, carting, and unloading of which costs nearly 15s. About the middle of April we give a single turn of the harrows, at a cost of 10s., to level the surface, and make the next ploughing or grubbing more easily done.

Now comes the oft-debated question, whether the spring cultivation should consist of grubbing in opposition to ploughing, or a mixture of both systems. In the present case we grub first, as the land is dirty and not very stiff, the weeds coming up better than when cut by the plough. This is done at a cost of 2s. 6d. To reduce the cost of the harrow, and the weeds we require to give four turns of the harrows, two in one direction and two at an angle, or at right angles to the first, at a cost of 3s. 4d. Immediately after the harrowing, and before the sun hardens the knots, the land is rolled, at a cost of 1s. To disengage the weeds from the crushed knots and shake them out, a double turn of the harrows is given, at a cost of 1s. 8d. This is followed by a single turn of the chain-harrows to roll up the weeds into rolls, at a cost of 1s. The weeds are then gathered into heaps by hand, and removed by a man with horse and cart, at a cost of, respectively, 1s. 3d. and 1s. (2s. 3d.). As these workings have rather reconsolidated the land, we now give it a light ploughing, which costs close upon 7s. 6d. (1½ acre). This is followed by three turns of the harrows, to separate and bring to the surface all the remaining weeds, at a cost of 1s. 6d. The weeds now being in this second gathering very numerous, nor the land very full of knots, we escape the expense of another rolling, followed by harrowing, chain-harrowing, and reharrowing, gathering the weeds by hand, at a cost of about 10s., and removing them for about 9d. (1s. 7d.).

We next have to decide what portable manures to use, and fix on the following mixture, viz.:—1 cwt. Pease straw guano, 2 cwt. dissolved bones, and 2 cwt. crushed bones, costing 44s. 6d. The expense of mixing and cartage brings up the portable manures, after being placed on the field ready to apply, to about 46s. We select a fine morning, say on May 12, to begin sowing operations. On a farm of about 500 acres, the usual staff required for putting down Turnips is five pair of horses, nine men, one boy, and ten women, if the weather is dry, and the soil is not so crumbly as it is now. It is now for about 9s. 10d. the 25 cartloads of manure carted out in winter may now

* *Récherches Chimiques sur la Végétation*, 1804.

† *Mémoire on the Action of Light upon Plants, and of Plants upon the Atmosphere*. (Phil. Trans. part 1, 1866.)

‡ *Chemistry of Plants*, vol. ii., pp. 134, and connect.

§ Experimental Investigation into the Amount of Water given off by Plants during their Growth; especially in relation to the Phlegm and Sources of various humors.

|| On the Sources of the Nitrogen of Vegetation; with special Reference to the Question whether Plants Assimilate Free or Uncombined Nitrogen; by Lavoisier, Berthollet, and Pugin.

¶ On the Composition of the Waters of Land Drainage and of Rain. (Journal of the Royal Agricultural Society of England, vol. xvi., part 1.)

‡ On the Sewage of Towns (Third Report and Appendices, 1, 2, and 3 of the Royal Commission), 1865. Also, On the Composition, Value, and Utilisation of Town Sewage (Journal of the Royal Agricultural Society, new series, vol. iv.; entire series, vol. xix.), 1866.

* Report of the British Association for 1866. See also "Chemical News," September 14, and *Agricultural Gazette*, September 8, 1866.

† Effects of the Drought of 1870 on some of the Experimental Crops at Rothamsted. (Journal of the Royal Agricultural Society of England, vol. xix.; second series, part 1, 1871.)

measure 10 yards, which, valued at 5s. 3d. per yard, comes to 52s. 6d. The quantity of Swedish Turnip seed sown has been 3 lb. at 1s., making the value of seed down 3s.

Hitherto there has not been much in the management of our acre that has caused anxiety, as the workmen have been very much in our hands; but now it comes a change. If we shut the door to the straight and regular drills, with their six-drill edging round them, we could shut out all intruders likewise, it would from many a trouble free us. In the course of a few days the tender shoots are seen here and there, and after a gentle shower, and the sun at our back, we can glance the eye along the rows from end to end: the question of expense which had been intruding itself on our thoughts is shelved for the present, and brighter thoughts fill up their place. We return to take a fresh look at our new friends in a couple of days. An eastern wind and a cloudless sky we had not noticed on first setting out, and as we open the gate about ten o'clock in the forenoon, we wonder where our friends have gone. Alas! here they are, looking very blue, round holes in some, decapitated stumps are others, and the rest decidedly hard up. As we gaze in sorrow, a sudden movement here, another there, and others everywhere, reveal the cause. Thousands of *Halicta nemorum* are holding high carnival on the young leaves. The name is by far too good for them, and if they would remain where they come from and halt there, we could understand their name better. However, the wind veers round due west, a refreshing shower brings health and vigour to our plants, and our vaulting friends are done out of their dinner. The rough leaf comes quickly on, and we send a man and horse to scrape the drills with a horse-hoe, which he does for 1s. 5d. The thinning we calculate at 3s., as it is better to spend an extra sixpence now than have the work hurried and ill done. Again our enemies come to the attack, in the shape of cooing doves, and it is now that 2s. 6d. per pair of horses could be willingly paid for the work and convenience to pies. Had we fixed a sum per acre for herding, none could have found fault. Before long another horse-hoeing is given, at a cost of 1s. 5d. This is followed by hand-hoeing, at a cost of, say, 1s., and according to the cost of this last operation we may estimate whether the thinning has been done well or ill.

Thus far the working expenses have been £3 11s. 2d., and the manures have amounted to £4 18s. 6d.; together the figure stands at £7 13s. 8d.; and as we may find some difficulty in persuading any one to give us that figure for the Turnips grown on our experimental acre,—for on asking a price we would feel inclined to add the rent of the land, say 40s., not forgetting tenant's profits, taxes, and tear and wear of implements,—we resolve to go on to the end. To occupy our spare time in autumn, we may turn now and again, and not to the profit to be made, but to consider our balance-sheet. Former calculated cost, £8 9s. 2d.; rent, £4; tenant's profits at the modest sum of 10s.; its superabundance by grieve, 2s.; tear and wear of implements, 1s. 4d.; taxes, 2s. 4d.; together, £11 5s. 5d. It can easily be imagined how every damaged Turnip is now looked upon with a jealous eye, the more so as we know by sad experience this winter that every one broken by wood-pigeons, rabbits, and hares requires the aid of no machinery to reduce it to ruin. Having these extra fears to push us on, we commence to store them. It is not my place in this paper to give other people's experience as to the best method of storing, either for speed or cheapness, consequently I will keep still, as I have strictly done hitherto, by detailing my own experience.

To return to our 6453 lineal yards of Turnips to be lifted, we find it costs close upon 4s. to root and top them. To cart them to the house and have them matched costs, in ordinary circumstances, 20s. 2d. When all is finished, the bill of costs, which I have all the pleasure of placing before the Club, for approval or otherwise, consists of the following items:—

Working expenses	£3 11s. 2d.
Manure	4 18 6
Kent	2 0 0
Tenant's profits	0 10 0
Superintendence	0 2 0
Tear and wear of implements	0 1 4
Taxes	0 2 1
Expenses of storage	1 11 2
£12 18 7	

The scope of my present paper does not permit me to enter into the question of how much of the cost ought to be distributed over the other years of the rotation. Certainly, a deduction for unexhausted manures is more than legitimate; at the same time I cannot see how any one could expect to grow a good crop of Turnips by a much less liberal management, even if the following crops were to belong to another interest. Were he allowed to sell them from the farm, the value might cover the cost; but that I have nothing to do with to-night. It certainly seems a vast sum to talk of £1202 as the cost of 100 acres of Turnips; but let us glance for a moment at a few rough details. Few give less than two pounds' worth of portable manure, and still fewer give less than ten carts of heavy manure in spring, which would be gladly bought in many districts for 50s. In this Club we have been told by a very practical farmer that he gave 20 loads

per acre, or at the rate of £5. The working expenses, as I proved before, cannot be done for less than 71s. per acre; then we have rent, £200, and profits at 10s.—£50. In these five items we run up to £1055 at once. Then we have seed, taxes, tear and wear, so that my former figure is nearly reached. Before sitting down, I may mention that by manuring the stubbles in autumn we may fully 5s. 12d. per acre, besides being able to do double the work in spring with the same staff of horses in drilling and sowing. A most successful and practical engineer made the remark to me the other day, in answer to my question,

if he could not devise some plan to enable us to lift our Turnips independent of human hands, "Well," he said, "it is clear, in the first place, that when you have the crop you must secure it at whatever cost; if you don't you lose it, and all your former outlay is gone too." I fancy we don't keep this enough in mind, and if by writing this paper I have indelicately stamped on my own mind that our Turnip crop is a most costly and valuable one, and worthy of being cared for after we have got it, I shall have no cause to regret having taken up the subject of the cost of growing an acre of Turnips.

AGRICULTURAL STATISTICS.

No. 3.—NUMBER AND PERCENTAGE OF EACH CLASS OF HOLDINGS IN EACH DIVISION AND COUNTY OF GREAT BRITAIN.

Counties Proper.	Number of Holdings.					Percentage of Holdings.				
	Not exceeding 5 Acres.		Above 5 and not exceeding 100 Acres.		Total.	Not exceeding 5 Acres.		Above 5 and not exceeding 100 Acres.		Above 100 Acres.
	From 5 to 20 Acres.	From 20 to 50 Acres.	From 50 to 100 Acres.	Above 100 Acres.		From 5 to 20 Acres.	From 20 to 50 Acres.	From 50 to 100 Acres.	Above 100 Acres.	
ENGLAND.										
Bedford	1,118	1,048	474	204	2,844	88	21	21	21	21
Berks	1,093	978	471	239	2,781	51	21	21	21	21
Buckingham	1,762	1,156	608	551	4,111	54	25	25	25	25
Cambridge	1,535	1,033	951	616	4,141	50	24	24	24	24
Chester	3,857	3,977	2,904	1,605	12,343	59	17	17	17	17
Cornwall	4,079	4,043	2,421	1,612	13,547	60	30	30	30	30
Cumberland	1,075	1,555	1,593	1,738	5,961	33	43	43	43	43
Derby	3,165	4,165	2,459	1,397	11,236	59	32	32	32	32
Devon	3,541	4,062	3,150	3,070	13,823	44	30	30	30	30
Dorset	1,168	1,221	608	511	3,508	55	25	25	25	25
Durham	1,112	1,325	893	566	3,896	45	28	28	28	28
Essex	2,040	1,945	1,311	1,255	6,551	53	28	28	28	28
Gloucester	3,601	2,585	1,951	1,010	9,147	59	22	22	22	22
Hants	2,421	2,137	1,717	1,254	7,529	54	28	28	28	28
Hereford	1,064	1,725	872	700	4,361	55	23	23	23	23
Hertford	1,250	860	530	401	3,041	51	23	23	23	23
Huntingdon	768	772	730	515	2,785	44	23	23	23	23
Kent	1,584	2,895	1,750	1,331	7,560	47	30	30	30	30
Lancaster	4,030	7,891	5,056	2,739	19,715	55	38	38	38	38
Leicester	1,937	2,497	1,352	920	6,706	51	29	29	29	29
Lincoln	6,444	7,939	3,717	2,293	18,483	59	20	20	20	20
Middlesex	1,717	812	409	274	3,212	60	27	27	27	27
Monmouth	1,604	1,263	708	704	4,280	50	35	35	35	35
Norfolk	6,457	3,959	2,309	1,688	14,393	59	25	25	25	25
Northampton	1,375	1,712	985	798	5,870	46	27	27	27	27
Northumberland	1,086	1,281	652	514	3,533	43	22	22	22	22
Nottingham	2,110	2,174	1,157	777	6,218	54	26	26	26	26
Oxford	1,155	990	544	482	3,171	47	23	23	23	23
Rutland	374	432	235	170	1,211	51	20	20	20	20
Salop	3,399	3,170	1,295	2,368	10,250	59	29	29	29	29
Somerset	4,039	4,039	2,382	1,882	12,340	54	29	29	29	29
Stafford	3,971	3,604	1,985	1,336	10,906	51	26	26	26	26
Suffolk	2,623	1,768	1,375	1,334	6,500	45	29	29	29	29
Surrey	1,423	1,488	750	579	4,240	53	26	26	26	26
Sussex	1,724	2,086	1,501	1,228	6,539	45	32	32	32	32
Warwick	1,838	2,090	1,058	1,666	6,652	53	27	27	27	27
Westmoreland	869	857	885	823	3,434	47	18	18	18	18
Wiltshire	2,655	1,700	848	629	5,832	57	19	19	19	19
Worcester	2,061	1,942	987	750	5,740	57	25	25	25	25
York	2,411	2,009	1,317	2,009	7,746	53	28	28	28	28
(East Riding	4,093	3,895	2,181	1,991	12,160	53	28	28	28	28
(North Riding	7,499	11,747	5,575	2,911	27,732	54	28	28	28	28
(West Riding										
Total for England ..	102,342	111,284	62,826	45,629	301,081	54	28	28	28	28
WALES.										
Anglesey	555	1,267	712	397	2,931	55	33	33	33	33
Brecon	381	545	708	715	2,349	41	48	48	48	48
Cardigan	1,607	1,607	1,058	557	4,729	52	34	34	34	34
Carmarthen	1,616	2,026	2,201	1,696	7,539	48	38	38	38	38
Carmarvon	1,115	2,092	1,086	575	5,268	50	31	31	31	31
Denbigh	1,167	1,535	1,234	841	4,777	50	38	38	38	38
Flint	1,184	1,214	618	394	3,404	68	24	24	24	24
Glamorgan	889	1,354	1,212	831	4,286	44	42	42	42	42
Merioneth	375	952	919	493	2,739	44	48	48	48	48
Montgomery	1,094	1,850	1,165	807	5,916	50	37	37	37	37
Pembroke	1,239	1,812	1,223	772	5,046	52	34	34	34	34
Radnor	395	533	453	400	2,881	41	38	38	38	38
Total for Wales ..	10,708	16,477	12,592	8,940	58,717	49	38	38	38	38
SCOTLAND.										
Aberdeen	2,110	3,621	2,227	1,935	10,903	49	36	36	36	36
Argyle	1,148	840	469	222	2,699	58	21	21	21	21
Ayr	434	507	360	222	1,523	52	30	30	30	30
Banff	1,045	1,395	731	516	4,687	58	31	31	31	31
Berwick	245	157	73	71	546	96	40	40	40	40
Bute	47	132	132	66	377	55	40	40	40	40
Cathness	800	1,090	357	160	2,307	61	73	73	73	73
Clackmannan	40	43	17	23	123	58	50	50	50	50
Dumfries	29	102	102	43	276	52	45	45	45	45
Dumfriesshire	418	401	313	244	1,376	51	39	39	39	39
Edinburgh	170	225	92	97	684	90	40	40	40	40
Elgin or Moray	552	532	378	312	1,774	50	33	33	33	33
Fife	1,094	1,850	1,165	807	5,916	50	37	37	37	37
Forfar	479	581	317	31	1,398	41	27	27	27	27
Hamilton	118	81	32	36	267	52	42	42	42	42
Inverclyde	2,599	2,599	1,317	222	6,737	55	11	11	11	11
Kinross	424	513	273	280	3,090	50	29	29	29	29
Kirkcaldy	29	60	25	22	136	72	32	32	32	32
Kirkcubright	270	319	221	228	908	59	28	28	28	28
Lanark	443	622	539	662	3,276	55	31	31	31	31
Lanarkshire	81	70	76	96	323	53	28	28	28	28
Leith	51	115	83	91	330	41	43	43	43	43
Orkney	651	1,377	713	224	3,065	45	30	30	30	30
Shetland	904	2,810	189	21	3,924	94	5	5	5	5
Perth	60	46	37	26	149	50	46	46	46	46
Perthshire	2,027	813	707	774	4,321	51	27	27	27	27
Renfrew	253	262	221	31	1,067	53	44	44	44	44
Ross and Cromarty	4,510	1,186	355	175	6,126	56	20	20	20	20
Roxburgh	277	233	117	124	744	57	36	36	36	36
Selkirk	80	46	20	12	258	55	18	18	18	18
Stirling	275	244	250	357	1,126	44	33	33	33	33
Sutherland	1,076	541	53	22	1,692	51	33	33	33	33
Wigtown	170	258	191	245	864	52	33	33	33	33
Total for Scotland ..	24,066	22,372	10,579	9,268	76,285	57	25	25	25	25
Total for Great Britain	136,112	150,133	85,997	63,837	535,081	54	28	28	28	28

ESTIMATED ACREAGE OF LAND OCCUPIED BY HOLDINGS OF VARIOUS CLASSES IN GREAT BRITAIN IN THE YEAR 1870.

	By Holdings, not exceeding 5 Acres. (Computed at an average of 3 Acres for each Holding.)		By Holdings, from 5 to 10 Acres. (Computed at an average of 7 1/2 Acres for each Holding.)		By Holdings, from 10 to 20 Acres. (Computed at an average of 15 Acres for each Holding.)		By Holdings, from 20 to 50 Acres. (Computed at an average of 35 Acres for each Holding.)		By Holdings, from 50 to 100 Acres. (Computed at an average of 75 Acres for each Holding.)		By Holdings,* above 100 Acres.		Total Acreage returned under Crops, &c.	
	Acre.	Percent. of total Acreage.	Acre.	Percent. of total Acreage.	Acre.	Percent. of total Acreage.	Acre.	Percent. of total Acreage.	Acre.	Percent. of total Acreage.	Acre.	Percent. of total Acreage.	Acre.	Percent. of total Acreage.
England ..	306,000	1	1,665,000	9	9,205,000	10	3,450,000	15	15,783,000	67	23,409,000	100		
Wales ..	33,000	1	255,000	9	420,000	17	675,000	27	1,165,000	46	2,548,000	100		
Scotland ..	69,000	2	330,000	7	385,000	9	675,000	15	2,992,000	67	4,451,000	100		
Great Britain ..	408,000	1	2,250,000	7	3,010,000	10	4,800,000	16	20,040,000	66	30,408,000	100		

* After deducting the estimated acreage for holdings up to 100 acres, the remainder gives an average of 215 acres for holdings above 100 acres.

Note.—The percentage columns in this Table show by how much per cent. the land occupied by each class of holdings is in proportion to the total acreage returned as under crops, &c., in each division of Great Britain.

CLAY-LAND MANAGEMENT.

[At a recent meeting of the Cirencester Chamber of Agriculture, Mr. Gray read the following capital paper
"On the Economical Management of Clay Lands."]

MR. GRAY said: It is not many years since I thought that a clay farm was going to be my master: perhaps I am now over sanguine, the last few years having been favourable to clay farming, but when one has had a hard tussle with a tough and sturdy fellow and made him knock under, one is apt to think one can keep him down. Feeling thus, I have ventured to bring this subject before you, and to hope that what is of all importance to myself as a clay-land farmer, may be without interest to you.

I am not going into the subject of drainage, or of the question whether such land should be laid down to grass, but simply to consider the subject of the economical management of such soils under the plough. And, in this connection, the subject of economy we must not forget that there are two sides from which we may view the subject. We may be economical by a liberal outlay as well as by saving expenditure. In the first place, we will consider how we may economise expenditure, and then how we may expend economically; and labour being the one fruitful source of expenditure, the great question is—How can we reduce the cost of labour? To this question there are three answers—1st, By employing those servants who will work for us most cheaply; 2d, By doing as little work as possible; 3d, By avoiding everything that may tend to increase unprofitable labour. First, then, as to employing cheap servants. I am not going to disparage horses or steam-power, or even manual labour; they are each good in their place, but they are each and all expensive servants, and our great aim must be to dispense with them as far as possible, and to try if we can find servants that will work more cheaply. Now, I maintain that Nature has provided for the special benefit of the clay-land farmer a set of servants who ask no wages, and who only need to have their task set them—properly set them—and that we may by making the most of those servants work our clay land more cheaply, economically, and profitably than even light lands can be managed. Our cheap servants are frost and sun, shine, air and water; and on clay lands—although we cannot make them do all our work—though we cannot dispense with horse and steam-power—yet, as far as my experience goes, they will if we give them the opportunity do the greater part of our work for us. Our predecessors used to take to a very great extent in the bare fallows, but we cannot now afford to lay our land in fallow as they did—we must grow a crop every year. We may wonder how farmers formerly, and how some now-a-days, afford a year's bare fallow, but the reason is that they make use of cheap servants to do their work for them, and so are enabled to do with fewer horses and men than are needed if we attempt by main strength and stupidity to farm our clay lands into form and fertility. And we shall, I believe, always find that on such land a fallow of some kind is necessary—1st, to destroy weeds; and 2d, by breaking up and exposing the soil to sun and air, allow excess of water to escape, and enable such soils to acquire the temperature necessary for a rapid and luxuriant growth of crops. But I think those here who are clay-land farmers will agree with me that on such land a winter fallow is of small value, when considered as part of the bare fallow.

My experience is this, that clay land after being winter ploughed will always turn up if ploughed in spring in a worse state than if left alone; and as far as I understand the matter it is the summer fallow that does the chief good to clay soils. Though frost does good by crumbling the surface, it is only the drought of summer that mends the subsoil; and I find a single deep ploughing at midsummer will do more for my land than all my labour in winter and spring. I have, therefore, given up winter and spring work, with the exception of one deep autumn ploughing for one-sixth of the clay land, which goes in to roots, and another

one-sixth ploughed after roots, and these I get in great part broken up by steam before winter has set in: the winter frost does for that third part of the farm all I want. The remaining two-thirds of the farm are half under seeds and half under Wheat; and the portion under seeds is, immediately after haymaking, broken up to make a summer fallow by steam-power, to a depth of 1 foot, and left then to the sun and rain to break down the soil, to warm it, and make it fit for the growth of Wheat—by this means I find that my labour bill on that land is really very light, and although, having to hire steam-power, I cannot show so good and cheap a list of tillages, nor so clean a farm as Mr. Smith, of Woolston, I can know manage my clay land more cheaply and keep it much cleaner than is possible on my light land, simply from this reason—that in the one case, sun and wind and rain and frost do the greater part of the work; and on the light land the greater part of the work has to be done by force of working. On such lands I believe Mr. Smith, of Woolston, is setting us an example of the true and right principle of economical management, and if we all put the same energy into our work, and took advantage of Nature's work as he does, we should astonish ourselves with the result. But all farmers have not the ability to work steam-power as economically as he does. The shift I have adopted on my clay land is as follows:—

1. Roots, manured and deep ploughed in autumn, and dressed with superphosphate as soon as dry enough in spring (March and April); horse cultivated and seed-drilled on the flat, followed as necessary by horse and hand hoeing.
2. Oats, deep autumn-ploughed after roots. Harrowed and drilled in, in March.
3. Seede, mown and land steam-fallowed at once for Wheat.
4. Wheat, drilled as soon as the autumn rains have mellowed the land.
5. Seeds as in 3, mown and fallowed.
6. Wheat as in 4, the stubble dressed, and winter fallowed for roots.

On this plan I find my cost and returns have been so far pretty nearly as follows:—

Cultivation and Expenses on		£ s. d.		Per ton.	
1. Year—Mangel	..	0	12	0	yield gr. 11 6
" Oats	..	3	12	0	8 6
" Wheat	..	3	17	5	4 0
" Seeds	..	6	7	0	13 0
" Wheat	..	2	17	5	4 0
" Wheat	..	6	7	0	13 0
£31 11 10		£56 11 0		31 11 10	
Profit in six years		£24 10 2		4 3 2	
Ditto yearly		£4 10 2		4 3 2	

In relation to the above quotations, I must state that the last two years are fictitious, I having not yet had my land under that course for six years, they are therefore only a copy of the two previous years, but I have no reason to think they will be very different, and though the profit is a fair one, it must be borne in mind that my first years of farming were under adverse circumstances, consequently the labour bill has been heavier than I trust it will be in future; and I should also say that the cost of manure applied to roots has been £4 8s. for Wheat I have charged £2 15s. each year for manures applied.

Now I do not at all set up that course as a perfect one, but it has this advantage, that without wasting a crop of more value than a second cut of Clover, half the farm is yearly fallowed and cleaned; one-sixth being under roots, and two-sixths under seeds followed by a summer fallow. Nor do I maintain that such a course could everywhere be adapted—in fact I modify my system; part of the seed being coming in as required for Vetches, &c., and part of the root being not lifted, but fed on the land in early autumn by sheep.

Such a plan also could not be carried out except by the help of steam-power. I could not possibly, by any number of horses the farm could maintain, break up two-thirds of my clay land by a fortnight after haymaking; but that I can do by the help of steam-power, and by that help I can get the work done where frequently horses could not do it at all; take last year from hay time till the end of August, no horse-power has been able to break up my land. I find that the second land, then, steam-power applied in summer is the second cheapest labour power; and horses come third in my estimation. I find that after summer fallow in the above manner, I can make sure of a good crop of Wheat, the chief part of the labour not having been effected by the steam-plough, but by the effect of sun and air and the mellowing influences of the autumn rains, which, as I said, cheap servants. I said that the second answer to the question of reducing cost of labour was to do as little work as possible, now that is partly effected by letting the weather do its work, and by using steam instead of horses. But I think we may save labour in another way. It is usual on wet clay lands to lay them up in lands and cut water furrows. Now since using deep summer fallowing in preparation for Wheat, I have found that water furrows apparently do more harm than good; that land laid flat does not get so water-borne as where laid up in lands and furrows. I have this year two fields in Wheat, one ploughed after steam cultivation and laid in lands, and the other drilled after being only harrowed. The one was water-borne, the other not; one looks like 5 qr. of Wheat, the other more like 3 qr. The work probably we may save labour in that respect. On the matter of the growth of roots, my labour cost is very light, and I find the plan a good one of not attempting to move the soil in spring, except to break the surface and mix in manures.

But the great saving in labour is effected by getting land clean of weeds, and on clay lands the summer fallow in most cases effects that object, but when effected I fear that most farmers are far too careless in sowing weeds. They are too ready to sow weeds to the horses. If our wheat is grown on foul land, the chaff is sure to contain seeds of weeds. I am disposed to say, then, that as a first means of saving labour in future a clay farm must be got clean. We cannot farm economically while we have weeds in our fields. Almost all our labour spent on clearing weeds is unprofitable labour, and what we want is to do no work at all, and what will be a profit. We must get our own land clean and take care not to sow weeds again. Better waste two or three pounds' worth of chaff by burning it, or putting it on meadow land, than by letting the weeds it contains go on to our ploughed land. There is one more point connected with economy of labour, and that is the doing of work at just the right time. A clay farmer has far the greatest need of judgment in that respect. He needs to be patient and wait quietly till the right time, but when the right time comes he must drive hard. In this respect, if we can obtain steam-power, our anxiety about getting our work done is greatly relieved; and where there is the opportunity of getting help by steam, every clay farmer should, I believe, part with all horses except what are needed for harvesting, sowing, and the dung-cart, and do the heaviest work by steam. By using steam-power there will, in most cases, be some slack time for the horses, but that is better than not getting the work done at the right time; and, besides, horses that are worked hard need occasional rest, so that a slack time is not always thrown away. My own experience of giving up part of my horses has been very satisfactory. Before using steam I required 10 horses to work my farm, and even they could not generally overtake my work; but by expending on steam a less amount than the cost of maintaining and working three horses, my labour has been so much reduced that I frequently find I have not enough to do with those remaining. However, I prefer to have more rather than less strength than needed. With regard to the crops most profitable on clay land, I suppose we shall all agree that Wheat is our mainstay; for roots, my bias is entirely on the side of Mangel and Cabbage, or Rape. I have given up Swedes myself, and my impression is that the reason they are the most treacherous and wasteful crop we grow, although on sheep farms they cannot well be replaced. In the place of seeds, instead of red Clover I generally grow the common yellow Clover with Ryegrass; and although the yield of perennial Ryegrass is least, I find that the Wheat after it is better than when the Italian is grown, and it has the advantage generally of being cleaner—less full of weeds—than the foreign Ryegrass.

In the matter of manures, my plan with regard to farmyard dung is to make it all under cover, and as I economise straw to the utmost, I never find it too dry from being under cover. I avoid labour by never turning it except when obliged from want of room; it is usually carted direct from the sheds to the land, and once on the land, although it is better to be ploughed in early for the first time, it is better to be left in the dunging up of the ploughs when dry, in other respects I believe there is no real loss, and the longer the dung when ploughed in the better for the crops in the spring following. With regard to artificial manure—I dress heavily both Wheat and roots, using for roots superphosphate and nitrate of soda chiefly; and for Wheat a manure called Scatch, which consists of the waste trimmings of skins before tanning, which,

containing a large amount of hair, is both nitrogenous and lasting. I am persuaded more and more every year, that a large outlay in manures is an economical expenditure. We can hardly grow our crops too large; the labour is scarcely increased by heavy cropping; the rent and other charges are the same in either case, and my own experience has invariably been that wherever I have expended most that I have been most fully repaid, except in the one single case of growing Swedes: the risk from failure in this crop is so great that I have given it up almost entirely, and decidedly on stiff lands, where most of the stock has to be fed under cover, this single crop of Rape for winter and spring feed and Manure for winter and spring the more remunerative crops to grow.

There is one point connected with economy of labour which I should like to mention, though I am not sure that it is of more importance on clay lands than on light. That is, that hedges being a source of weeds and increase of the labour of fallowing, should if possible be done away, and where possible I believe it will be found economical to do away with them permanently and divide our fields by permanent tracks for steam engines, wide enough apart to allow the full stretch of rope, so that in case of wet seasons the work may be done without the engines treading the land at all. This of course must in most cases be a matter of decision between landlord and tenant.

Home Correspondence.

Quantity of Sewage Applied per Acre by the Metropolis Sewage Company at Barking.—I am sorry that Mr. Morgan, the Secretary of the Sewage Company, should have thought it necessary to commence a discussion of this subject in your columns. To the remarks which I made at the Institution of Surveyors on his paper, he, as reader of the paper, had the opportunity and right of reply, of which he availed himself with such warmth, as to have caused me to resign the Presidency. He also calls in the assistance of Mr. Hassard, one of the assistant engineers employed on my original scheme, to make certain statements as to pumps, which I never contradicted, and which are quite beside the question; and then he is kind enough to talk with becoming contempt of what he is pleased to term my theories. I am sorry for all this, but as the question of quantity is of capital importance in the consideration of the subject of his paper, it is essential that the public should have the other side of the question before them; and as Mr. Morgan never misses an opportunity of attacking any and every statement that I make, they should know that Mr. Morgan is the Secretary of the Sewage Company. I myself had the honour of proposing him to discharge the duties of that post, and I did so because I had feared that a fairly competent discharge of his duties in an office in London, but he had, up to that time, never heard the word sewage pronounced in his hearing, and he knew nothing of ordinary farming. I stated at the Institution of Surveyors, and now repeat, that there exist absolutely no appliances for: ascertaining or registering the total quantity of sewage delivered on to the Lodge Farm in a day, or a week, or a month, or a year; still less for subdividing such total quantity and apportioning it among the different acres and crops. Mr. Hassard's statement about pumps is altogether illusory. As Mr. Morgan knows perfectly well, the pump was frequently out of order, and quite unable to deliver anything like the "theoretical" quantity; moreover, Mr. Morgan did not conduct any continuous series of observations, and, supposing his irregular and occasional gaugings to have been fair approximations, there is still a margin of error which completely invalidates all his calculations. This is regarded as a quantity which he and his directors profess to have used on the whole farm. What, then, are we to think of Mr. Morgan's apportionment to the individual acres and crops of this imaginary total?—an apportionment which amuses Mr. Morgan to work out into the third and fourth place of decimals! There is no surer sign of superficial knowledge than the assumption of minute accuracy when even more minute accuracy is really impossible, and there is nothing more mischievous than such imaginary statistics. For instance, Mr. Morgan asserts that he "consumed" the entire sewage of 335 persons per acre of Italian Rye-grass in one year. This quantity is equal in nitrogen to more than 10 tons of the best Peruvian guano. Mr. Morgan's statement is, therefore, a transparent absurdity. It is quite clear that if he did pass any such stupendous quantity of liquid—equal to about six years' rainfall—over the land he simply wasted it; and no doubt he has passed very large quantities of sewage over the Lodge Farm, and wasted a great deal of it, but this only proves that the Secretary of the Company is not a farmer, nor a physiologist, nor a chemist, nor an engineer, not that the entire sewage of each head of "W. Hope, Parloos, a whole year, is only worth 6d. or 1s. 4d. per Acre, Parloos, May 21.

Pig Breeding and Feeding.—The same rule applies to pigs as to other farm animals—choose a good breed, especially in the male parent. Where there is a great natural tendency to fatten, follow the advice of the late Mr. Fisher Hobbs, who said, when selling a breeding sow, "Let her work hard for a

living; don't feed her bountifully, or she will get fat and have no pigs, or very few." There was wisdom in this; but remember that the kind of food you give her is a most important consideration. The fetus cannot be properly formed unless the materials are of the right sort, for there must be the elements of bone, muscle, and fat—the latter alone is of little use; therefore avoid the fatal mistake of giving to the sow a large quantity of roots before parturition. The same mistake is often made with sheep and cows. If a sow is allowed to range at large, she does well, having access to pasture, because in a good field there is a great variety of plants possessing various and valuable qualities—aromatic, condimental, and others, generally available to the juvenile formation and development, which the natural instinct of the animal teaches her to select. This may be supplemented by pollard, bran, a little meal, boiled Potatoes, and a few Swedes or white Turnips, but very few Mangels, especially when fresh and succulent. A moderate supply of Peas, Beans, and Barley, or soaked Indian Corn, may be added; also Tares, Clover, and green Beans with the pods on. Cabbage is very safe food. Nothing comes amiss to a sow. The great point is to take care that the food should consist of a variety, and not, as is too often the case, confined to one sort, especially roots. After parturition roots may be much more liberally given, and especially Cabbage, in conjunction with other food; but as the period of parturition approaches, and especially immediately after parturition, to guard against fever, the diet should be sparing and cooling. I know some who invariably give an ounce of Epsom salts in the liquid food to the sow after parturition. After recovering from the excitement, the necessary materials for milk-making must be contained in the food. Cottagers are often successful with their sows, where they have a chance of roaming in lanes and coming home to receive a little meal, boiled turnips, and a few vegetables, &c. In cold weather warmth and shelter are essential. Never allow a pig to bury itself in stable manure, or make holes in the floor and lie in them, for cold will strike the heated side and give him heaves or lung complaint. Young pigs, when taken from the mother, should have pollard, a little meal, and a variety of food, but especially skimmed milk with fine pollard or middlings, and as they grow older Peas, soaked Indian Corn, &c. These are all good and are always acceptable. For fattening pigs nothing beats one-third pea meal and two-thirds barley meal, if mixed with skimmed milk so much the better. Pigs may be fattened very rapidly by steamed roots mixed with meal or boiled Potatoes, the food given warm. Although bulky looking they will not weigh so well, or eat so well, as those fattened on pea and barley meal, with or without milk. If a very small pig is put in a large pen, or if a large pig in hot weather by placing them, on sparrowed floors, with a pit under them. There is a natural tendency in pigs to huddle together: if placed on soft barley-straw there is no circulation of air under them, therefore stiff reedy wheat-straw is much to be preferred. They get fever in hot weather, unless there is circulation of air around them, and plenty of water. The fattened or sparrowed floors have an immense advantage in this respect. The urine runs through the straw, and they lie clean, cool, and dry, with air circulating around them. Pigs naturally deposit their solid excrement in a corner, away from their bed. When Barley was 18s. 6d. per qr. I fattened about 400 pigs, and was always very successful in avoiding disease; they were all placed on sparrowed floors. In hot weather we showered upon them occasionally from the jet about 80 gallons of water per minute; after the first alarm they enjoyed it, their skins became as clean as the back of one of them, and they fed and prospered most satisfactorily. It pays to give a pig when he first comes from market a good scrubbing with soap and water. In winter it is necessary either to put some straw upon the sparrowed floor, or to enclose the place so as to keep it warm, providing sufficient ventilation. Pigs pay (in manure) as well or better than most animals, but the meat market will not carry a heavy supply of manure for a little longer, and it is really very profitable to fatten in the cool months are best for town markets. Fat pigs in the country sell well at, and immediately after, harvest, also at hosing time. Pigs, like other farm animals, should always have access to water, also to a lump of rock-salt. Bear in mind that pigs have no wool, and if well bred very little hair, therefore they require warm clothing, and to be housed in a warm place. If a sow is very apt to overlie their young, this is easily prevented by a ledge or board, of about 8 inches wide, projecting from the wall of the piggery, 6 to 7 inches from the floor. The little pigs are safe from pressure under this ledge. *J. F. Mechi, May 27.*

Light-Land Farming.—Mr. Everitt, in his paper on "Farming and Farming," at a meeting of the Lavenham Farmers' Club, alluding to light-land farms, observed that "any young man who was foolish enough to place himself upon light land should keep his pockets buttoned up." . . . "Men might spend their money upon manures, but they would never see it again." Such teaching does not coincide with Mr. J. B. Lawes' able paper on "Exhaustion of Soil, in relation to Landlords' Complaints and the Cultivation of Unexhausted Improvements," which appeared in

Agricultural Gazette of April 9, 1870. Mr. Lawes points out "that the surplus available for rent depended on the use of elements of fertility from without, would be proportionally the greatest on the poorest soils, and the least on the naturally most productive soils." . . . "Compared with heavy land they are cultivated with less cost: they are much better adapted to carry stock, and with the aid of purchased food and manures, they can now rival in productiveness the natural fertility of clays and loams." Pray which of these gentlemen is correct? The very great success that has up to the present time attended Mr. Prout's farming, perhaps brings Mr. Everitt to the conclusion that light lands may be thrown overboard. The system pursued for over 20 years by the Rev. S. Smith, Lois Weedon, with such great success, does not appear to attract much attention; it is that it is only adapted to the Lois Weedon lands, or that the general tenure of land prohibits its introduction? *An Inquiring Farmer.*

Societies.

ROYAL AGRICULTURAL OF ENGLAND.

The half-yearly general meeting was held on Monday, at the rooms of the Society, Hanover Square, London; Lord Vernon in the chair. The House List of the Council was adopted, including the following new members:—Mr. J. Bowen Jones, Endsom House, Shrewsbury; Mr. Jabez Turner, Haddon, Huntingdonshire; and Mr. W. H. Wakefield, Kendal, Westmoreland.

On the motion of Mr. Millward, seconded by Mr. Lister, M.P., Sir Watkin Williams Wynn, M.P., was elected President for the ensuing year.

The following is the report of the Council:—

The Council of the Royal Agricultural Society of England in presenting their half-yearly report have to state that since the last general meeting in December, three governors and 37 members have died, and the names of 132 members have been removed from the list; on the other hand, one governor and 210 members have been elected, so that the Society now consists of 72 life governors, 73 annual governors, 1530 life members, 3860 annual members, 17 honorary members; making a total of 5648.

The accounts for the year 1870 have been examined and certified by the auditors and accountants of the Society, and have been published, together with the Oxford country meeting account, in the last number of the Journal. The Council refer with satisfaction to these documents as showing the prosperous condition of the finances, notwithstanding the large and increasing sum annually spent in furthering the objects for which the Society was founded.

The ordinary income of the Society for the year 1870 exceeded the expenditure by £1500 3s. 7d.; but the showyard receipts at Oxford fell short of the expenses by £2504 4s. 8d., leaving a net deficiency on the year of £1003 5s. 1d. The funded capital of the Society remains the same as at the last half-yearly meeting, namely, the permanent fund of £100,000. The year Centenary Bazaar and the Reserve Show Fund have added £1612 7s. 8d. New Three per Cent. In addition, the sum of £2000 lies on deposit with the Society's bankers, and the balance of the current account on the 1st instant was £3362 7s. 3d., both these sums being available for defraying the expenses of the Wolverhampton meeting.

During the past half-year the Council have sustained a heavy loss by the death of their valued colleague, Lord Walsingham, a vice-president of the Society; and they have also received, with much regret, the resignation of Mr. W. H. Brampton, a member of Council. The vacancies thus created have been filled up by the election of Major-General Viscount Bridport, as trustee, in the room of Mr. Brampton; by the election, as vice-president, of Lord Vernon, in the room of the late Lord Walsingham; and of Sir Watkin Wynn, Bart., in the room of Viscount Bridport; and by the election of the following members of Council:—Mr. R. H. Masfen, of Pendeford, Wolverhampton, in the room of Mr. W. H. Hassall; and Mr. J. Wells, of Booth Ferry, Howden, in the room of Mr. J. Arncliffe.

Mr. Juhlin-Dannfelt, Superintendent of the Experimental Farm and Agricultural College at Stockholm, has been elected an Honorary Member of the Society.

The Wolverhampton local committee, in making every exertion to ensure the success of the country meeting, and have added to the Society's list prizes for hunters and roasters, also for carriage and agricultural horses, as well as for dairy cattle, for extra classes of Shropshire sheep, and for wool, butter, and cheese, amounting in all to upwards of £1000.

The farm-prize competition in connection with the Wolverhampton meeting promises to equal in interest that of last year. The conditions of competition have not been varied more than was required by the addition of the new prizes. The regulations have been more clearly defined than they were previously. It has been decided that competing arable farms must be not less than 200 acres in extent; and that the dairy farms be those on which not less than 20 cows are kept, and which are dairy farms, and not dairy purveyors, including the sale of milk, either to towns or cheese factories. It has also been decided that every competitor must enter all the land in his occupation within the area of competition; and that a tenant-farmer, in order to be eligible to compete for prizes offered by the Society, must have held at least three-fourths of the land which he occupies. Twenty-three arable and four dairy farms have been entered; and it is hoped that the awards of the judges may be made known, as on the last occasion, at the general meeting of members held at the Wolverhampton Hotel.

The Council have considered in what manner they

could best recognise the long services of Mr. Amos as a consulting engineer to the Society, and, being desirous that he might still assist the Council with his advice, have appointed him honorary consulting engineer to the Society; they have also presented him with the vote of thanks from the Council, on vellum and accompanied by the Society's gold medal.

The alteration in the engineering staff of the Society consequent on the retirement of Mr. Amos has received the careful attention of the Council, and they have resolved that as the original appointees of consulting engineers was the firm of Messrs. Easton & Amos, the responsibility of carrying on the business of the Society remains with the existing firm, viz., Messrs. Eastons, Amos & Anderson.

Arrangements are now in force for supplying the members of the Society with veterinary information, and with reports on diseases amongst cattle or other live stock, have also been discussed by the Council, with a view of ascertaining whether these arrangements may with advantage be modified.

The original purposes of the grant made by this Society to the Royal Veterinary College were twofold:—(1) To advance veterinary science by means of the instruction afforded to students at the College; (2) To enable members of this Society to obtain the best assistance and advice in case of the outbreak of disease amongst their stock.

In addition to these primary objects the Society hoped to present to its members in general, information on veterinary science by means of lectures, reports on cases treated, and on measures to be adopted to prevent disease.

The first of these objects has scarcely been so satisfactorily performed as could be wished; the number of veterinary surgeons who have gone out from the College, and who are established in the country, have not so full a knowledge of the treatment of the diseases of cattle, sheep, and pigs as to give confidence to their employers, though thoroughly competent as far as treatment of horses is concerned, and generally possessing a higher scientific education than the preceding generation.

Neither has the second object been satisfactorily attained. Members of the Society do not apply to the veterinary inspector in cases of disease so much as they might do, and complain that it is not easy in these cases to obtain the professional assistance they require.

Further than this, the Society does not receive from the College, or its professors, the current information on diseases, or the suggestions for their cure and prevention, which the Council think ought to be at their service.

They have therefore, under the conditions on which the grant should be made, shall be as follows:

That the grant to the College shall be specially devoted to the advancement of veterinary science as applied to the diseases of cattle, sheep, and pigs.

It is desirable that the governors of the Veterinary College should appoint an official assistant to the professor of cattle pathology, in order that he may more satisfactorily attend to the applications of members of the Society; and by lectures and practical treatment of cattle diseases at the College give more thorough instruction to the students of these subjects, and further that the professor should present to the Council quarterly reports on matters connected with diseases of cattle, sheep, and pigs, and on any question of veterinary science which may be of interest to agriculturists.

A devoted member of the Royal Veterinary College has therefore been invited to meet the Veterinary Committee of the Council, to discuss the measures which have been considered necessary to be adopted in order to render the cattle department of the Royal Veterinary College really useful to agriculturists.

The Council have noted with great satisfaction that the members of the Society avail themselves of their chemical privileges in increasing numbers; and they have been much gratified at the general testimony as to the value of the Society's quarterly reports on venereal and adulterated manures and feeds, &c. &c. Were other evidence wanting, the fact that the Council of the Royal Agricultural Society of Ireland have determined to adopt the same course would be sufficient to indicate that these reports are considered of great value by the agricultural community.

The case of Bradbury v. the Royal Agricultural Society is expected to be tried during the month of June in Westminster Hall.

Four out of nine candidates who had entered their names for the exam. presented themselves for examination for the Society's educational prizes and certificate. Of these three were under the age of 21.

Mr. G. P. Smith, of the Royal Agricultural College, Cirencester, passed an excellent examination in the science and practice of agriculture, and was awarded the first prize, and is also entitled to the prizes for chemistry and land surveying. Mr. H. G. Ohry, also of the Royal Agricultural College, Cirencester, being over age, does not receive a prize, although he stands first for geology.

One candidate only entered for anatomy and animal physiology, and the examiner did not think him worthy of a prize. Three candidates entered for botany, and all failed.

The result of the examination is that Mr. Smith becomes a member of the Society, and obtains a first-class certificate, the first prize, £25, and the following prizes for proficiency in special subjects:—

Science and practice of agriculture	..	£20
Chemistry	..	.. 10
Land surveying	..	.. 5
Land surveying	..	.. 5

Mr. Ohry gains a first-class certificate, and becomes a life member of the Society. Mr. T. S. Minton obtains a second-class certificate.

The Committee cannot but express their regret that more candidates have not come forward for the prize offered, and that out of the number entered more than half did not present themselves for examination.

By order of the Council,

H. M. JENKINS, Secretary.

The report was adopted, on the motion of Sir J. H. Maxwell, Bart., seconded by Mr. Mechi.

Thanks were afterwards voted to the auditors; and, on the motion of Sir Watkin Williams Wynn, Bart., M.P., seconded by Sir Walter Stirling, a cordial vote of thanks was given to the chairman.

Farmers' Clubs.

AYRSHIRE.

Some of the Hindrances to Agriculture.—This was the subject of a paper by R. M. CUNNINGHAME, from which we make an extract.

Farmers are becoming more and more alive to the position in which they are placed, for it is evident enough that, owing to the circumstances of the land suitable for agricultural purposes in this country, rents will continue to advance; and as servants' wages, manures, &c., are all steadily increasing, the question forces itself on us—How are we to meet all these advances? How, but by the removal of everything which militates against the production of larger crops, alike of grain, grass, and roots.

1. The first hindrance I shall allude to is the Law of Hypothec. The late John Gray, of Dilton, than whom there were few better managers of an estate, or who more correctly understood the relation of landlord and tenant, said in public on one occasion—"The letting of land is a commercial transaction. In the contract between landlord and tenant there must be, as in all other commercial contracts, a strict exchange of equivalents, if both parties are to reap from the transaction all the advantages properly incidental to both."

We only want a fair field, and seek no favour; but this law gives special protection to landlords to enable them to encourage the competition of men whom, were it abolished, they would not deal with. This law also operates against an increase in the produce of land (which is a great national loss), from the encouragement it affords to enter a farm with insufficient capital. I believe scarcely a greater evil can attend a farmer than struggling to cultivate land with half the requisite capital: he cannot possibly farm it with advantage himself, or he can do anything like sufficient capital employed in farming the cultivated lands of Scotland, one-third more could be produced therefrom than is being done at present. To my mind the worst feature in this notorious law is the barbarous power with which it invests a landlord to injure a tenant's character and credit through sequestrating for rent before it is due. Probably I shall be told that this seldom happens. Be it so. Still, no man should be so armed by law that he might perpetrate such a wrong on his fellow-man.

2. The next hindrance I would notice is that caused by the working of the Game Laws. Good and successful farming cannot be carried out where much game of any kind exists, and I believe that wherever landlords themselves have attempted to carry out high farming by growing expensive green crops, and at the same time strictly preserve game, they have found it to be an impossibility. These two cannot walk together, for they are utterly incompatible the one with the other. In my opinion, one of the greatest absurdities of the Game Laws is, that they cut at the root of all liberty of the subject—that privilege which ought to be enjoyed by all good citizens in this free country, viz., self-defence. It is understood in all well-governed kingdoms that a man is free to protect himself and his property against all depredators; but against the Game Laws, the Game Laws. They override all such prerogatives, and consequently are entirely at variance with righteous judgment.

3. The next hindrance I would refer to is the want of what might be designated "Tenant-Right," or, in other words, compensation for permanent improvements and unexhausted manures, &c. The want of such a system hitherto in Scotland has been the cause of much land becoming deteriorated and impoverished, and the tenant, in consequence, more or less impoverished, where the tenure is doubtful or a renewal. Now this is not only an injury to landlords and tenants, but it also entails a great loss on the nation, which ought to be guarded against. How this is to be accomplished is a matter likely soon to command public attention, and is of vital importance to agriculturists. There are differences of opinion amongst farmers as to whether a tenant drawing him the close of his lease can with benefit to himself impoverish the soil. I am one of those who think that his true interest is to keep up high cultivation to the very last drop. To prevent in part the deterioration of land, it would be highly beneficial, where there is no desire for change on either side, that new arrangements should be made two or three years previous to the expiry of a lease; but doubtless for the permanent maintenance of land in a high state of fertility more is needed, and something like the system obtaining in several districts in England, where payments are made for improvements executed, and for manures left in the ground by the outgoing tenant, should be made compulsory by law on removal.

It would be but common fairness, that when a tenant has sunk a considerable amount of capital in improving a farm, he should, when compelled to leave, be remunerated for his property left in the soil; and on the other hand, if the subject be deteriorated, the landlord should be indemnified for the loss sustained. The

resolution proposed to the Lord's Committee by Earl Grey would have counteracted in part this hardship, viz., "When the lease of a farmer became void by his insolvency, his creditors should have the right of calling upon the landlord either to pay them the fair value of the unexpired term of the lease, or to sell that lease to a new tenant, adding the price obtained for it to the devious assets of the bankrupt." Strange to say, this amendment, although in accordance with equity, had to be withdrawn.

4. The next and last hindrance I would make mention of is the insufficiency of farm cottages for our ploughmen and labourers. This is a very serious drawback, and a crying evil which cannot too soon be remedied; and I am sorry to say it is one which is peculiarly applicable to Ayrshire. The bulk of the farm cottages in this county are constructed on the principles of sheer cold economy, with very little regard to the health or comfort of the occupants, and with no regard whatever to their self-respect and to the proper tone of their moral feelings. In case anyone should think that I am making an exaggerated statement on this head, I shall here give the evidence of a gentleman who lately visited the county for the purpose of reporting on this very subject, in connection with the Commission on the employment of children, young persons, and women in agriculture." Mr. J. Henry Tremeneere, assistant commissioner, says regarding farm cottages in Ayrshire—(fourth report): "The inadequate supply of cottages for the agricultural labouring class and their deplorable condition present a marked contrast to the high cultivation and general prosperity which are everywhere conspicuous in Ayrshire; and in no county in Scotland can the wants and comfort of the rural population in that respect be more disregarded. Not only are cottages not built, but the old ones are permitted to fall into decay and ruin, and no disposition is shown to replace them. In some extensive parishes the cottages are not sufficient for a tenth of the labouring population, and in many of them there are no cottages at all. This great deficiency in one of the first requisites for the comfort and respectability of the labouring classes, is a subject of just and frequent complaint by tenant-farmers, and is consequently a necessary consequence of employing unmarried men, and of lodging and boarding them in their houses. So strongly are the inconveniences of this deficiency felt by the farming community in Ayrshire, that it was suggested by more than one large occupier, that every landed proprietor should be compelled to build and keep in repair a number of cottages on every arable farm proportioned to its acreage or rent. Nor does this want of sufficient cottage accommodation arise from the interest of farmers, but has a most injurious influence upon the morals of the young adult population of a district thus circumstanced. They cannot marry unless they settle in some village or town, perhaps miles distant from their employer's farm, and so extensive are many of the parishes that even that resource would seldom be available. The natural result is an amount of immorality and illegitimacy, which, under different economical arrangements, might probably be altogether avoided."

DISCUSSION.

Mr. YOUNG (Kilbennie) had long held the opinion that no one thing would be so much to the advantage of the future progress of agriculture as a wisely considered law, giving compensation for unexhausted improvements. In Ireland there was such a law at present; in fact it went much further, for it not only gave compensation for permanent improvements, but also for such things as small disturbances, which they thought very unjust and unreasonable, and a great hardship to landlords. But if they got a law for Scotland and England, giving fair and reasonable compensation for all such unexhausted improvements, as would add to the letting value of the land, it would give an immense impetus to the agriculture of the country. For example, there were large tracts of land in this country un reclaimed, but no tenant, however enterprising, would do so under a 10 years' lease; but he believed if they had law of this kind much of that waste would be reclaimed, and the country would be increased, and pauperism, by providing a larger amount of employment, and to increase the food of the people, which would be a national advantage. He quite agreed with Mr. Cunningham that if a farmer by negligence or bad farming were to impoverish the soil, such a law would operate the value of the land, his landlord should have a claim against him for compensation. He believed if a law of this kind were tried by experience—the best and highest test they could apply—it would prove for the benefit of the landlord, the interest of the tenant, and the good of the whole community.

Mr. CALDWELL (Knockshoggle) said: Cottage accommodation was very much wanted; and not only cottage accommodation, but farm-house accommodation in office-houses, and in the houses of the small farmers, many farms that would be greatly benefited, and, he thought, would be enabled to pay more rent if they had better accommodation for cattle and grain.

Mr. STEVENSON (Silverwood) said: Labourers were getting scarcer, and the young men were so quiet and idle, and the women were so idle, and the hours they were used to do. Farmers now felt that when they could get a married man it was a very great advantage, but they felt the want of up-putting for them very much. He thought there was a little objection on the part of the landlords to these cottages, but he did not know exactly where their objection was. Perhaps it might be thought that it would increase pauperism. He did not know whether that would be the effect of it or not; but, certainly, unless they got something of that kind, he did not know where

in future they were to look for labourers. The want was beginning to be very much felt.

Mr. ROBERTSON (Kyebrun) said Mr. Cunningham had referred to two or three things that it needed a little courage for a tenant-farmer to take up in a meeting like this. He believed there was a class of landed proprietors in the county who had an idea that this Club was composed with a view which came to the benefit of the public. Some of them thought that the Club was a political combination as well as an agricultural combination; and this was an idea that caused some to look upon this Club with a little lightness, and to say that it did not fairly represent the tenant-farmers of Ayrshire. There were one or two other things besides those stated by Mr. Cunningham which might be regarded as proving a hindrance to agriculture. One of them was that this county was getting like the land occupied by Abraham and Lot—it was getting too straight for those who used the plough following from the sowing of the very high competition which was now taking place for land, and the rent people were compelled to pay for it cramped them in an injurious way, as they had not the capital left to expend on the land necessary to bring it to perfection. Whenever a man came to be hampered for capital to manage his farm, instead of increasing its productiveness in his hands it would decrease. One thing he could have wished Mr. Cunningham had brought out was, not only to state what the hindrances to agriculture were, but how these were to be overcome. He believed there were many farms, but was not aware of many which had been brought out. For instance, nearly every farm that came into the market had its rent raised considerably—20, 30, or 40 per cent. Now he knew that there were farmers who desisted from improving their farms, just in the fear that if they should have the rent raised they would have no improvements, or that somebody else would take the farm and reap the benefit. But how were they to get a remedy for this?

Mr. JOHN LINDSAY (Ayr) said it was difficult to say which of the four hindrances that had been referred to was the greatest. The necessity for compensation for exhausted manures and for improvements seemed to him to rank very high in importance. There did not seem to be any practical difficulty in the operation of such a measure. It had been in operation for some time in England, and it had had very good results. The fact that it was naturally, owing to the want of leases. The fact that it was in operation there, and had proved perfectly workable, should encourage them to seek to apply it to Scotland. It was quite well known to them in this county that many farms at the expiry of a lease were very low in condition. The farmers who entered upon the farms found that five or six years at least were required to bring them to anything like condition; and then the same interest that impelled the previous tenant to reduce the condition of the farm, impelled his successor as his lease expired, to do the same thing again. He had seen farms for five or six years at the beginning and five or six years at the end of a lease, the land was in condition only to produce about half of its natural results. The consequence was a loss to the community which, totalised, was something enormous. On that account the question of compensation in his opinion was a very important one, and not a difficult one to deal with.

Mr. WALLACE (Braebhead) thought the third head was the most important part of Mr. Cunningham's paper. If they had a proper compensation clause, he thought they would be all right. He had not much faith either in the landlord or the tenant, but he thought the third thing was to have good men to work with. He thought they might take a leaf out of the proprietors' book, and select their landlord just in the same way as the landlord selected his tenants. It was possible they might be taking a rather one-sided view of some things, and he had been trying to weigh in his own mind whether there were not grievances chargeable against themselves as tenants. There was one thing, that often when a proprietor took an interest in his tenants, and came amongst them as a visitor, the tenants were ready to pounce upon him when their grievances were brought forward. He thought it would like if every time they were going out amongst their workers, they were to be pounced upon for higher wages, or for some repairs to their houses. Would they not go past them as often as they could? It was right to bring their grievances before them in that way, if they got proper men as landlords, they would be able to do it. When he began farming he was very much encouraged both by the very judicious manager and the proprietor of the estate; and when he ventured to do a little improvement he never failed to get encouragement. If they got proper men as landlords, they would be able to do it. When he began farming he was very much encouraged both by the very judicious manager and the proprietor of the estate; and when he ventured to do a little improvement he never failed to get encouragement. If they got proper men as landlords, they would be able to do it.

Mr. YOUNG (Kilhenzie) expressed his dissent from Mr. Wallace's opinions in regard to leases. There should be both leases and a compensation clause, but no tenant would go on with improvements if he was liable to be turned out of his farm at any time. They would be much better with yearly leases and a compensation clause.

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Farm Memoranda.

THE PRESENT APPEARANCE OF THE CROPS.

Ayrshire, May 17.—The following remarks relate to the present appearance of crops in this neighbourhood.—Wheat, generally backward, several patches thin, and partly ploughed down. Oats looking healthy,

and well rooted. Barley braiding well. Beans also looking well. Peas, none grown. Kye and Bere very little sown. Potatoes well forward, but several fields cut down by frost this morning. Ice here this morning as thick as a penny-piece; exceedingly cold and withering. *Andrew Ralston, Lagg, by Ayr.*

Beds, May 22.—Wheat crop, although thin in many parts, is much improved, and promises an average. Winter Beans and Oats are in many places a failure, and the land ploughed up and sown with other crops. Last-year-sown Clover and other seeds I have not seen so bad a crop for the last ten years; spring corn promises well, and young seeds as well as old pasture. We want warm weather, and all crops would make good living. The winter crops have in many places been sown earlier, and come up well and plenty of plants. *James Ross, The Hoe Park Farm, Luton.*

North Bedfordshire, May 22.—The present appearance of crops of vegetation generally in this neighbourhood may be fairly stated at about an average. The autumn and winter being upon the whole dry, has been favourable to the clay soils, the chief drawback being the prevalence of wireworm and other insects, which have very much thinned a portion of the Wheat crop, particularly that after fallow. In April we had a considerable amount of rain, with a very low temperature. This did some considerable harm for the wheat, but both wheat and barley are now in good condition. The weather of the last fortnight has enabled them to recover tolerably well, still Wheat and Barley are barely an average; other crops, and also grass, very good. Upon the whole this may be considered a fruitful season at present, but is scarcely likely to be what is called a Wheat year. *H. A. Bottle, Putehall, Kimbolton.*

Dorsetshire, May 10.—I send you a few remarks on the crops in the neighbourhood of Blandford. In this neighbourhood Sainfoin is generally good, but the crop of Kye-grass and Clover so thin on the land that little of it will be good enough for stock for hay. An average cut of grass may be expected on the meadow land. The Wheat on most farms is looking healthy; a few fields may be seen deficient in plant. The Barley and Oat crops promise well; the March month was so favourable for putting the seed in the land, with the glorious month of April proving all that was required for it. *John Ford, Rushton Blandford.*

Durham, May 17.—In this district I cannot say much as to the crops, owing to the backward state of everything, and particularly as regards grain crops. The cold weather we are now having is retarding the growth of everything. I am glad, however, to say we have not so severe a frost as we have in some parts. *Robert Reid Dixon, Darlington.*

Essex, May 21.—I have lately made a circuit of some five or six miles from this, and in general terms I can only say that the crops are in a corresponding state. I have not seen the country in a more promising position. To those unacquainted with this locality, I beg to say that my remarks apply to a district where the natural capabilities of some of the lands are very good, and others where the depth of cultivation and amount of manure applied, would astonish some of those gentlemen who thought Mr. Machi extravagant when he recommended in his recent address an investment of £20 an acre. The crops in most cases are in a good state, and a large percentage in a good condition; there is a very little but under favourable circumstances will yield a crop. Barley and Oats are forward and good. White Peas for the London market are an important crop, and are at present in bloom; should we escape frost and high winds during that stage, we may anticipate an early and abundant yield. Early Potatoes are also much grown, and are making a very vigorous growth. On the farm here we have about two acres of Angel, and with the exception of some fields of early meadow land, are a forward and regular plant. The first seed sown on March 20, we are now singling out. The hay will be over an average, and the Clover much under. *P. Mitchell, Rainham.*

Fifehire, May 17.—Wheat is not looking well, has sustained bluish appearance, partly on account of the heavy rains and keen frosts during night. Barley and Oats have braided well, and in the meantime promise fair for a good crop. Potato planting is now finished, but there are a few complaints of the earlier planted sets having rotted on clay land. Grass is looking well, and the hay crop promises to be a good one. *John Pitcairn, Kinnaird, Newburgh.*

Northumberland, May 18.—I was down in the east county yesterday, and there, as well as here, the Wheat crop is looking, with few exceptions, wretched—whole fields run off in some places; my own is looking very puny and shy. Oats are late, and looking ill, getting that blue and red colour which indicates stoppage of circulation, both in man and vegetable. Barley is looking better I think than either of the other cereals, but is also late. The weather is bitterly cold, and harvest must be late, even with the sun. We had 70 of frost on Friday morning. Pasture, as you may fancy, very bare. *Thomas P. Dods, Anick Grange, Hexham.*

Wills, May 18.—I am sorry it is not in my power to give you a favourable account of the

Wheat crop; in my district the plant is very thin on the ground, in few instances a full plant; many acres ploughed up, and very few in appearance. Barley and Oats, nothing to complain of. Spring Beans and Vetches looking generally well; winter Beans bad. Sainfoin good. Seeds bad. Little hay will be cut unless we have a congenial rain. North-east winds cut everything up; a favourable change is very desirable. *Geo. Brown, Avelbury, Calne.*

North Riding of Yorkshire, May 11.—With a rainfall considerably in excess of the average and a high range of temperature, the month of April was very favourable for spring vegetation. All the spring-sown corn came up strong, and a very regular braid, and up to the present time presents a very favourable appearance. Autumn-sown Wheat varies on poor cold land very indifferent, while that on dry soil sown in good condition promises well. The excessive rainfall in April retarded the preparation of the land for Swedes, but within the last 10 days progress has been resumed with vigour, and a considerable acreage is now sown, the land working tolerably well. Up to the 8th inst. our prospect for grass was good, since then the weather has been very cold, and the grass has been cut, and it will maintain, in prospect, during high prices, store sheep being equally as high. This may be owing to the high rates commanded by beef and mutton, and unless the present high rates are maintained the grazier of stores recently purchased cannot but find the business unprofitable. Our wool markets for the current clip have barely commenced, but from the numerous inquiries it is anticipated that better times than the flockmaster has experienced during the last two years are in store for him. As to the price of the current clip, or, more correctly, in this district, very few at this time, and from other than this locality must come the supply for the million for the next two months at least. *W. F. M.*

Hampshire, May 10.—The Wheat plant promises well, where there is enough on the ground, but a great portion is too thin, and in need of improved tillage, and it is to be hoped that the weather will, however, do all that is possible towards strengthening the weakest crops. The loss of plant applies for the most part to Wheat sown out of sea, the very early and very late sown being the best. Many farmers on the hills are beginning to think that, although formerly the Wheat was usually sown too early, yet that at the present day they have fallen into the other extreme of sowing too late, and consider that many of the deficiencies of the plant, &c., of late years, such as blight and loss of plant, &c., are to be attributed chiefly to that cause.

Barley and Oats are generally planted well, with some few exceptions, where the wireworm has thinned the crop. It has been, however, this year sown much earlier than usual, the weather being favourable, and but few roots to detain the sheep on the land. In consequence the Lent corn will be better able to withstand the effect of a dry season should it occur, and be forward to harvest the same time as the early sown. The early sown of Peas and Peas are looking well and healthy, the period of sowing and the weather since having been more favourable for Pulse crops than for grain. There is no doubt a very extensive breadth of Beans and Peas planted this year, owing to the great failure of the Clover and field grasses. Winter Oats, winter Barley, and winter Beans have all suffered loss of plant more or less, from the effects of the severe frost during January, and like much of the Wheat, it is doubtful whether the crop will be obtained.

The fodder crops, such as Trifolium, Tares, &c., are a good average produce, Trifolium and Rye being now in full season for soiling in the early districts, and are yielding a good sward, the advantage of which can scarcely be over-estimated, hay and straw being so scarce and dear; it may however be still further economised by cutting straw with the green fodder during the summer—at least, this is the practice upon some well-cultivated farms. The green crops can thus be used much earlier, and are found much healthier food for all cattle and horses. The crops of Clover and field grasses for hay are found to be very deficient in plant, and also unpromising in growth, therefore an average crop of field hay is quite out of the question. The dry pastures and meadows are altogether the reverse of the field grass: a more abundant crop of grass, at present, and a better promise for hay, we have never seen, and let us hope that it will be realised, in order that during the next season the average number of sheep and cattle may be fattened, and thus cheapen the price of meat to the consumer. The prices of beef, mutton, lamb, &c., are all much higher than on the average of seasons, and to keep prices at all within reasonable limits the butchers are now killing three animals instead of two as in ordinary seasons, and this encroachment on the standing stock of the country has been going on for a long time, hence it begins to tell seriously on the price of the store stock, and cattle, which, notwithstanding the high cows, are all exceedingly high in price and in brisk demand.

The prices of all kinds of feeding stuffs, as also Oats and grinding Barley, are higher; Wheat is, however, somewhat stationary in value, and we cannot expect more than trifling variations either way from present values unless some very unforeseen circumstances occur: the price at present should, however, be considered satisfactory.

Generally speaking, the fallows in preparation for root crops in a forward state. The great deficiency in root crops of last year has induced parties to cultivate a much greater extent of Mangel this year than usual. There is also more Kohl Rabi, Cabbages and Carrots under cultivation than formerly, the advantage being found not only in the produce but also in the alternation.

The deficiency in the quantity and quality of guano is beginning to tell upon the demand for other artificial manures, some of which have risen in price considerably, and are not likely to recede again during the season of root culture.

Potatoes, too, will be extensively planted this year, and parties now appear to have forgotten that the crop is still subject to disease, and will be so under certain conditions of the atmosphere. There is no doubt, however, but that dry summers have produced the soundest and best Potatoes.

Some of the last report the lambing season has been brought to a close, and the fall of lambs of the Hampshire Down breed is now ascertained to be beyond the average number, the ewes and lambs also being generally in a healthy state. In fact it is very rare to see at our markets and fairs a flock suffering from the epidemic lameness so prevalent a few years ago.

We find this year's clip of wool is likely to make a better price than last year, probably owing to the short shear in the country; and the fleeces being lower in condition than usual, will yield lighter fleeces. *Joseph Blundell, Southampton.*

The Week's Work.

MAY 27. — *Turnip Seed-time.*—The sowing of Turnips in the north commences about the close of the month and beginning of June. Some of the earliest sowing should be sown as early as Sweden, and the cultivation and manuring are identically the same as that directed for Sweden last week. Assuming that the land was ploughed from 12 to 14 inches deep in autumn, then it should be smashed across as early in spring as the season will permit to the same depth; this will retain the fine winter-made mould on the surface, essentially necessary to success and which this year amounts more largely than usual. Much of the art of growing Turnips successfully depends upon the manuring and seeding of the land so as to retain a sufficiency of moisture to start vegetation, and which only can be done in dry weather by keeping the sowing close up to the manuring. Where there is a sufficient force to keep a sowing-machine going, this is easily done, but when otherwise sow at the close of every yoking close up to the ploughs, using the liquid manure during when the land is naturally deficient of moisture, as success depends on getting the seed rapidly into a rough level, and in using the liquid manure did give a plentiful supply of water, as directed last week for Sweden, otherwise it may do more harm than good.

Wheat flagging, although the exception, will require the timely aid of the scythe in some places, in seasons like the present. It must be borne in mind that when once the crop covers the ground, with plenty of sap below to force it forward, it is liable to "flag," so that relieving the ear prevents etiolation and lodging, thereby forcing forward the harvest, but the success of the practice depends upon relief being given in time.

Paring and Burning, in breaking up grass land, are more easily done this month than during the preceding months, the weather being generally drier, so that the several operations of paring, burning, spreading the ashes, and ploughing, follow each other in quick succession without interruption. Rape generally does better than Turnips, but in a moist season, with plenty of sap in the land, Turnips may be grown.

Stifle Burning and Clay Burning have nearly been superseded by steam culture, the use of artificial manures, and thorough drainage—deep drainage and steam culture getting rid of the weeds, and the artificial manure supplying the salts more economically than the burnt ashes.

Ewes flocks attend to. In the North Leicester cross lambs, produce of 4-year-old Cheviot drought or crock ewes and 5-year-old Blackfaced ewes, should now be ripe for the shambles. The ewes follow, and in not a few instances when the grass is rich and forcing, the ewes and lambs are sent to market together. Some stock-farmers draught out for market the most forward ram lambs from breeding flocks and also ewe lambs not suited for breeding. As a rule, lambs (whether ram or ewe) that run early to fat seldom turn out good breeders, so that when they are sent to a fair selling price the best plan is to turn them into money. And this applies to all breeds North and South and perhaps with greater force to our improved breeds, naturally prone to obesity, than to the Cheviot, Blackfaced, and other native breeds less liable to run to fat in early life. Extra fat mutton is attended with a very heavy drawback in the shape of waste fat, only fit for the tallow-tub of the butcher, so

that lambs yield nearly as much available food as older sheep. In other words, growing fat for the tallow-chandler don't pay the farmer; so that the disposing of lambs with this tendency not only makes the most money of them, but it also at the same time improves the flock.

Castration of lambs should be done in mild dry weather. Those intended for the shambles need not undergo the operation. Docking generally takes place at the same time, and also the branding of those selected for breeding. The branding of those intended to be sold in the Summer markets is left to the purchaser. The selection of ram and ewe lambs for breeding is a work of very great care.

Dairy cows should now be in their prime for rich milk, butter, and cheese. The milk-room in some places is very liable to get "mouldy" in close weather, when the fire is put out and every thing left to be dried by solar heat. In such cases and in wet weather generally, the best plan is to rekindle the stove so as to keep utensils, shelves, and everything clean and sweet. In a dairy the hygrometer must be attended to as well as the thermometer and also the purity of the atmosphere, for when manure is being turned or carted out and various other operations done that load the atmosphere with noxious matter, it takes all the art at the command of the dairymaid to keep things inside as they should be.

Small porkers fed on the butter-milk and skimmed milk of butter dairies and on the whey of cheese dairies, require a fair allowance of solid food. When the whole milk is churned no solid food will be required, but otherwise a daily allowance of sonr food should be given, to preserve health and produce a fine quality of pork. Young pigs intended for bacon should never be allowed to lose their milk flesh, but extra fattening should be avoided as it prevents the growth of muscle. February and March brood sows will be forward with their second litters, and they and nursing sows keep in good condition. *W.E.*

Notices to Correspondents.

CHICORY: *F.* It should be sown as Carrots, in rows about 12 inches apart, on land well and deeply cultivated. We will give fuller information next week.

SILLAGE EGGS: *Cox* If you have provided chalk and old mortar, and all the other conditions of health, and soft eggs still are laid, you had better change the breed.

Markets.

ENGLISH WOOL.

During the past week English Wool has continued in good demand, at hardening prices.

HOPS.

BOROUGH MARKET, May 18.

The market is very firm, at a considerable advance in price of every description of English Hops. There is every appearance of a further rise. Bavarian and Bohemian Hops are 4s. to 6s. per cwt. dearer; choice American Hops have an upward tendency.

MARKE LANE.

MONDAY, May 22.

The supply of English Wheat to this morning's market was small. Factors demanded more money, but millers not being disposed to give any advance, scarcely any sales were made. The attendance was good, and for foreign there was a consumptive demand, at the extreme prices of last week. Barley and Peas were unchanged in value; Beans rather cheaper. Fine Oats were scarce, and Swedes brought an advance of 6d. per qr. There was no alteration in the top price of Flour, but barrels were rather dearer.

PRICE PER HUNDRED QUARTERS.			
WHEAT, Essex, Kent, Suffolk, White	47-60	Red	55-60
— fine selected runs	49-56	Red	56-62
— Talavera	62-66		
— Norfolk	48-52	Red	—
— Foreign	48-65		
BARLEY, Kent & dist. 30 to 34s. Chevi	43-46	Malt	36-47
— Oats, Essex and Suffolk	26-28	Malt	35-43
— Scotch and Lincolnshire	28-30	Feed	—
— Foreign	28-30	Feed	—
— Foreign	28-30	Feed	—
RYE, Essex and Suffolk	34-36	Foreign	33-36
RYE-MEAL, Foreign	—		
BEANS, Margate	37s. to 47s.	Pick	49-50
— Pigeon	51s. to 59s.	Winds	Longpod
— Foreign	—		
PEAS, White, Essex, and Kent	48-49	Egyptian	42-44
— Maple, 40s. to 44s.	Grey	36-40	Foreign
MAIZE	—	Foreign	33-36
FLOUR, best white	42-43		
— 2d ditto	40-42	Country	36-42
— Foreign	—	per barrel	28-30

WEDNESDAY, May 24.

The grain trade to-day opened and closed quietly. Prices, however, owing to the anticipation of the revival of the demand on French account, were prevented from having any material rise. The shipper of English wheat was not so well off, while the arrivals from abroad were far from being extensive. The demand for both red and white produce was inactive, at the rates current on Monday. Barley sold quietly on former terms. Malt was depressed, though unchanged in value. There was a

large supply of Oats, which changed hands less freely, at about previous currencies. Beans and Peas were purchased cautiously, at recent values. The Flour trade was inactive, and the tendency of value was unfavourable.

ARRIVALS OF GRAIN, &c., INTO LONDON BY WATER CARRIAGE.

	Wheat.	Barley.	Oats.	Flour.
English & Scotch	Qrs. 944	Qrs. —	Qrs. —	Sacks. —
Irish	—	—	—	—
Foreign	8110	280	39,810	940 { 7340 bbls.
	9054	280	39,810	

LIVERPOOL, May 23.—The Corn market was rather thinly attended for a Tuesday. Wheat in limited demand, and prices 1d. to 2d. per cent reduction on red American sorts, and 1d. on white, since Friday last. Flour is quiet, and nominally cheaper. Beans at 11s. decline. Safford, 37s. Oats and Oatmeal remain unchanged. Indian Corn pressed, ex quay, at 9d. per qr. under Friday; mixed American, 34s. 3d.

AVERAGES.

	Wheat.	Barley.	Oats.
April 15	57s 6d	36s 5d	26s 5d
— 20	58 12	37 3	27 9
— 25	58 11	37 3	27 9
May 6	58 11	37 3	26 10
— 13	58 7	37 10	26 11
— 20	58 10	37 7	27 11
Average	58 8	37 2	27 3

METROPOLITAN CATTLE MARKET.

MONDAY, May 22.

We have a very short supply of Beasts; trade is, however, dull at our quotations, and a clearance is scarcely effected. There are a few more Sheep than on Monday last, and the demand has decreased, consequently prices are considerably reduced. Cheviot Lambs and calves are in demand, otherwise trade is very dull. Our foreign supply consists of 1070 Beasts, 16,500 Sheep, 120 Calves, and 15 Pigs; from Scotland there are 260 Beasts; from Norfolk and Suffolk, 1450; and 190 from the Midlands and Home Counties.

S. d. s. d.

Best Scots, Here-	Best Long-wools	s. d. s. d.
fords, &c.	Do. Shorn	5 4-5 8
Best Shorthorns	Ewes & ad quality	— — — —
2d quality Beasts	Lambs	— — — —
Best Downs and	Calves	6 0-7 4
Half-breeds	Figgs	3 8-6 2
Do. Shorn	Figgs	3 4-4 8
Beasts, 2970; Sheep and Lambs,	35,500; Calves, 135; Pigs, 200	

THURSDAY, May 25.

There are very few English Beasts on offer; the number of foreign is larger than last Thursday. Trade is excessively dull, and on the average prices are lower. The number of Sheep is smaller, but the demand has considerably decreased, consequently they cannot all be sold, notwithstanding a disposition to take lower prices. Trade is also very dull for Lambs and Calves; only some of the choicest maintain late quotations. Our foreign supply consists of 225 Beasts, 3210 Sheep, 395 Calves, and 10 Pigs.

S. d. s. d.

Best Scots, Here-	Best Long-wools	s. d. s. d.
fords, &c.	Do. Shorn	5 4-5 8
Best Shorthorns	Ewes & ad quality	— — — —
2d quality Beasts	Lambs	— — — —
Best Downs and	Calves	6 0-7 4
Half-breeds	Figgs	3 8-6 2
Do. Shorn	Figgs	3 4-4 8
Beasts, 600; Sheep and Lambs,	12,400; Calves, 555; Pigs, 40.	

METROPOLITAN MEAT MARKET, May 25.

Best Fresh Butter	.. ..	15s. per dozen lb.
Second do.	.. ..	13s. —
Small Pork, 4s. 4d. to 4s. 8d.		Large Pork, 3s. 6d. to 3s. 8d. per 8 lb.

HAY.—Per Load of 36 Trusses.

SMITHFIELD, Thursday, May 25.

PrimeMeadowHay, 130s. to 137s.	Clover, old 130s. 140s.
Inferior do. 90 120	Inferior do. 100 115
New Hay — —	Prime 2d cut do. .. 130 140
Inferior do. — —	Inferior do. 100 120
Straw 36 44	

CUMBERLAND MARKET, Thursday, May 25.

CUMBERLAND MARKET, Thursday, May 25.	
Sup. Meadow Hay 13s. to 14s.	Inferior Clover .. 11s. to 13s.
Inferior do. 110 .. 126	Prime 2d cut do. .. — —
New do. — 100	New do. — —
Inferior do. — —	Straw 43 .. 48
JOSHUA BAKER	

COALS.—May 22.

Hastings Hartley, 75s. 6d.; Walls End Hetton, 17s. 6d.; Walls End Hetton Lyons, 17s.; Walls End Hawthorn, 14s. 6d.; Walls End South Hetton, 17s.; Walls End Hartlepool, 16s. 6d.; Walls End Original Hartlepool, 17s. 6d.; Walls End Tees, 17s. 6d.—Ships at market, 25s. sold, 24s. unsold; 1, at sea, 15s.

SEED MARKET.

There is now scarcely anything doing in our markets. Clovers meet with no attention whatever. Rape and Mustard seed are in fair demand, at full prices. For bird seeds the trade is steady. French Buckwheat sells at last week's currencies. Blue Peas are scarce.

JOHN SHAW & SONS, Seed Merchants,
16, Water Lane, London, E.C.

Glass for Garden Purposes.
JAMES PHILLIPS AND CO.
beg to submit their REDUCED PRICES as follows:—

PROPAGATING



GLASSES.

Each.—s. d.	12 inches in diameter	Each.—s. d.	12 inches in diameter
3	0 38	1	0 10
4	0 41	2	0 13
5	0 44	3	0 16
6	0 47	4	0 19
7	0 50	5	0 22
8	0 53	6	0 25
9	0 56	7	0 28
10	0 59	8	0 31
11	1 02	9	0 34
12	1 05	10	0 37
13	1 08	11	0 40
14	1 11	12	0 43
15	1 14	13	0 46
16	1 17	14	0 49
17	1 20	15	0 52
18	1 23	16	0 55
19	1 26	17	0 58
20	1 29	18	0 61
21	1 32	19	0 64
22	1 35	20	0 67
23	1 38	21	0 70
24	1 41	22	0 73
25	1 44	23	0 76
26	1 47	24	0 79
27	1 50	25	0 82
28	1 53	26	0 85
29	1 56	27	0 88
30	1 59	28	0 91
31	2 02	29	0 94
32	2 05	30	0 97
33	2 08	31	1 00
34	2 11	32	1 03
35	2 14	33	1 06
36	2 17	34	1 09
37	2 20	35	1 12
38	2 23	36	1 15
39	2 26	37	1 18
40	2 29	38	1 21
41	2 32	39	1 24
42	2 35	40	1 27
43	2 38	41	1 30
44	2 41	42	1 33
45	2 44	43	1 36
46	2 47	44	1 39
47	2 50	45	1 42
48	2 53	46	1 45
49	2 56	47	1 48
50	2 59	48	1 51
51	3 02	49	1 54
52	3 05	50	1 57
53	3 08	51	1 60
54	3 11	52	1 63
55	3 14	53	1 66
56	3 17	54	1 69
57	3 20	55	1 72
58	3 23	56	1 75
59	3 26	57	1 78
60	3 29	58	1 81
61	3 32	59	1 84
62	3 35	60	1 87
63	3 38	61	1 90
64	3 41	62	1 93
65	3 44	63	1 96
66	3 47	64	1 99
67	3 50	65	2 02
68	3 53	66	2 05
69	3 56	67	2 08
70	3 59	68	2 11
71	4 02	69	2 14
72	4 05	70	2 17
73	4 08	71	2 20
74	4 11	72	2 23
75	4 14	73	2 26
76	4 17	74	2 29
77	4 20	75	2 32
78	4 23	76	2 35
79	4 26	77	2 38
80	4 29	78	2 41
81	4 32	79	2 44
82	4 35	80	2 47
83	4 38	81	2 50
84	4 41	82	2 53
85	4 44	83	2 56
86	4 47	84	2 59
87	4 50	85	3 02
88	4 53	86	3 05
89	4 56	87	3 08
90	4 59	88	3 11
91	5 02	89	3 14
92	5 05	90	3 17
93	5 08	91	3 20
94	5 11	92	3 23
95	5 14	93	3 26
96	5 17	94	3 29
97	5 20	95	3 32
98	5 23	96	3 35
99	5 26	97	3 38
100	5 29	98	3 41
101	5 32	99	3 44
102	5 35	100	3 47
103	5 38	101	3 50
104	5 41	102	3 53
105	5 44	103	3 56
106	5 47	104	3 59
107	5 50	105	4 02
108	5 53	106	4 05
109	5 56	107	4 08
110	5 59	108	4 11
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114	6 11	112	4 23
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118	6 23	116	4 35
119	6 26	117	4 38
120	6 29	118	4 41
121	6 32	119	4 44
122	6 35	120	4 47
123	6 38	121	4 50
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125	6 44	123	4 56
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134	7 11	132	5 23
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141	7 32	139	5 44
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154	8 11	152	6 23
155	8 14	153	6 26
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157	8 20	155	6 32
158	8 23	156	6 35
159	8 26	157	6 38
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161	8 32	159	6 44
162	8 35	160	6 47
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295	15 14	293	13 26
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297	15 20	295	13 32
298	15 23	296	13 35
299	15 26	297	13 38
300	15 29	298	13 41
301	15 32	299	13 44
302	15 35	300	13

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FOUNTAIN JETS.
In great variety, from 3s. 6d.



No. 547A.
GARDEN ENGINE.
12 Gallons £3 0 0
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Useful for every variety of purpose—in watering or washing Flowers or Trees in Gardens, Conservatories, &c.; also for washing Carriages or Windows, laying Dust, &c.
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Small size for the hand, as an ordinary Syringe .. 0 15 0



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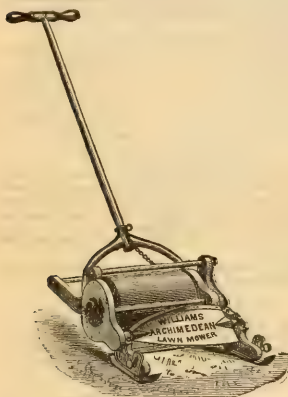
2½ inches	£1 9 0
3 " "	1 18 0
3½ " "	2 7 0
4 " "	2 15 0



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With improved Valves for Liquid Manure, £2 16s 6d. Two-inch Flexible Rubber Suction Pipe, in 10, 12, and 15 feet lengths, per foot 2s. 5d.



No. 470½—SWING
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Galls. £3 18 0
20 " 2 0 38
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THE "ARCHIMEDEAN" AMERICAN LAWN MOWER.

The only Lawn Mower that Cuts Wet or Long Grass
(as well as dry) without Clogging,

Leaving the Cuttings in small particles, evenly scattered, never looking untidy, serving as a Mulch to Protect the Roots from Heat and Drought, and Fertilising the Sod, which cannot fail to invigorate and beautify the Lawn. Perfectly adapted to SLOPES, UNULATING LAWNS, RIDGES and VALLEYS; and for the CROQUET GROUND is invaluable.

NOTICE.—GREAT REDUCTION in PRICES for 1871.—We have great pleasure in stating that owing to the unprecedented success our "Archimedeian" Lawn Mower met with last year, we have increased our facilities for manufacturing, and notwithstanding that several important improvements have been made in the machine, yet we have made a large Reduction in Prices for 1871.

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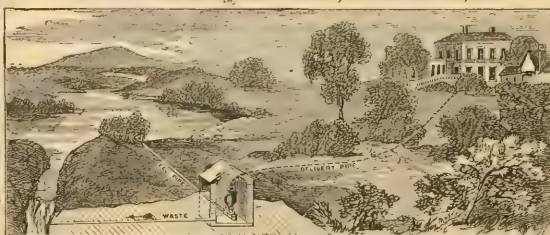
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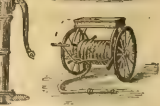
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THE IMPROVED SELF-ACTING HYDRAULIC RAM.

This useful Self-acting Apparatus, which works day and night without needing attention, will raise water to any height or distance, without cost for labour or motive power, where a few feet fall can be obtained, and is suited for supplying Public or Private Establishments, Farm Buildings, Railway Stations, &c.



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S. OWENS AND CO. Manufacture and Erect every description of Hydraulic and General Engineers' Work for Mansions, Farms, &c., comprising PUMPS, TURBINES, WATER WHEELS, WARMING APPARATUS, BATHS, DRYING CLOSETS, GAS WORKS, APPARATUS for LIQUID MANURE distribution, FIRE MAINS, HYDRANTS, HOSE PIPES, &c., &c.
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UNDER THE PATRONAGE

OF

HER MOST GRACIOUS MAJESTY
THE QUEEN,



AND MOST OF THE
PRINCIPAL NOBILITY
OF
GREAT BRITAIN.

The Improvements introduced into Shanks's Lawn Mowers at different times have resulted in these machines occupying the first place in the market, to which the continued increase in the annual sale bears ample testimony.

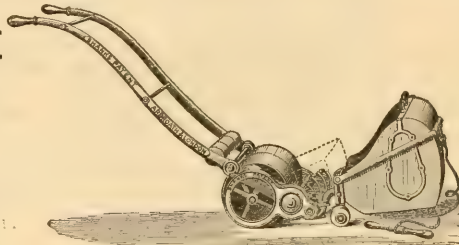
THE MACHINE

FOR 1871

IS MADE FROM

NEW PATTERNS,

AND IS SO ARRANGED THAT IT



CAN BE USED

EITHER

WITH or WITHOUT

THE USUAL

FRONT ROLLERS

ALEXANDER SHANKS AND SON, in bringing their PATENT LAWN MOWERS under the notice of the Public for the Season of 1871, desire at once to draw attention to the various points of merit which their Machine possesses over all others. These advantages have only to be known to ensure the success and to establish more firmly than ever the position of Shanks's Machine as unquestionably the cheapest and best Lawn Mower in use.

1. SHANKS'S PATENT LAWN MOWERS have been entirely remodelled for the Season of 1871. Every conceivable alteration has been made tending to improvement and reducing friction to a minimum. Notwithstanding the great expense which has attended these alterations, A. S. AND SON offer THEIR NEW MACHINE AT LAST SEASON'S PRICES.
2. SHANKS'S PATENT LAWN MOWER is fitted with a double-edged Sole-Plate. This Sole-Plate enables the Cutting parts to last twice as long as those in other Lawn Mowers.
3. SHANKS'S PATENT LAWN MOWER is fitted with a self-sharpening Revolving Cutter.
4. SHANKS'S PATENT LAWN MOWER is fitted with a Wind-Guard, which prevents the Grass escaping the Box when the Machine is in use during the prevalence of wind.
5. SHANKS'S PATENT LAWN MOWER has no obstruction in front of the Cutter, a most important improvement, just introduced.
6. SHANKS'S PATENT LAWN MOWERS are made of the very best material, carefully apportioned so that no part has more weight than is absolutely necessary, and securing at same time the greatest rigidity as a whole.
7. SHANKS'S PATENT LAWN MOWERS are more easily worked and more durable than any other Lawn Mower, and are not at all liable to get out of order.
8. SHANKS'S PATENT LAWN MOWERS are silent in working.
9. SHANKS'S PATENT LAWN MOWERS perform their work in a manner vastly superior to the Scythe. The Lawn is not "ribbed" when cut, but has a most beautiful appearance, being as smooth as a piece of velvet.
10. SHANKS'S PATENT LAWN MOWER has not only obtained more Prizes and Medals than any other, but the highest Prize that has ever been given for a Lawn Mower at an International Exhibition was awarded to A. S. AND SON, who received a First Prize Silver Medal for their Machine at the Paris Exhibition of 1867. It is significant that no other Exhibitor received a Prize, not even an "Honourable Mention" or a "Bronze Medal."
11. SHANKS'S PATENT LAWN MOWERS are warranted to give ample satisfaction, and, if not approved of, can be at once returned.
12. SHANKS'S PATENT LAWN MOWERS are delivered free at any Railway Station or Shipping Port in Great Britain. Orders are executed on the day they are received, either from the Manufactory, DENS IRON WORKS, ARBROATH, N.B., or from the London Office and Warehouse, at 27, LEADENHALL STREET, E.C.

PRICES:—SHANKS'S NEW PATENT HAND MACHINE.

Easily Worked.				Easily Worked.			
8-inch Machine..	..	..	£2 10 0	16-inch Machine..	..	..	£6 10 0
10-inch Machine..	..	..	3 10 0	19-inch Machine..	..	..	7 15 0
12-inch Machine..	..	..	4 10 0	22-inch Machine..	..	..	8 10 0
14-inch Machine..	..	..	5 10 0	24-inch Machine..	..	..	9 0 0

The Hand Machines are all with Silent Movement.

SHANKS'S NEW PATENT PONY and DONKEY MACHINE.

If with Patent Delivering Apparatus.			
25-inch Machine..	..	£12 10 0	25s. extra.
28-inch Machine..	..	14 10 0	30s. "
30-inch Machine..	..	15 15 0	30s. "

Silent Movement, 12s. 6d. extra.

Boots for Pony, 22s. per set; Ditto for Donkey, 18s. per set.

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30-inch Machine..	..	£19 0 0	30s. extra.
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42-inch Machine..	..	26 0 0	40s. "
48-inch Machine..	..	28 6 0	45s. "

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ALEXANDER SHANKS AND SON,
DENS IRON WORKS, ARBROATH; and 27, LEADENHALL STREET, LONDON, E.C.

27, Leadenhall Street is the only place in London where intending purchasers of Lawn Mowers can choose from a Stock of from 150 to 200 Machines.

All sizes kept there, whether for Horse, Pony, or Hand Power.

THE GARDENERS' GAZETTE

AND
AGRICULTURAL GAZETTE

No. 22.—1871.]

SATURDAY, JUNE 3.

Registered at the General Post Office as a Newspaper. Price 5d. POST FREE, 5 1/4d.

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	WEATHER TABLES.

CHOICE DWARF ROSES, in pots (Tea and Hybrid Perpetual, at per dozen or 100. BEDDING PLANTS—a fine assortment. AGRICULTURAL AND GARDEN SEEDS, as usual. CATALOGUES free on application. G. DAVISON, White Cross Nursery, Hereford.

ROSES, in pots.—All the finest in cultivation, strong, in pots, for Bedding or Conservatory Decoration. Five thousand disposable. PRICED CATALOGUES free. W. KNIGHT, High Street, Hailsham, Sussex.

NEW ROSES OF 1871. JOHN CRANSTON offers a selection of TWELVE NEW ROSES of the present year. Fine plants ready in April. Descriptive LIST on application to the Nurseries, King's Acre, near Hereford.

MARECHAL NIEL and other NOISETTE and TEA ROSES.—Magnificent plants, in 6 and 7-inch pots. Price per dozen, 10s. 100, to 100, on application to EWING AND CO., The Royal Norfolk Nurseries, Norwich.

SIXTY THOUSAND DWARF TEA-SCENTED ROSES, in pots, also specimen TEA ROSES, in 6-inch pots, for Greenhouse Culture or Exhibition. CATALOGUES now ready. W. WOOD AND SON, Woodlands Nursery, Maresfield, near Uckfield, Sussex.

DWARF ROSES, in pots, by the dozen, 100, 1000, or 10000. The largest stock of Roses in the Kingdom. CATALOGUES on application. W. WOOD AND SON, Woodlands Nursery, Maresfield, Uckfield, Sussex.

CHOICE ROSES.—The finest stock of Tea, Noisette, China, and other Roses to select from, all strong and healthy, in pots.—Quoted from a stock that never had to be sold. RICHARD SMITH, Nurseryman and Seed Merchant, Worcester.

ORCHARD HOUSE TREES, Fruiting in Pots.—Peaches, Nectarines, Plums, Pears, Apples, Figs, Apricots, Cherries, Mulberries, &c. Mile End Nursery, London. RICHARD SMITH, Nurseryman and Seed Merchant, Worcester.

Pines. B. S. WILLIAMS has recently rebuilt and enlarged his HIGH HOUSES, and can now offer splendid grown PLANTS of all the best kinds. Prices on application. Victoria and Paradise Nurseries, Upper Holloway, London.

PINES.—A surplus stock of fine strong Succession Plants.—Quoted from a stock that never had to be sold. M. ROCHFORD, Market Gardener, Page Green, Tottenham, N.

WEBB'S PRIZE COB FILBERTS, and other PRIZE COB NUTS and FILBERTS. Lists of these varieties from Mr. WEBB, Calcut, Reading.

WEBB'S NEW GIANT POLYANTHUS, Florist Flower, and GIANT COB FILBERT SEEDS; also Plants of all the varieties, and Double PRIMROSES of different colours. ARICULAS, both Single and Double; with every sort of Early Spring Flower. LIST on application. Mr. W. Calcut, Reading.

BEDDING GERANIUMS for the MILLION. First-class quality. J. MILLER, Worktop Manor, Notts.

To the Trade.—Geraniums. HUSSEY & CO. SOLE IMPORTERS OF GERANIUM CHAIN GERANIUMS, good plants, in single pots, at 14s. per 100. Also BLOOM, SHOTTESHAM PET, and FLOWER of SPRING, at 12s. 6d. per 100.

First-class New Geranium, 1871. PROMETHEUS (Zonal).—Rosy fire-bright Indian yellow, the grandest trust yet raised. It gave from 20 to 217 flowers with true year; free bloom, strong grower, rather dwarf. Plants now ready, 5s. each, or 7s. per doz. EDWARD SHENTON, Botanic Nurseries, Biggleswade, Beds.

First-class New Geranium, 1871. SILVER CORN (Variegated).—A fine white and green foliage, with a great proportion of white, pure and a striking new variety. Plants now ready, 2s. 6d. each, or 12s. per doz. EDWARD SHENTON, Botanic Nurseries, Biggleswade, Beds.

Bedding Plants for the Million. JAMES HOLDER can supply Scarlet and Variegated GERANIUMS, CALCOLARIAS, VERBENAS, DAHLIAS, SALVIA, FUCHSIA, HERTFORDIA, PINK PUMPS, CUPHEAS, KONIGS, LOBELIAS, PYRETHRUMS, &c., eight to ten plants each, in 6-inch pots, at 1s. 6d. per plant. N.B.—A few choice PELARGONIUMS, in var. varieties, at 1s. per pot, cash. Crown Nursery, Reading.

For other Novelties, see MESSRS. ARTHUR HENDONSON AND CO'S NEW SPRING CATALOGUE, and Advertisement in *Gardener's Chronicle*, May 30, in detail. Fine Apple Black, &c. H. Vale, London, W.

Gardenias for Sale. M.R. J. FILLMER, Temperance Nursery, Acton, W., begs to call attention to his splendid stock of GARDENIAS, in 60 pots, 10s. 100, and other larger specimens, all in first-class condition. Prices on application. The Trade supplied.

CENTAUREA RAGUSINA COMPACTA.—Fine strong autumn-blooming plant, in 2 1/2 in. pots, at 1s. 6d. each, or for planting out at once, at 3s. per dozen, or 20s. per 100. Culture and bed planting. Strong plants, 2s. 6d. each, or 12s. per doz. J. FILLMER, Temperance Nursery, Acton, W.

SACCOLABIUM GUTTATUM. Lodgidge's true old scarce variety: SACCOLABIUM GUTTATUM, Bunney's fine variety. A few strong duplicates to offer. J. FILLMER, Temperance Nursery, Acton, W.

POLEMONIUM CERULEUM VARIAGATUM.—Price per 100 to the Trade, for strong, hardy plants, on application to HOWDEN BROTHERS, Inverness, N.B.

British Fern Catalogue. ROBERT SMITH, 11, South Street, London, E.C., for six postage stamps, Part I. British Ferns and their varieties, 6 pages, including prices of Hardy Exotic Ferns, of his PRICED DESCRIPTIVE CATALOGUE of BRITISH and EXOTIC FERNS, No. 7. Foot's Cross Nursery, Sidcup Hill, Kent.

PETUNIA PRINCESS LOUISE.—A magnificent new double Petunia, of a soft crimson colour, blotched with purest white, giving it a most striking and attractive appearance. Habit dwarf and vigorous, and a most abundant bloomer, suitable for pot culture and bed planting. Strong plants, 2s. 6d. each, or 12s. per dozen. The usual discount to the Trade. S. BADMAN, Eltham Road Nursery, Lee, S.E.

PARIS, 1867. SUTTONS' GRASS SEEDS for ALL 1867. SOILS. THE PREMIER PRIZE SILVER MEDAL for GARDEN SEEDS, GRASSES, and GRASS SEEDS, was Awarded to SUTTONS and SONS, Seedsmen to the Queen, Reading, Berks.

DAHLIAS.—Choice named varieties, strong plants. A. WATKINS, Nursery, Bishop's Stortford.

Verbenas, Verbenas, Verbenas. PHILIP LADDS is now sending out PURPLE, SCARLET, and WHITE VERBENAS, in pots, at 2s. 6d. per dozen.—Nursery, Bexley Heath, Kent, S.E.

New Verbenas and Fuchsias. W. KNIGHT solicits orders for the above, which he has now ready in extra good, clean plants, by the dozen, 100, or 1000. Floral Nurseries, Hailsham, Sussex.

Seed for Present Sowing. CALCEOLARIA.—Splendid hybridised, CINERARIA.—Finest price, PRIMULA.—Beautifully fringed. Sealed packets, 1s. 6d., 2s. 6d., 3s. 6d., 4s. 6d., 5s. 6d., 6s. 6d., 7s. 6d., 8s. 6d., 9s. 6d., 10s. 6d., 11s. 6d., 12s. 6d., 13s. 6d., 14s. 6d., 15s. 6d., 16s. 6d., 17s. 6d., 18s. 6d., 19s. 6d., 20s. 6d., 21s. 6d., 22s. 6d., 23s. 6d., 24s. 6d., 25s. 6d., 26s. 6d., 27s. 6d., 28s. 6d., 29s. 6d., 30s. 6d., 31s. 6d., 32s. 6d., 33s. 6d., 34s. 6d., 35s. 6d., 36s. 6d., 37s. 6d., 38s. 6d., 39s. 6d., 40s. 6d., 41s. 6d., 42s. 6d., 43s. 6d., 44s. 6d., 45s. 6d., 46s. 6d., 47s. 6d., 48s. 6d., 49s. 6d., 50s. 6d., 51s. 6d., 52s. 6d., 53s. 6d., 54s. 6d., 55s. 6d., 56s. 6d., 57s. 6d., 58s. 6d., 59s. 6d., 60s. 6d., 61s. 6d., 62s. 6d., 63s. 6d., 64s. 6d., 65s. 6d., 66s. 6d., 67s. 6d., 68s. 6d., 69s. 6d., 70s. 6d., 71s. 6d., 72s. 6d., 73s. 6d., 74s. 6d., 75s. 6d., 76s. 6d., 77s. 6d., 78s. 6d., 79s. 6d., 80s. 6d., 81s. 6d., 82s. 6d., 83s. 6d., 84s. 6d., 85s. 6d., 86s. 6d., 87s. 6d., 88s. 6d., 89s. 6d., 90s. 6d., 91s. 6d., 92s. 6d., 93s. 6d., 94s. 6d., 95s. 6d., 96s. 6d., 97s. 6d., 98s. 6d., 99s. 6d., 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For descriptions of these and other NEW PLANTS, visit Mr.
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M. R. WILLIAM BULL will require NEW SEEDS,
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Auricula, self	Cineraria	Pansy, show
Auricula, self	Cyclamen	Pink
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State quantities and prices per ounce. Satisfactory proof must be
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WOOD AND INGRAM offer fine strong plants of the

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Countess of Craven (Perkins), per dozen, 9s.
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Excellent, per doz., 12s. Princess Herbert, per doz., 12s.
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Plants from this seed have always been awarded First Prizes
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ACACIA RICEANA, the most beautiful of all the Acacias,
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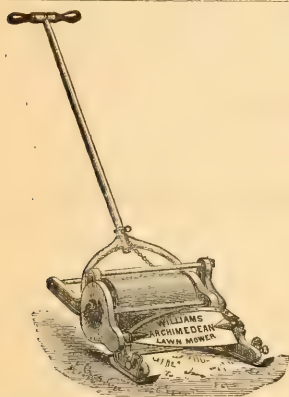
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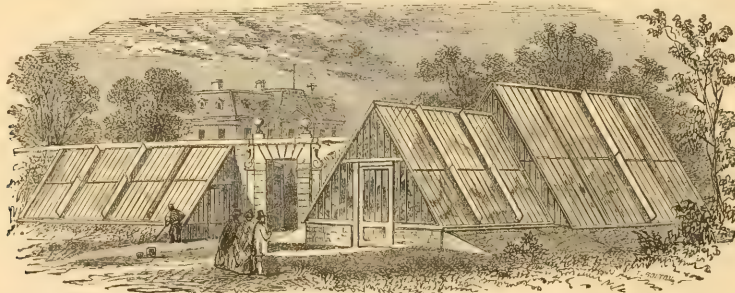
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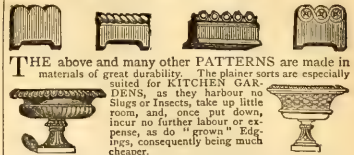
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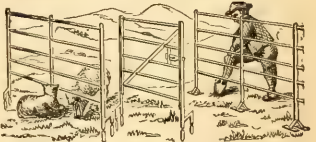
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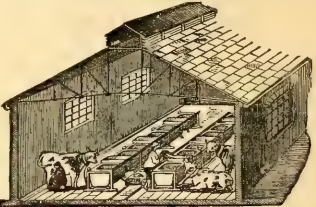
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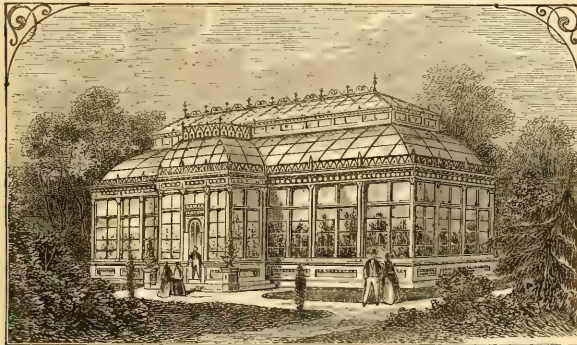
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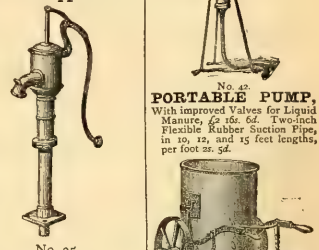
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Containing varieties of Ornamental-foliaged Bedding Plants which are used with such great effect in Battersea Park.

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Containing varieties of Ornamental-foliaged Bedding Plants which have been used with such great effect in Battersea Park.

No. 2. Price 2s., basket and packing included.
120 Ornamental Plants, in 30 varieties, grown for the beauty of form and colour of foliage, and selected by us from the list of Ornamental-foliaged Bedding Plants.

Comprising those in Collection No. 1, adding Variegated-leaved Pelargonium, Peristrophe, Mesembryanthemum, Panicum, Solanum, &c.

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120 Plants of dwarf compact growth.

Comprising Alternanthera, Antirrhinum, Arabis, Aubretia, Cerastium, Echeveria, Lobelia, Pelargonium, Pyrethrum, Saxifraga, Sedum, Scervipernum.

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No. 8. Price 42s., basket and packing included.

Containing 120 fine selected Bedding Plants, out of pots, Ageratum, Alternanthera, Antirrhinum, Fuchsia, Heliotropes, Iresine, Lobelia, Petunia, Phlox.

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Consisting of showy varieties of Bedding Plants, which are offered at cheap rates, on condition that the selection is left entirely to ourselves. These collections are specially suited to those who wish to make a display at a small expense.

As the contents of these collections are varied from time to time to suit our stock, we cannot undertake in any case to send a list of contents.

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Containing 5 doz. Showy Bedding Plants, out of pots, in 6 varieties.

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C. LADY CAROLINE NEVILL,
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Are now being distributed at 21s. each.

CATALPA SYRINGÆ-FOLIA AUREA.

A new hardy tree, with immense leaves of a rich golden hue, invaluable for landscape or sub-tropical purposes.
21s. each.

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A large-flowered snow-white variety, possessing every quality necessary for bedding-out or edging.
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First-class Certificate, Special Certificate, and Extra Prizes,

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IN WHICH, AMONGST MANY OTHERS, WILL BE FOUND DESCRIPTIVE NOTICES OF THE FOLLOWING NOVELTIES INTRODUCED BY THEM:—

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GOLD and SILVER, TRICOLOR, and BRONZE ZONED,

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VERBENA.—Seven splendid varieties, in which V. Basilisk is a grand bedder, line habit, with colour of V. Melindres.

A Coloured Plate of this for six stamps.

The Mayor stated, with regard to an opinion that had been expressed, to the effect that the exhibition ought not to be continued on Saturday, as it would entail a considerable amount of labour on the Sunday, that the

committee were prepared to consider anything that might be urged upon them. Tickets, however, had been issued for the five days mentioned, and they would almost feel bound, therefore, to hold the exhibition on the Saturday. With regard to those gardeners who would be detained in Nottingham on the Sunday, the committee were willing to assist, and would be glad to allow reasonable expenses to them.

We give prominence to the subjoined letter on the so-called MIMETIC PLANTS. We think the term proposed an improvement on the one now used, though clearly not itself free from objection:—

"It seems to me that it would be better, borrowing a term from mineralogy, to describe these as pseudomorphs. Minerals which assume a crystalline form not properly belonging to them are called pseudomorphs, and the expression is, I think, equally applicable to these plants which put on the form or habit of the species of a widely removed natural family. Mimicry, so called, is obviously a very different phenomenon amongst animals and plants. Mimetic animals are found in contiguity with the objects they mimic, and if, as Mr. BENNETT thinks, it is generally an assumption that they gain anything by therese mimicry, it is at any rate an assumption which it is difficult not to make. But with plants the case is quite different, as the forms which resemble one another are as often as not found in widely separated localities. This easily suggests as the explanation when the resemblance is supposed to equal, consider an assumption, namely, that a similar environment is the reason of the similar external form. In some cases, such as Euphorbiaceæ and Cactaceæ, it seems easy enough to apply this principle; in others, where the resemblance could hardly be complete, it might be thought enough to show exactly how it acted, but this would not necessarily imply that it did not exist. I believe a great many cases of similarity of structure admit of interpretation by it. For example, among our deciduous forest trees, such as the Lime, Elm, Hazel, Beech, have rudimentary scales, which, when the buds are opened, while the leaves are still in the bud, help to cover up and protect them. It seems reasonable to suppose that in these trees, belonging to three quite distinct natural families, the pressure of a similar physical condition has been met by a similar and certainly curious structural expedient. Another instance may seem almost trivial, but it is, I think, also in point. A friend pointed out to me the resemblance which the heads of some owls bore to those of cats, and jokingly inquired if the common circumstance of mouse-eating was the cause. The real explanation is, however, I think, not very distant, in the fact that the owl, unlike other birds, has its eyes, which are large, turned almost to the front of the head, so that it can probably see with both at once. The eyes, then, are the common feature of resemblance in the owl and cat, and both, as in some other animals, are large and prominent, owing to the necessities of nocturnal habits. I see no reason to doubt the possibility of cases of true mimicry in plants when immunity from the ravages of some animals may be the advantage gained, but I think that such cases should be distinguished from pseudomorphism. W. T. Thistleton Dyer.

—Last year we recorded the coning of *PICEA LASIOCARPA* at the Knap Hill Nursery, for the first time, so far as we know, in this country. Owing, however, to the want of male blossoms, the seeds produced were imperfect. There are now several plants coming forward, and as there is also an abundance of pollen no doubt seeds will now be properly fertilised. We noticed one peculiarity, which may be interesting to those who make Conifers a special study. Some of the cones on these plants of *P. lasiocarpa* were quite green, while on about an equal number of others they were of a purple colour—no other difference being apparent in the plants. Has this kind of thing ever been observed before? *PICEA GRENADENSIS* is also coning this year at Knap Hill—the first time we believe; and among others that are producing fruit, no doubt the result of the last dry season or two, is *Abies Albertiana*, or *Mertensiana*, *Thujopsis dolabrata*, and *Thujopsis Standishii*.

—The promise of bloom on the Knap Hill AMERICAN PLANTS was so extraordinary last autumn, that one is now grieved to see how much injury a severe winter has done to the past year's prospects universally regarded as hardy. The bloom is in some still very fine, and an ordinary observer would possibly detect little or none of the mischief which has been done, and an experienced eye sees at once that, although in many cases the blossoms are able to expand, they are so far crippled that the trusses lose their symmetry and fullness. As if the winter's trial had not been severe enough, a spring frost has intervened and arrested the development of the half-opened buds of the *Azaleas*, that is only here and there that these gay children of the West show signs of all their beauty. There is one source of gratulation in the midst of all this seeming desolation, namely, that it has shown how some of the kinds stand perfectly unharmed, both in foliage and flower. As a rule, of course, all the sorts which have arboreum blood in their veins perish—generally root and branch; and we learn also that the varieties bred from the ponticum strain, though not killed, have their trunks and branches much injured or destroyed. It is only those bred from *cedar*, *cedrus*, that escape with impunity, and these in a greater or lesser degree in accordance with the influence of their ancestors, in cases where any intermixture of blood has taken place. The pallid, lilac-hued *Everestianum* and *roseum elegans*, are two sturdy and hardy sorts, but some of the higher coloured varieties also, of more recent date, seem able to brave all weathers with

impunity, since they are blooming in the utmost profusion, perfectly unaffected by the winter either in leaf or flower. Among those of this category, we particularly noted, on the occasion of a recent visit, the rosy *Lady Armstrong*, the rosy-scarlet *James Bateman*, the rich crimson Mrs. Milner, and H. W. Sargent—all remarkably attractive flowers, together with Mrs. John Clutton, the gem of all others amongst the whites, and *Caracacus* among the purplish crimsons. We have here half-a-dozen sorts, which are comparatively new, and which it would be very difficult to beat, taking into account their high and pure colours, the magnificent trusses, and their fine hardy Laurel-like foliage. There may be others equally hardy, which we failed to note, and if so Mr. WATERER would be doing a service to Rhododendron growers by contributing their names. Though we have noted above the effects of the winter upon the display which converts this nursery every spring into a perfect fair-land, we would by no means have it understood that the icy touch has left nothing but a desolate wilderness behind it. This is by no means the case, for within the large extent which this American nursery comprises may be seen as usual a profusion of masses of the finest colouring, yielding such a display as is still probably unequalled elsewhere. For the two last seasons, indeed, this picture has been to some extent shorn of its beauty, but the year 1871, we think, will come to us may again see it in all its splendour. We may add that Mr. WATERER's exhibition of Rhododendrons at South Kensington is now very attractive, and will be at its best by the time this paragraph is in the hands of our readers.

—The following circular, respecting the HORTICULTURAL DEPARTMENT OF THE LONDON INTERNATIONAL EXHIBITION, 1871, has just been issued by the Royal Horticultural Society:—

"I. By a minute of Council, dated April 6, 1870, the following gentlemen were appointed, with the sanction of Her Majesty's Commissioners for the International Exhibition, to act as permanent secretaries of the horticultural section of the London International Exhibition, the management of which is vested in the hands of the Society, namely, Mr. HOGG, F.L.S., for the fruit department; Mr. MASTER, F.R.S., for the foreign deciduous and conifer department; T. MOORE, Esq., F.L.S., for the home division of the floral department. These gentlemen have been accordingly deputed to carry out all the necessary arrangements, and to conduct all correspondence relating to the same."

"Foreign horticulturists may enter and exhibit novelties or any other objects of interest at any meetings of the Fruit or Floral Committee."

"3. Such foreign horticulturists as may be accredited to represent their respective countries at the London Exhibition, or who may attend in the capacity of distinguished visitors, will be installed *pro tem.* as members of the Scientific, Fruit, or Floral Committee, and will be invited to join in their deliberations, conforming at the same time to the general regulations of the respective committees, which require that all exhibitors who submit subjects in which they are personally interested are being adjudicated upon."

"4. The secretaries will form, *ex officio*, the nucleus of an international jury for the adjudication of all foreign novelties exhibited in this department; and in order that nothing of importance may be overlooked, or may fail to reach the awarders, the secretaries at each meeting of the season (May to October) invite the assistance of such members (home or foreign) of the Fruit and Floral Committees respectively as may be known to be authorities on the merits of the particular classes of flowers or fruits to be exhibited."

"The permanent exhibitions will be judged in the manner already indicated, so far as the conditions will admit. They will be examined at the first meeting in each month (May to October), and marks will be recorded at each examination in favour of the meritorious features of each competing exhibition, which marks will be summed up at the end of the season, and the rewards distributed accordingly. In addition to this, a medal may also be awarded to any exhibitor for any specially meritorious display noted during the season."

"The prizes for novelties shown by foreign exhibitors will consist of the usual certificates (First and Second Class) granted by the Society for similar subjects."

"2. When foreigners exhibit in the classes defined in the Society's schedule, they must conform to the general regulations, and those who desire to do so, may, if they desire it, on notification to the secretary, obtain medals, instead of the money prizes."

"8. The prizes awarded for the permanent exhibitions, as well as those to foreigners for special exhibitions, *hors concours*, such as a group of new plants, Orchids, Palms, Apples, Peaches, or any similar prominent subjects."

"2. miscellaneous or mixed groups of plants, flowers, or fruits; or (3.) remarkable individual specimens, will consist of medals. Those who may desire to commute the medals for money or articles of value must notify the same to the respective secretaries before the close of the season."

"9. In forwarding objects for exhibition (especially flowers or perishable fruits), when they are not accompanied by a person in charge, exhibitors are advised to take special care to forward to the bill of lading, and to the Assistant-Secretary, JAMES RICHARDS, at the Society's offices, South Kensington, as in default of the receipt of this document delay has already in some cases taken place in the delivery of perishable objects sent for exhibition."

"10. In all other respects, and in so far as they apply, foreigners will be guided by the general regulations of the Society's exhibitions, as printed in the schedules.—By order of the Council, HENRY Y. D. SCOTT, C.B.,

Lieut.-Col. R.E., Secretary to the Royal Horticultural Society, and to Her Majesty's Commissioners of the Exhibition of 1871."

—Fine weather and almost cloudless skies were the distinguishing meteorological features recorded near London during the week ending May 27. Such however was not the case at all stations, as at Birmingham, where rain fell nearly all day on the 26th, heavy falls occurring also at most of the other stations on that day. The extreme MAXIMUM TEMPERATURES increase as the summer advances, and 79° was a not unusual temperature at several of the towns in England, 79°·5 at Blackheath and Nottingham being the highest, and 70° at Newcastle the lowest, with a mean for all places of 77°·2. In Scotland, 75°·6 at Glasgow, and 69° at Dundee were the highest and lowest respectively, the mean for all stations being 71°·9. The extreme MINIMUM TEMPERATURE recorded in England was 37°·9 at Eccles, and in Scotland was 41°·4 at Aberdeen; the mean for the two countries being 46°·9 and 44°·5 respectively. MEAN TEMPERATURES.—58°·1 at Portsmouth, and 56°·7 at Blackheath, were the chief of the weekly mean temperatures registered at the different stations in England, and 56°·3 at Greenock, and 55°·7 at Glasgow, of those recorded in Scotland. The mean temperature of the southern country was only 1°·3 above that of the northern, consequent upon the nights in Scotland being warmer than those in England. MEAN ANNUAL RAINFALL.—Wolverhampton, with 1·75 inch, Birmingham with 1·70 inch, and Nottingham with 1·26 inch, are the largest falls registered in the two countries, Perth being the only town in Scotland at which any considerable fall of rain took place. Portsmouth, Blackheath, and Norwich, had but little rain in comparison with the other stations of England, and is the cause of the mean being only 0·87 inch instead of 1·07 inch,—which it would be if these three places were omitted. The mean for Scotland was 1·34 inch. (See Mr. GLAISHER'S Tables in our present issue.)

The brilliant appearance which is presented at this season of the year by the *Azalea*, in which the HARDY AZALEAS are employed as cover for game, enables us in some degree to realise BETRUM'S description of the effect produced by *Azalea calendulacea* in North Carolina. He named it *A. flammea*, and says:—

"The epithet 'fiery' I annex to this most celebrated species of *Azalea* as being expressive of the appearance of its flowers, which are in general of the colour of the first kind, orange, red, and bright red, with white and cream colour. These various splendid colours are not only in separate plants, but frequently all the varieties and shades are seen in separate branches on the same plant, and the clusters of the blossoms cover the shrubs in such incredible profusion on the hill sides, that when opening to view from dark shades, we are alarmed with the apprehension of the woods being set on fire. This is certainly the most gay and brilliant flowering shrub yet known; they grow in little copses or clumps, in open forests as well as in dark groves, with fern shrubs, and about the bases of hills, especially where brooks and rivulets wind about them. The bushes seldom rise above 6 or 7 feet in height, and generally but 3, 4, or 5, but branch and spread their tops greatly."

—We have had submitted for our inspection by Mr. POCOCK, gardener to R. M. FORBES, Esq., Tilburstone Lodge, Godstone, some leaves of *CATELL'S ECLIPSE BROCCOLI*, curiously united at their tips so as to form a sort of hood over the flower. There are some traces of Fungus mould on the leaves; and, in fact, if any, the hood is the cause of it, not a prevent. The POCOCK in question has stood root well in a warm sheltered garden, and is a recognised good sort. The hood-like arrangement of the leaves would doubtless act as a preservative against frost.

—M. MORANGE, of whose skill in remedying trees affected with canker, canes, &c., we had occasion to speak in our last issue, has been permitted to operate upon some trees in the Royal Gardens, Kew. We shall take an opportunity of alluding in greater detail to the method adopted by M. MORANGE, and in the meantime state that M. MORANGE's address is 5, Westcombe Terrace, Ashley Road, Richmond, London, S.W.

—A GRAND DRILL REVIEW, organised by the Society of Arts, of 4000 boys, with their bands, will be held by H. J. B. PRINCE ARTHUR, in the Royal Horticultural Gardens, on Wednesday, June 14. Admittance to the gardens only, *1s.* A musical performance by the boys in the Royal Albert Hall will take place after the review. Subscriptions in aid of the cost of conveying the boys by railway, and providing them with refreshments, will be received by the Secretary of the Society of Arts.

A NEW SYNOPSIS OF ALL THE KNOWN LILIES.—IV.

Subgenus 2. *LILIUM PROPER*.—Bulbs squarish; stigma a thick head to the style, with three blunt lobes.

Group 1. *EULIRION* (Funnel-flowered Lilies).—Perianth funnel-shaped, horizontal, or slightly drooping, its divisions broad above the middle, narrowed thence to the base, spreading only in the outer quarter when fully expanded. Filament and style all parallel

with one another, slightly curved upwards towards the tip.

Key to the Species.

- Leaves cordate-ovate, long-stalked. 3. **CORDIFOLIUM.**
Leaves linear or oblanceolate sessile. 4. **LONGIFOLIUM.**
Flowers shaped like a funnel, with a distinct neck. 5. **JAPONICUM.**
Flowers shaped like a funnel, without a distinct neck. 6. **NEPALENSE.**
Leaves 12–20; flowers 5–9 inches long, with divisions 15–21 lines broad. 7. **CANDIDUM.**
Leaves 30–50; flowers 3–5 inches long, with divisions 8–12 lines broad. 8. **WASHINGTONIUM.**
Leaves 60–100; flowers 2–7 inches long, with divisions 6–12 lines broad. 9. **WASHINGTONIUM.**

5. *L. japonicum*, Thunb. Fl. Jap. p. 133; Ait. Hort. Kew. edit. 2, vol. ii, p. 246; Bot. Mag. t. 1597; Lodd. Cab. t. 438; Kunth, Enum. iv., p. 267; Miquel, Ann. Mus. Lug. Bat. iii., p. 15; Spae, Mon. p. 11; *L. odoratum*, Planchon, Flore des Serres, t. 8, fig. 67.—Stem 2–3 feet high, erect, stiff, terete, quite glabrous, like the rest of the plant. Leaves 12–20, scattered, more spreading than in longiflorum, oblanceolate, the lower ones reaching 4–6 inches long, 6–9 lines broad, three-quarters of the way up, acute, narrowed gradually to the base, but not distinctly petiolate, moderately thick and firm in texture, dark shining green above, paler below, distinctly 5–7-nerved, the upper ones growing gradually shorter, reaching an inch broad. Flowers usually solitary in the wild plant, and not more than 2 or 3 under cultivation. Perianth 5–6 inches long, more or less ascending, pure white within, but more or less tinged with purple on the outside, broader round the neck than in longiflorum, and narrowed more gradually down to the base; divisions oblanceolate spatulate, the outer 15–18 lines, the inner 18–21, or even 24 lines broad two-thirds of the way up, all blunt at the front, and only slightly falcate at the tip when fully expanded, spatulate narrowed to a claw which is 2½–3 lines broad an inch above the base. Ovary 15–16 lines long, style 3½–4 inches, decidedly curved upwards towards the end. Filaments white, 4–5 inches long; anthers 1½–2 inches long; pollen reddish-yellow.

A native of Japan, introduced to this country with *L. tigrinum* in 1804, by Captain Kirkpatrick, of the East India Company's Service. There is a specimen, dried, from Kew Gardens, probably not much later, in the British Museum. It was gathered by Oldham in the Korean Archipelago, and is said to be also Chinese. It is not Himalayan, the plant intended by D. Don and others, who have reported it from Nepal, being *L. longiflorum* var. *Wallichianum*. From all the forms of longiflorum it may be distinguished by—1, its broader, fewer, and more spreading leaves; 2, the shape of the entire flower, and broader claw of its divisions; and, 3, its shorter anthers, with pollen tinged with red. Both this and longiflorum are rather tender in England, and need protection in winter.

Var. Brownii, Brownii, Miele, Cat. Fl. Exp. Soc. Hort. Lille, June, 1851; Spae, Mon. p. 11; Lemaire, Flore des Serres, vol. i, t. 47; *L. japonicum*, Bury, Hexand. t. 2.—Stem reaching 3–4 feet high, marked with dark purple spots and streaks. Lower leaves reaching 8–9 inches long, an inch broad three-quarters of the way up. Flowers 3–4 inches long, more drooping, 7–8 inches long, tinged with purple on the outside. Anthers 6–9 lines long, and filaments and style in proportion.

This seems to me rather a luxuriant form of japonicum, of which the characters are likely to be due to cultivation, than a variety in the botanical sense of the term. Oldham's specimens just mentioned from the Korean Archipelago represent this form very satisfactorily. The perianth measures 7 or 8 inches round the neck when fully expanded. The beautiful large folio drawing (tab. 2) in Bury's Hexandria appears to belong here.

6. *L. nepalense*, D. Don, Mem. Vern. Soc. iii., p. 412; Prodr., Fl. Nep. p. 52; Wallich, P. Asiatic. Rar. iii., p. 67, t. 291; Kunth, Enum. iv., p. 267; Spae, Mon. p. 10.—Stem, 14–3 feet high, erect, ½ inch thick at the base, quite glabrous like the rest of the plant; leaves

30–50, scattered, linear-lanceolate, the lower ones 4–5 inches long, 6–9 lines broad at the middle, narrowed gradually to the base, and an acute point, erecto-patent, thinner in all the other Eulirions, distinctly 5-nerved beneath, the upper ones growing gradually smaller. Flowers up to 6 in a narrow thyrsoid raceme, the lower peduncles arcuate-ascending, 3–4 inches long, subtended by linear bracts 2–3 inches long; perianth 3–4, rarely 5 inches long, white, more or less suffused with purple on the outside towards the base; divisions oblanceolate, more reflexed in the expanded flower than in any of its neighbours, the outer 6–8 lines, the inner 8–10 lines broad two-thirds of the way up, narrowed gradually to a long claw, quite without papillae on the face or style down the groove; ovary about an inch long; hairs 1½–2 inches; filaments 2–3 inches; anthers linear-oblong, ½ inch long.

Widely spread through the Central Himalayas in the temperate region, at an elevation of from 7000 to 9000 feet above sea-level. Gathered in Nepal by Dr. Wallich, in Kumaon by Strachey and Winterbotham, in Gurwal by Dr. Thomson, near Simla by

Flowers 5–10, rarely up to 20, in a thyrsoid raceme. Pedicels rigidly erecto-patent, the lower ones 2–3 inches long, naked or bracteolate. Bracts lanceolate or ovate-lanceolate, 6–12 lines long. Perianth pure pearl-white, very rarely tinged with purple on the outside, 2–3 inches long, the upper ones more or less ascending, the lower drooping; divisions oblanceolate, outer 6–9 lines broad, inner 8–10 rarely 12 lines broad two-thirds of the way up, narrowed gradually to a cuneate base; ovary 8–9 lines long; style 14–2 inches, slightly ascending towards the point; filaments 15–18 lines long, pure white; anthers 5–6 lines long; pollen bright yellow.

This is so thoroughly known by every one that there is no need to dwell upon it. It is enumerated in Gerard's list of 1596. In a wild state it extends through the south of Europe from Corsica to Greece and Turkey.

Var. peregrinum = *L. peregrinum*, Mill. Dict. No. 2; Sweet, Brit. Flow. Gard., series ii, t. 367; Kunth, Enum. iv., p. 266.—Whole plant more slender in habit. Leaves narrower, rather fewer. Flowers rather smaller, divisions a little narrower, the outer 6–7 lines, the inner 8–9 lines broad, with a more distinct claw.

Known from a very early date in cultivation, but a form never clearly identified in an indigenous condition.

8. *L. Washingtonianum*, Kellogg; Wood, Proc. Acad. Philad. 1868, p. 166.—Stem 3–5 feet high, ½–¾ inch thick towards the base, stiff, erect, terete, glabrous like the rest of the plant. Leaves in several distinct whorls, which are 3–4 inches apart in the lower part of the stem, and made up of 10 to a dozen ascending oblanceolate leaves, which are 4–5 inches long, ½–¾ inch broad three-quarters of the way up, acute, narrowed gradually from the middle to the base, moderately thick in texture, quite glabrous, with only the midrib distinctly marked, the upper whorls with fewer and smaller leaves, and not unfrequently altogether broken up. Flowers 3–4 in poor specimens, up to 12–18 in fine ones, in a raceme reaching a foot long, and when they are fully expanded 8–9 inches broad. Peduncles rigidly erecto-patent, cernuous at the apex, the lower 2–4 inches long, each with a lanceolate bract at the base much shorter than itself. Flowers all more or less cernuous when expanded. Perianth white more or less tinged with purple or lilac, sweet-scented, 2½–3½ inches deep, narrowed gradually from the neck to the base; divisions oblanceolate, spreading only in the outer quarter when fully expanded, the outer ones 5–6 lines, the inner ones 6–8 lines broad five-sixths of the way up, narrowed gradually at the base, like all the rest of the group, not at all hairy or papillose down the face of the claw. Ovary 8–9 lines long; style 1½–2 inches, a good deal curved upwards towards the point in the expanded flower; filaments 2–2½ inches long; anthers linear-oblong, half an inch long.

This noble Lily inhabits the western slope of the Californian Sierra Nevada, and is found along the watershed of the streams that run into the Sacramento. Professor Wood in the notice in the Proceedings of the Academy of Philadelphia above quoted, describes the plant as occurring in woods here and there from the Yosemite to the Columbia, and says further, "It is well-known to the miners, who recognise its superior qualities, and call it the Washington Lily. There are specimens in the Kew herbarium gathered by Jeffrey in 1853, by W. L. Baker in 1857, and also by Bridges. I have not yet seen this species in a living state, but am very glad to note that it has found its way into your advertising columns. It shows how Lilies have been neglected when a plant like this has to wait 15 years for an orthodox botanical christening; and when, growing in a country so much frequented and so easily accessible as California, it has to wait 17 years to reach the hands of our gardeners. Well, we have got it at last, and I hope we may not let it slip through our fingers, as we did in the case of *L. nepalense*; and I only ask all those amongst your readers that can appreciate a fine Lily, to read the description I have just given, and to look at Mr. Fitch's woodcut to realise what a treat is awaiting them. *J. G. Baker*. [A remarkably fine plant, and remarkably distinct in character. Eds.]



FIG. 142.—LILIAM WASHINGTONIANUM.

Jaquemont and Fielding. Dr. Wallich's plant, as illustrated by the figure and specimens, differs from that of all the other collectors by its larger flowers and broader leaves. It differs from Klotzsch, figured at tab. 53 of the report of the exploring expedition in the Himalayas in the years 1845–6 of Prince Waldemar of Prussia, is very likely a variety of nepalense. It has flowers not more than an inch and a half deep, with divisions 7–8 lines broad, and scattered lanceolate leaves 15–18 lines long. There is also a *L. nimum*, Klotzsch, briefly described in the same, of which the affinity is no doubt in this direction. *L. nepalense* was introduced into England in 1855, but, I fear, was lost very soon. It is a well-marked species, evidently allied to japonicum on the one side, and to candidum on the other.

7. *L. candidum*, Linn. Sp. Plant. p. 443; Bot. Mag. t. 278; Red. Lil. t. 199; Flore des Serres, t. 735; Kunth, Enum. iv. 266; Spae, Mon. p. 8.—Stem 2–3 feet high, stiff, erect, 6–9 lines thick at the base, quite glabrous like the rest of plant. Leaves 60–100, much crowded in the lower half, erecto-patent, linear, the lowest reaching 8–10 inches long, 6–12 lines broad above the middle, subcoriaceous in texture, 3–5 nerved, diminishing gradually upwards, the uppermost lanceolate, about an inch long.

PROPOSED TRIAL OF BOILERS AT THE NOTTINGHAM SHOW.

I FEAR we are getting into a sort ofmania about boilers. The horticultural press is heavily laden with them; they are the burden of conversation among gardeners and gentlemen likewise. Instead of the old waggon query, "How's your poor feet?" I expect speedily to be accosted with "How are your poor boilers?" As the dog-days are coming, it may be wise and safe to stop boilerphobia before it gets more dangerous, for this rage for new boilers is dangerous. Boilers are expensive playthings, and if the rage for change once becomes rabid, it may bite the pocket terribly deep, besides working other mischief, such as getting a new boiler less efficient than an old one, &c. Now, I know nothing so likely to cure or moderate the boiler fever as a real test of boiler merit. The boiler that generates and distributes most caloric within a given time, with the smallest amount of fuel, would appear to be the best. It ought to be a comparatively easy matter to measure to a nicety such items as these; but others would need testing also to get at the full merits of boilers; the time of cooling would have to be taken into account, as well as of heating. It would probably be found that the boiler that heated most promptly, cooled the fastest, and that, consequently, the rapid heating would turn out an evil instead of a good. What we gained at one end we should lose, perhaps with interest, at the other; or, in other words, the rapid heating would be far more than counterbalanced by the sudden cooling. A good horticultural boiler should not only be a vehicle for conveying, but a reservoir for storing, caloric; and practically, time is a much more important factor in heating than the heating of boilers, for they are heated when we are awake, but they mostly cool when we are asleep.

Again, boilers have not only to heat cold water inside, but in the majority of gardens they have to fight against it outside. Practically it is of immense importance to lift the boiler and its furnace bottom beyond reach of the earth's flooding line. Shortness of stature, if I may so put it, is of immense importance in boilers. It is no small matter to dig for a foot or two; but the small matter to lay these dry is herculean work, and woe be to the cultivator in flood time that trusts the dry-looking earth, or to the usual cementings to bar out the water, or to human hands to lake it out. I have seen it rise, inch by inch, like a cruel fate, in spite of as many hands as could get near to throw it out with dish and pail, till—fizz! hiss!—it has reached the bars, and smothering smoke and hissing steam proclaim the cold water the victor. Cultivators have a right to demand of the boiler makers deliverance from such risks as these. This request is pertinent at the present moment, when the whole system of hot-water circulation seems gravitating towards a lower boiler. This is emphatically a step in the wrong direction. Boilers, like the craft who warm them, should lift up, not kicking or setting lower down.

Unless the whole system of arranging pipes within hothouses and of setting hot-water boilers can be revolutionised, to change the position of making the return or lower pipe the flow is, indeed, as you express it, a great one. It is so great as to be well nigh impossible in half of the gardens throughout the kingdom, without incurring an expense totally out of proportion to the advantages gained. It is easy to write, set the top of the boiler on a level with the lowest pipe; but that, being interpreted by facts, means go down 2, 4, or 6 feet under the water-line of the earth, and keep this space dry at flood times. I submit that it will need stronger facts than any that have yet been offered to send our boilers down into these nasty depths of mud and water. Undoubtedly you use strong words concerning the advantages to be gained by this mode of setting, but no attempt is made to sustain the strong statements by reference to scientific principles, nor to buttress them up by practical facts. I write this after carefully reading Mr. Cannell several *Gardeners' Chronicle* articles in May 27. True you assert that the present mode of setting is extravagant as to prevent horticulture from ever becoming anything but a luxury for the rich, while the saving in the cost of piping and of fuel, effected by the conversion of the return pipe into the flow, will put hothouses within reach of the million; and the impetus which it will give to horticulture is well nigh incalculable. (See leader, May 6, p. 578.) In other numbers fuller information is promised, and in that of May 27 we have pen and ink sketches of how all this is to be accomplished. I confess (of course it may be fault and not at all that of my teachers) that I cannot see how all these advantages are to be gained by a simple inversion of the usual order of a current of hot water. That the usual order of circulation may be reversed by an increase of pressure is admitted; but pressure implies force, and force expended on reversing the natural order of motion is force lost for heating. Besides, high pressure applied to hot-water apparatus for horticultural purposes has been tried and condemned; it was not only found to be wasteful but dangerous. Again, it must be borne in mind that the water in a hot-water boiler has a choice of ways—left to itself it will take the easiest, that is, the highest

road. It needs force to make it travel on the lowest way first. Check the highway, turn the valves on ordinary flow-pipes, and the hot current advances through the back door. All practical men are familiar with these facts. Occasionally, too, this back or double action is established without any very apparent reason. When this happens, and both flow and return pipes reach about the same temperature, the fact is looked upon as a proof of faulty circulation, and a loss of heat.

Now it is singular that you and Mr. Cannell rest the merit of the new arrangement upon this very fact. You accept it as proof positive of a rapid circulation; but this by no means follows: your fact may prove just the contrary. The surest measure of speed in the water flow is the disparity of temperature between the flow and return pipes. It is the winning horse that leaves most of its strength on the course, so the fleetest current may lose most of its caloric on the journey. And it is the heat lost on the journey, between the starting-point and the winning-post, that we race our water through our boilers for; the heat at both ends may prove, not that the steed has run without sensible loss, but that it has never started. The result of two motions of equal power in opposite directions, is rest. The equal temperatures of the flow and return pipes may result in a similar manner. Propelled from both ends, at the one by action, at the other by the specific weight of water in vertical column, which is tremendous, a struggle commences, a general *mille* ensues, and each end becomes alike warm in a contention that ought never to have been waged. Instead of a loyal obedience to natural law abnormal arrangements are made, the nett results of which may be specious gain, but involving, I firmly believe, an ultimate loss of heat where it is wanted,—that is, within the houses to be warmed.

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Such at least is my opinion, but it is desirable that other opinions and those that you hold should be tested before such a tribunal as is likely to be gathered together at Nottingham. I may be told to go to Woolwich. Well, I have virtually been there. I have carefully examined the model of the boiler, and perfectly understand, I believe, the description and illustrations so clearly given in last week's *Gardeners' Chronicle*. But what is needed are absolute and comparative details, and of these we can hardly be said as yet to have had any you promised them in plenty, but instead we have an illustration and some general remarks upon heating from Polmaise downwards. What is wanted is trustworthy statistics from the doings of the two sides of the boiler, right and left, and the superior heating power, if any, of the right over the left; the amount of pipe, the circulation is arranged in opposite directions, one from above in the usual way, the other from below. What is the record of experience as indexed by carefully collated, trustworthy facts?

While writing this somewhat strongly I pass no word of condemnation on Cannell's boiler. It seems to be a praiseworthy one. I hope it may prove in every way a successful attempt to get the most caloric out of the fuel into the water, before it proceeds along waste lane into space, and will possibly be found to have substantial merits enough to bear the dead weight of an erroneous theory of circulation, which, by the way, I must not accept, you suddenly enjoin me to. By all means let it and others be not only exhibited but tried at the great show at Nottingham. D. T. Fish.

ORCHID CULTURE AT CALCUTTA.

Our Orchid-houses are of very simple construction—indeed, *fac simile* of those used by the natives here for the culture of the Pan or *Calceolaria* plant. The large one for Francis Macdonald, Esq., is a long narrow building, 47 feet broad, with a flat roof at an elevation of 7 feet. It is thus constructed:—Iron pillars are sunk in masonry at distances of 14 feet, between which again stout posts of Teak wood are fixed. Over these posts Teak rafters (2½ by 1 inch) are fixed diagonally, and overlaid by stout Bamboo rods at distances of 2 feet; these consist of ordinary sized Bamboos split longitudinally into four parts, and forming the basis for a light framework of Bamboos, on which the *Ocotea*-grass is thinly strewed, and bound down with thin rods of Bamboo. The sides are very similarly constructed, and even more thinly covered with grass. In both positions the grass should be so disposed as to cut off all direct solar rays, without inducing any appreciable

degree of darkness. Orchids, though many, in their impatient of direct exposure to the sun, nevertheless, with few exceptions, delight in abundance of light.

The staging of the house is constructed of split Bamboos, each of the interior tables (of which there are four) measuring 52 feet in length, 9 feet 4 inches in breadth, and 2 feet 4 inches high, and thus affording space for a large collection of plants. There are also surrounding side tables, 4 feet 6 inches in breadth, on which are placed collections of terrestrial Orchids, Ferns, and Begonias, all of which thrive admirably thereon.

The epiphytal Orchids, with the exception of the *Phalenopsis*, are grown in pots with their sides rather closely perforated with holes or slits, so as to admit air freely to their roots, and the escape of water. The potted material is lumpy charcoal and pieces of brick in about equal parts. To this I previously added Cocoa-nut fibre, but this proved too retentive of water in the rainy season, and also poured myriads of a small gastropod which was likely to destroy the whole collection, and which I began to fear we should never get fairly eradicated. Fortunately, however, there were a few sorts which we had tried in charcoal and pieces of brick only, and these thrived ultimately so well, and further kept so entirely free from the molluscous pest, that I had the whole collection turned out and re-potted in the same material. I am glad to say that it has never again made its appearance, though we are always using water from the same tank, and our Orchids are in general in a most thriving state.

As regards watering: from the end of the rains and throughout the cold season, as a rule, no water is given, though, after an unusually hot day, the paths of the house are sprinkled in the evening; and, of course, any Orchids naturally frequenting equally humid and hot climates are always kept slightly moist, so as to prevent flaccidity and loss of foliage without injury to growth. In the rainy season, which commenced until the flowering season commences in February and March, when a little is given to them individually as their flower buds get fairly set; and, when the general season of bloom arrives the floor of the house is freely watered at night and morning. To retain the flowers in beauty as long as possible, no watering overhead is permitted until they have naturally faded, and equally careful are we to have the blossoms fairly set before applying any water, so that the chances are that the opposite treatment would induce vegetative development only—leaf shoots in place of flowers. After the flowering season, an abundance of water is given at night, and the whole house is also syringed. In the morning the floors of the house are watered and the plants syringed, and in the hottest of our weather the floor is again watered at 11 A.M. and 2 P.M., and we thus keep up a very humid atmosphere. This artificial watering is continued until the rains set in, when, of course, they have an abundance. By this treatment we are able to grow well and flower freely almost all of the tropical Indian Orchids. We have also been most successful with all the South American kinds, as Stanhopeas, Cattleyas, Lælias, &c., which have been lately introduced. John Scott, Curator, Royal Botanic Gardens, Calcutta, in *Proceedings of Agri-Horticultural Society of Madras*.

THE GENUS GRIFFINIA.

The *Griffinias* form a very marked group among the *Amarylids*, and contain some species of a strikingly ornamental character. We are, therefore, glad to take the opportunity afforded us by Messrs. Haage & Schmidt to introduce the accompanying woodcut figures from their catalogue, and to recommend the genus to the special notice of plant lovers.

The *Griffinias* belong to that section of the *Amarylidoideae* order in which the leaves are evergreen, and the plants are of continuous growth. They form a well-marked genus, their broad and usually stalked leaves, which are netted in a peculiar lattice-like form, giving them a very characteristic appearance, while in several of the species the flowers are of conspicuous size, and of pleasing and attractive colours. In a general way the flowers of the *Griffinias* are easily recognised among the *Amarylidoideae* by some obvious peculiarities of structure. One is that the three upper segments of the perianth are (we believe, in all cases) distinctly broader than the others, and are directed upwards, while of the three other segments two spread out at right angles, and the third is directed downwards. Another feature occurs in most of the species, viz., that one stamen is separate from the others and stands erect, while the remainder are decussate, and disposed in the plane of the perianth segments. In particular gives a peculiar aspect to the flowers.

The species are not numerous, and such of them as could be got together would make a very interesting cultural group. Their aspect is not unlike that of *Eucharis*, which would make a fine companion plant, being, like them, of evergreen habit. They require the heat of an intermediate stove, but are not by any means difficult of cultivation. Some excellent hints, by Mr. T. Fish, as regards the culture of the *Griffinias*, which may be taken as applicable to the whole family, will be found in the volume of the *Florist* for 1870. The following are the described species:—

G. hyacinthina.—The original species, imported from Brazil, and flowered in the rich bulb collection of Mr. Griffin, to whom the genus is dedicated. This has

ovate bulbs of moderate size, stalked ovate oblong leaves, 6 to 8 inches long, and remarkable for their lilac-like venation, and a scape somewhat longer than the leaves, bearing a compact umbel of 9 or 10 flowers barely 3 inches across, the upper segments of which are blue at the top, white towards the base, and the lower are but slightly, if at all, coloured. It is figured in an early volume of the Bot. Reg. (t. 163).

G. hyacinthina maxima (fig. 144).—This differs from the last in size, but it is a much larger and much finer plant. The bulbs are as large as one's fist, with a long neck; the leaves are broadly ovate oblong, and the flowers, of which some 10 or 12 form the close-set umbel, are fully as large as those of *G. dryades*, being almost 5 inches across, but deep blue and white, as in *hyacinthina*, than which it is altogether more robust. M. Van Houtte gives an excellent figure of it in "Flora des Serres" (t. 1667-8). This also is from Brazil.

G. intermedia.—This species has oval leaves, and pale, almost sky-blue flowers in close umbels, and is intermediate in size between *G. hyacinthina* and *parviflora*. Probably neither it nor *parviflora* are now in cultivation.

G. parviflora.—A much smaller plant than the other species in all its parts. The bulbs are about the size of pigeon's eggs, the leaves oval-lanceolate and lattice-veined, and the scape about 6 inches high, bearing a close umbel of narrow flowers, about 1½ inch across; lilac in the upper part, and very slightly tinted below. The Bot. Reg. (fig. 511) gives a figure of it, but in the presence of the other sorts now known, it is not worth cultivating.

G. dryades.—This is a vigorous-growing species, with a large bulb, large oblong-lanceolate leaves, with a blade upwards of a foot long, and a stout robust scape, 1½ foot high, supporting a large loose umbel of from 10 to 13 flowers, the segments of which are spreading, so that the flowers are fully 4 inches in diameter; lanceolate, more or less recurved at the tips, and of a pretty purplish-lilac hue, whitish towards the centre. It is a native of maritime forests near Rio de Janeiro, in Brazil. This plant is well figured in the Bot. Mag., t. 5786.

G. Blumenavia (fig. 143).—This fine and distinct species was found at St. Catherine, Brazil, by Dr. Blumenau, and it differs from the other known species as to suggest its possible distinctness. The bulb is of moderate size, the leaves oblong-lanceolate, the scape 6 to 8 inches high, bearing an umbel of 6 to 8 flowers, which are much more regular in form than in the other species, and are white, striped, except on the lowest segment, with rose-coloured veins. The upper perianth segments are the broadest, but the difference is not nearly so marked as in the other kinds; the stamens are all declinate instead of one being assurgent, and the stigma is three-cleft. It is well figured in the Bot. Mag. (t. 5666); the figure we here use was evidently copied from the inferior one in the "Revue Horticole."

G. Liboniana.—Under this name Lemaire has described and figured (Jard. Fleur., t. 200) a *Griffinia*, which is said to have distichous, stalkless, ovate leaves marked with white, but as we have neither Lemaire's book, nor the "Annales de Gand," in which it is also figured, within reach, we can give no further particulars respecting it. It would appear from the description of the foliage to be quite distinct from any of the other kinds.

Home Correspondence.

Wild Plants as Vegetables.—As I am never afraid of partaking of a new dish, always supposing that I know something of its parentage, so I no sooner saw the notice by Mr. West of the value of Charlock as vegetable than I gathered some, and partook of a nice little dish, with a dinner of roast veal, and I can most fully second every remark that has been made as to its value. It came to table as a fine-coloured and most tender green, and I feel certain that numbers would prefer it by its appearance and flavour, and consider it a delicate green if they knew not its origin, who, perhaps, if they knew that it was the common Cherlock, Charlick, Kerlock, or Ketlock of our fields and hedges, would refuse to touch it. This reminds me that a few days since I saw some remarks in the new edition of "Sowerby's English Botany," by Dr. Syme, upon the value of the Cow Parsnip as a vegetable. He says:—"The young shoots and leaves may be boiled, and eaten as a green vegetable, and when just sprouting from the ground resemble Asparagus in flavour. This experiment is, however, seldom tried, owing to the ignorance of those to whom such an addition to the table would be a benefit and luxury." Now, not only ignorance, but prejudice, is a bar to such proceeding, not only by the poor, but by those in better informed circles. Ask any person in Dorset to partake of boiled "Eltrots;" your answer would likely be: "We eat a common weed like that!—why, they give it to the pigs!"

Indeed, it is true pigs are very fond of it, and thrive upon it, and so would they upon Cauliflowers, but I have tried the *Hieracium Sphondylium*—if this be more respectable than Cow Parsnip, Hogweed, or Eltrots—and all I can say is, that few, indeed, are aware what a delicate vegetable it is. I boiled the young shoots and the petioles of the leaves, and partook of them, with a little pepper and a dash of vinegar, to our infinite gratification. The addition of melted butter, or, still better, *sauce mayonnaise*, would render it "a dainty dish to set before a king." Char-



FIG. 143.—GRIFFINIA BLUMENAVIA.

lock, I think, might be much improved by cultivation, for with manure and thinning it is not difficult to obtain specimens as large in the stem as an ordinary



FIG. 144.—GRIFFINIA HYACINTHINA MAXIMA.

man's finger; plucking the first shoots of these would tend to the throwing out of side shoots much like many of our greens, so that it would be productive and last some time. The Cow Parsnip would hardly be benefited by being brought to the garden, but in some places it is so abundant that the whole parish might readily be supplied; and when I see the avidity with which our poor people avail themselves of permission to pick a few Turnip-tops or Rape sprouts, it seems a pity that either ignorance or prejudice should prevent them partaking of far superior vegetables,—and such I consider either Charlock or Cow Parsnip to be. I sometimes read of the anchorite of old culling a few simples for a salve, or obtaining some wholesome vegetable diet from the wild scenes around him, and it would not be amiss if a knowledge of herbs in the present day would lead more to their employment as food than to their use in quack nostrums. Everybody has some favourite plant or plants to use and recommend for "fary tab," but few would eat an uncultivated vegetable. J. B.

Frost among the Hardy Shrubs.—My experience of the past winter, when I consider the severity equal to that of 1869-70, is so different from that given at p. 609, that I venture to trouble you with it, as it may interest some. In the winter of 1869-70, 3 feet of the top of a large *Pinus insignis* was destroyed, a large *Deodar Cedar* entirely deprived of every leaf, but recovered; all *Magnolias* killed to the ground; immense *Bay trees*, of years growth, killed to the ground; *Laurustinus* killed to the ground; a large *Acacena*, 10 feet high, killed to the ground; *Roses* and *Rhododendrons* much injured. In the winter of 1870-71, *Pinus insignis*, *Deodar Cedar*, were not in the slightest degree injured; *Magnolia*, *Bays*, and *Laurustinus* not at all injured; *Yuccas*, of which I have about 30 large plants in large pots on the terrace, not injured; 12 fine *Dracenas*, in pots, killed to the ground (this is my greatest calamity, two of them being very handsome plants of ten years' growth); *Roses*, *Rhododendrons*, &c., have stood well; and about 40 seedling *Aucubas* of the usual new sorts have stood well; the berries on the *Aucuba* not in the slightest degree injured. But I now see I have sustained injury from another cause, the great dryness of last summer, which killed many trees—several *Poplars*, two large *Elms*, one large *Beech*, an *Oak*, I fear, and a *Spruce Fir*, as well as several *Birches*, &c. *Kappa*, *South Devon*.

Blue Polyanthus.—In answer to your correspondent's inquiry of last week respecting the blue *Polyanthus*, I beg to say I have grown it between 50 and 60 years past, and now have several plants. It was purchased by me when a boy in Covent Garden Market, of one of the small flower dealers who then had a large basket of them. I have never seen it in any garden except my own, and never knew it to produce seed. I try it, however, as the style is very short, and the stigma low down in the flower, that by slitting open the tube it might be fertilised with the pollen of some other flower of the same kind, and I had intended to try this during the present season, but it escaped my recollection till too late. I can confirm Mr. Darwin's statement that the pollen of another plant of the same kind will frequently fertilise a plant better than its own pollen, and many plants had remained barren till this was discovered. The pollen of the blue *Polyanthus* will not fertilise its own flowers. *George Wood, Rochford*.

—In reply to the inquiries of your correspondent, Mr. McPherson, I have the pleasure to inform him that I grow the blue *Polyanthus*. I obtained it from the Messrs. Cunningham & Fraser, of Comely Bank Nursery, Edinburgh. I had previously seen it at Kew, and been much struck by its beauty and singularity. Mr. Ware, of Hale Farm Nurseries, has a small stock of it, which I think he told me he procured from a cottage garden in Scotland. It is one of those good old-fashioned plants which ought to be preserved with the most zealous care. I trust that all who are fortunate enough to possess it will propagate it to the utmost of their power; if not, like the old double white Cowslip, which the late Mr. Youell of Yarmouth used to keep in stock, it will soon be lost to cultivation. The old *Hen-and-Chicken Daisy*, which, when I was a boy, I used to see in every cottage garden, is now becoming exceedingly rare, and so is the lovely and deliciously-scented double white *Lychnis vespertina*, which I consider to be one of the most beautiful of our hardy herbaceous plants. It is very difficult to strike, which is probably one cause of its rarity. One of your correspondents lately spoke in eulogistic terms of *Doronicum austriacum*. I do not know this species, but I have been greatly pleased this spring with *Doronicum Chosizi*, a species intermediate between *D. Farduchianum* and *platanifolium*. Its dense, neat masses of bright yellow flowers, coming into bloom as soon as *D. caucasicum* is over, have this season been one of the chief ornaments of my spring garden. *H. Harpur Crewe, The Rectory, Drayton-Beauchamp, Tring*.

Trees on the Thames Embankment.—I observe the trees newly planted, and allowed little more than a yard square of open soil around each. Is it possible that the roots, extending themselves under the flag pavement, and under the hard road, almost equally impervious to moisture, can derive sufficient nourishment? I remember some years ago, in Paris, seeing trees planted in the same way along the quays in a wretched state, which I was inclined to attribute to want of moisture. *P. P. C.*

Buttercup and Rheumatics.—Yesterday an old customer presented himself, showing me his hand most fearfully blistered, having the appearance of being recently badly scalded. I asked at once if it was so, and he said no. He then pointed to his trousers and slippers, both cut open; and gave me the following explanation:—"My brother came to see me last 'bark end,' and seeing how I suffered from rheumatics, said he could tell me of a certain cure: that is (said he) if you

are not better before next spring, get some Buttercups—roots, plants, and flowers, chop all up and scald them, and put them on as poultices. I did so last night (he says) on my shoulder and hand, my knee and foot, but I did not keep them on an hour—they were so painful. To-day I find him no better: the blisters full and very painful. Is the common Buttercup known as an irritant? *J. O., May 26.* [The leaves of Buttercups and of the wild Clematis, Traveller's Joy or Virgin's Bower, are sometimes used by vagrants to produce blisters and excoriations, to elicit sympathy from the unwary. Almost all the Ranunculaceae are powerful irritants. Amateur doctoring is as foolish as amateur lawyering—excuse the word. Eds.]

Improved Thick-leaved Dandelion.—We have grown the above plant for the past two seasons, and can strongly recommend it as an excellent addition to our winter and spring salads. We had large bushy plants standing out all winter in rows, 2 feet apart, and arranged for use we tied the leaves loosely together, placing a box, or a large flower-pot, over the plant, and in a few days it was blanched and ready for food. When blanching it is pure white, and of a delicately bitter flavour. It is very productive, our plants were fully 18 inches in width, and as much in height. The plants we blanched this season had been two years on the ground. *Stuart & Mein, Kelso, N.B.* [In our opinion this is equal to, if not superior to Endive. Eds.]

Fruit Setting, &c.—At a time when so much is being said respecting syringing Grapes while in flower, I send for your inspection two bunches of Muscats which have been syringed twice a-day the whole of the time they were in flower. I have syringed my Muscats when in flower for several years, with the same result. *Jaac Dall, Stoke Rockford, Graftonham.* [Good bunches, set as thickly all over as could possibly be wished for. Eds.]

Aphis.—This pest is unusually abundant this season on most kinds of fruit trees and bushes. The Plum and Peach, as usual, have their double share, not even the late frost (that gardeners will not soon forget) saved us to any wonderful extent. In the Apple and Gooseberry plantations where their frosted fruit shed upon the ground, with aphid and caterpillar upon them. Apple orchards, with their blighted blossoms, have also a double enemy upon the leaf. Is this not enough to bring the tear, which a gardener often sheds within the "prison walls," without a sympathiser? But how are we to keep under these insect enemies at the cheapest rate? As our crops are likely this year to be light, this question ought to have the gardener's best attention. Soapuds are within the reach of all, and if applied with force to trees and bushes infested with aphids, will have a good effect, and dusting with finely sifted soil will still further help to dislodge the enemy. I have another remedy to recommend to tickle the enemy not to "make him laugh," but which will make him reel to and fro and appear at his wits' end: it is chamber lye. Use from one gill to a pint to a good-sized pail of water, the latter quantity if the trees are small, and it will be found a most effective remedy. My experience with chamber lye has extended over several years, and particularly in a troublesome Peach-house, which is now kept perfectly clean with two or three applications per week. *J. Taylor, Rose Hill, Botherley, Carlisle.*

The Python Horticultural Boiler.—I have sent you a rough sketch of what I think would be something new in the form of a horticultural boiler, and I believe it will be found to be quite as efficient in its working as many of the new boilers lately brought into notice. The idea of the Python horticultural boiler occurred to me from the form that the pythones serpent takes when incubating her eggs. You will see from the sketch that the flow-pipe is in the head of the Python boiler, and the return-pipe in the end of the boiler, and so the whole would be enclosed in a fireplace made of fire-brick, the flames would heat all the surface of the pipes, so that great heating power would be the result. The fire-bricks in the fireplace would likewise keep up a latent heat for a long time, and so by keeping the pipes hot less firing would be required than in many other boilers, and at longer intervals. From the horizontal position of the pipes in the Python boiler, it would not take up any more space in its setting than the common serpentine boiler. This is a great desideratum in many houses where there are only confined spaces where boilers can be set in. Mr. Cannell's beehive one, lately figured in your columns, seems to me to be a powerful boiler, but, from the height it would require in its setting (if all its supers were on), and from its complicated quantity of flow and return pipes, I am afraid a civil engineer would be required for its superintendence. The Cornish and Kent horizontal boiler of Messrs. Messing, Messing and Westland do not labour under this disadvantage of taking up much space in their setting, and I have no doubt but that these boilers will be found to answer all the purposes claimed for them by their designers. *A. Gardener.* [An novel and original idea, but we are afraid impracticable one. Eds.]

Pond Mud.—May I inquire whether caustic lime is not injurious when added to farmyard dung? and whether it is, in the same way, be injurious if

added to pond mud, by burning up, as it were, the decaying vegetable matter in which the mud abounds? I know this is the regular practice, but is it founded on correct principle? *P. P. C.*

Cool Treatment of Orchids.—As your correspondent, "G. H.," still persists in his own interpretation of cool treatment, and either ignores or condemns all others, I trust you will allow me to examine this question upon grounds which I propose to call home treatment. "G. H." has been taking us to the habitats of these plants, and bidding us mark the temperature, &c., of the locality, and insisting that as they have a certain temperature in their native haunts that they require the same temperature when transferred to our houses. This is not a new idea, it is an old one; but I think I can prove that it does not follow that because a plant is found growing at a certain temperature in the bright light of a tropical climate that it should require the same temperature in our dull winter months, with all surrounding circumstances completely altered. I do not intend to run through a desultory discussion upon Orchids, but to consider the genus *Ondontoglossum* only. Many of the species imported during the last eight years were first introduced into this country 20 or 30 years ago, and how were they treated at that time? Take a work of that date, say "Loudon's Encyclopedia," or "Paxton's Botanical Dictionary," and it will be found that the whole of them, without any exception, were treated as stove plants,—that would be the same temperature as this house now recommended by "G. H.," they may call it cool if he pleases to do so, but many horticulturists consider a mean of 70° during the winter months as stove heat? What was the result of placing them in this heat?—The total loss of many of the plants. Between the years 1830 and 1850, there were imported upwards of 50 species of *Ondontoglossum*—how many of these plants were there alive in 1855? Can any of your correspondents tell us of any collection of Orchids that could boast of ten specimens of the same species at the same time? I shall be very pleased to find myself corrected. Now, if it was not the heat that killed these plants, what was it? Will "G. H." endeavour to answer that? Let us now come to 1870, and how do we find *Ondontoglossums* treated? Why, in many places cool houses have been built for them, and they are grown literally in thousands; if any of your readers doubt this assertion, let me make a visit to Mr. Low's nursery in London, and inspect the collection there. It is upwards of 20 feet in length, and about 10 wide. I believe Mr. Low has imported more *Ondontoglossums* than any man in England, consequently he ought to know what treatment they require; are we to believe that it is all a mistake on his part to build this large house? I have personal knowledge of three houses belonging to private gentlemen, they are all built and heated in a similar way to Mr. Low's; they have been at work from four to seven years, and are perfectly satisfactory. On these three houses remain nearly 2000 Orchids. Again, most Orchid growers have some knowledge of the respected author of the "Orchid Grower's Manual." What does Mr. Williams advise? At p. 3 of the above work [which edition?] he says, "The house I recommend for the *Ondontoglossum*, and other species and genera that come from similar regions, and consequently require the same treatment, must be kept at a low temperature, say, 45° in winter, and 50° to 65° in summer; it must be well shaded in the sun, and must be kept cool and generous for the cool Orchids." And again, at p. 167, writing of *Ondontoglossums*, "little heat is needed for them, many being destroyed by too much heat." These are only a few facts upon this subject, and I challenge "G. H." to disprove them if he can. I have purposely kept at a safe point in temperature, but will now give an extreme case. At the last Crystal Palace show there was a class for 10, and in the 1st prize class we were fortunate enough to find the *Ondontoglossum*, the last being the finest plant of that kind I ever saw. Now the house in which these plants are grown, with many others, stood at 35° several times last winter, and on Christmas morning it was at 32°: not a plant was lost. *O. cristatum* suffered the most of any, but that is now growing nicely. If further proofs are wanted, I shall be happy to supply them at 2 future time. I believe that Mr. Anderson, of Meadow Bank, can tell us something about this matter, i.e., cool treatment; for about two years ago he made a tour through many Orchid-growing establishments. Will he oblige us by answering the following questions:—(1) Did he find any *Ondontoglossums* grown as recommended by "G. H.?" and (2), in what condition were the plants in the cool houses visited by him at that time? *Ex-Cantab.*

Are Vegetables better for being Cut and Used Directly?—Almost every one having a garden considers the great point to be, that you have your vegetables fresh and good. Now this is just the point to which I wish to direct the attention of your readers. Are vegetables really better for being cut and immediately used? My own experience is quite the contrary. My attention was first directed to the subject by eating the Cornish and Kent horseradish which, after being cut, had a better flavour than my own fresh Cauliflowers. [1] Lots of reasons and examples illustrating this idea, that vegetables are better for being cut and

allowed to remain some time before being used, occur to me; but before taking up your pages with my reasons, I will first refer to the opinions of others who, I dare say, have given this subject some attention. The subject is important, as vegetables are now sent from Cornwall to every part of England, and, I have heard, even to Russia. *Kappa, South Devon.*

Seedling Purple Beech.—The leaf enclosed is from a seedling Beech, which, in 1870, came up in a flower-bed in my garden. The seedling Beech is distant 17 yards from the stem of a common green leaved Beech tree, producing seed. There is, 40 yards off, a young coloured Beech in the garden, but I never yet noticed any seed on it. There was none to be found on it last autumn, 1870—I looked then on purpose for seed. There is seed now forming. At other gardens in the village there are coloured Beeches, but not very near. Of course the seed of this young plant may have been carried somehow to the spot from coloured Beeches, yet there is at least some probability that the seed came off the common green Beech tree close by. Persons better informed may perhaps know many other undoubted instances of coloured Beeches produced from the seed of the green leaved Beech. Selby ["Forest Trees," p. 318] mentions that the original parent of all the purple Beeches was discovered in Germany, now about 100 years ago. *A. S. Ormerod.* [The evidence you give is not conclusive either way. No doubt the original one was a seedling from the common Beech, and not a sport. Eds.]

Double Plums.—I send herewith some specimens of Plums from a tree (Kirk's Seedling, I believe) growing against an east wall in the garden here. The tree has a heavy crop, a large proportion being of the double form which I send. I think when I considered it that double form was a plum of single ones, but many of them have fallen. I shall be obliged if you can give an explanation of this peculiarity. The tree has not produced double Plums before, and I can see none on a tree which grows close to it, so that the branches cross each other. *G. H. Sawyer, Heywood Lodge, Maidenhead, May 30.* [Two ovaries have been formed in these flowers, instead of one, as is usually the case, and the two have become partially untied. Eds.]

Heating by Hot Water.—The sharp editorial queries at the end of my short note, p. 646, have by no means shaken my faith in the soundness of the views there expressed. I waited a week for further proof of the return pipe being made the flow, and am by no means convinced by the explanations given on p. 677. It is extremely probable that the position of the arrow on the right hand side of the boiler ought to be reversed. I believe that the bottom of the return pipe boiler is as hot, or hotter, than the top. The succession of plates, one on the back of the other, are designed to exhaust the fire before it escapes into the chimney. If successful in this, the top plate, from which the flow proceeds, must be very much cooler than the bottom of the boiler, crammed full of glowing coals; and if so, the return pipe will be the flow—the water way—as any one may test. Even if not so hot, the superior elevation of the so-called return pipe would tend to make still the flow. I have met with many curious facts in hot-water heating, establishing beyond all doubt the irrepresible tendency of hot water to reach the highest point. I see nothing to hinder it doing so in the boiler as illustrated in the *Gardeners' Chronicle*; neither is any proof given that it does not do it. Instead of the very general statements advanced at pp. 676, 677, we are entitled to a series of veritable readings between the temperatures of the two houses, one heated in the usual way, and the other proposed to be heated by the conversion of the return-pipe into the flow. Are the two houses alike, and what difference in time is there between the heating of the one on the right and the other on the left hand of the boiler? In writing this, it may be well to inform your readers that I am by no means opposing Mr. Cannell's boiler; on the contrary, I think well of it, if the joints can readily be made fire-and-water proof. For, indeed, was this great discovery made, the marvellous advantage arising from converting the return-pipe into the flow one of the merits of the boiler put forth by Mr. Cannell. Even now he says little about it, and it was not one of the original fourteen merits advanced in connection with his registered circulator. These facts do not invalidate the value of the new mode of motion, which you hold is to supersede the usual arrangement, but they prove that the boiler may be good or bad independent of it. You proceed to ask if I really mean to imply that there is any cold water in an ordinary apparatus after it is set going, to justify my argument that the caloric has to lift it? Undoubtedly there is. Heat and cold are relative terms, and in the many thousand gallons of water in a heating apparatus, extending it may be from the boiler 200 or 300 feet or yards to the extremity of the furthest house or pit, there is a huge mass of water to be moved, and a great difference of temperature, and consequently of weight, must be maintained, any one practically conversant with heating could ever have put the question, or the next: "And does he really mean to argue that the force that induces circulation is attributable to the cold water, and not to the

caloric?" Unquestionably to the cold water and to the caloric. And if the Editors continue to doubt the former, they will have to convince Mr. Taylor (see p. 678) as well as myself, that we are wrong. One more point about the Cannell boiler, recently so highly commended in your pages. I quite believe it is a good boiler, but I fail to see any very special merit in it. Indeed, that is, in the same reduced the expense of fuel one-half, but in the same letter we read that slack was burned instead of coal, which would make all the difference or more in the coal bill. As to the flue along the bottom, I believe it is of little use, as one may hold their hand in it without being burned. *A Practical Hand.*

Resting Orchids.—Having been asked my views upon this subject, by one of your correspondents, I will try to explain why I should so far have changed the opinion I once gave in your pages—that as Nature has provided two distinct seasons, the growing season and the resting season, so we must provide two distinct treatments—as to adopt, in some cases, the one treatment all the year round. Your correspondent in his second letter gives his rule: "I trust entirely to Nature's guidance; if the plant has been distinctly formed pseudobulb, I believe that plant requires a season of rest; and if there are exceptions in our houses, it is due to our treatment, or rather maltreatment, and not to the natural habit of the plant." The greatest difficulty I find in explaining this subject, is adequately to convey the idea understood by the word rest; and I think if we exclude all Orchids that have no pseudobulbs, and set up the idea that they do not rest, we shall have a great deal to add to the opinion of all plants and trees at their proper seasons, and I will take some other types than Orchids to explain my views. There is the Tulip and the Hyacinth class, which certainly are essentially deciduous, and there can be no two opinions upon their treatment; but contrast them with the Eucharis amazonica, which is an evergreen bulb, willing to flower twice a year, or even often, provided that it is well rested between its two flowerings, and the requirements, depending upon the speed with which its loss of leaves has been repaired. The Rhododendron is an example; it flowers, it grows, and then consolidates that growth, forming its next year's flower buds; but should the autumn unfortunately prove open and mild, it grows again, spoiling the flower buds by turning them into growths; and though it gets its winter rest all the same, it will not flower in spring. With a Gardenia it is different, as it can be made to set its buds in summer for an autumn flowering, and in winter for the spring. These two examples, and the Eucharis amazonica and the Gardenia, bring me to the point I had arrived at in my own experience, when I read Mr. Bates's book on the Amazon, a quotation from which I gave you at p. 1411, 1870. The important points in that letter were, first his description of a tropical climate, with equal day and night, and nearly equal temperature and moisture the year round, and the remarkable effects he tells us that are produced by the high temperature, where the influences are not in anyway counteracted by the proximity to the Atlantic, and which show themselves in this manner—that some trees yield flower and fruit twice in the year. He says the result of a tropical climate is that there is no hybernation—budding, flowering, fruiting, and leaf-shedding are always going on in one species or another. Among Orchids we have a great many types, and though we may divide them into the two classes as regards the possession of pseudobulbs, we must again distinguish those that are deciduous from the more purely tropical, that never should lose their leaves. I find that a great many Cattleyas will grow twice in the year, without in any way interfering with their flowering, and it is the same with a number of Dendrobiums, whether it is their habit to flower from bulbs without leaves or not; but I cannot yet say whether the succulent in growing and flowering any one plant twice in the year, which I do not see, whether it cannot yet be done. What I have tried, growing purely tropical Orchids in comparatively an equal temperature all the year round, regardless of their possession of pseudobulbs, has been attended with complete success. No plant or Orchid that will flower equally well with its leaves on, should be deprived of them is quite certain, and we must also distinguish between the two time a plant requires rest and the time that it suits us in our climate to keep it resting. We speak of a Cattleya resting, but its flowering and growing powers are greatly injured if it loses its leaves; we may say the same of many Dendrobiums, and I do not know of any of the most decidedly deciduous that are benefited by being rested longer than is required to deprive the flowering bulbs of their leaves; indeed, some flower from the two year old bulbs, in which cases I think we may find that they would do better treated as purely evergreen tropical sorts; take *D. heterocarpum* as an example. Lieut.-Col. Benson explained to us how they were rendered deciduous by the heat resting them, while we are obliged to employ cold and drought to obtain the same result: it is just a question if we are not in a great many cases wrong. I was looking the other day at a very young plant of *D. furciforme* octatum, which flowered equally well from bulbs having all their leaves on as from the old bulb without a leaf; and *D. Dalhousianum*, and I think many others, will do the

same. Then what rest is required by the class *D. chrysotis* belongs to, that flower from a still growing bulb? To note the number of sorts, and the peculiarities of all the Dendrobiums, would, however, make too long a letter, and is more suited to a descriptive catalogue. I advise gardeners only to use this power of resting Orchids or hybernation as a means to an end, studying the individuality of each plant, and remembering that it is as powerful to weaken an unhealthy plant as it is able to strengthen a strong one. I believe that if the house suits them, Orchids are of all plants the easiest to grow, but that if the houses are unsuitable it is in vain to try. I have come to this conclusion, by examining the imported plants, which are all seedlings; by reading the descriptions of the way they grew in their native countries, and by examining their seeds; and I am sure that any one who does the same will arrive at the same conclusion. No art of man can equal the perfection with which their climatic requirements are supplied, that enables the dust-like seed to germinate on the surrounding trees in such magic profusion. The tendency to become deciduous, that is more observable in Dendrobiums than any other class of Orchids, is due to the effect of altitude more than to any other cause. I am intending to study the effect of a sun-umbrella. No art of man can equal the power to stand this branch of the question, as it is the type of an Orchid having pseudobulbs and requiring leafless rest. In conclusion I think I may prognosticate that Orchid cultivation has yet to make great strides in advance, and which result can only be obtained by testing our well worn garden maxims by any new light that scientific explorers may obtain for us. Let us therefore all help, for it is the pull all together that does it, and I have no doubt that in the old notion of garden secrets, that led men to think themselves cleverer than the world combined. *G. H.*

Peach and Nectarines on the same Shoot.—I notice that several cases of this occurrence were recorded in England last season, and it is worthy of notice, as a peculiar phenomenon was observed with unusual frequency. I have not seen either the one or the other, but I have no doubt that the occurrence of the exceptionally dry season had anything to do with it. I know not. I was told of a fruit, half-Peach, half-Nectarine. As the Peach is the harder of the two, no doubt the Nectarine was originally a sport from it. *Alph. de Candolle.* [The difference in pubescence between the Nectarine and the Peach never seemed to us to be of any very great importance. Much more singular would it be if a "clingstone" sported from a "free stone." Has this ever been noticed? *Eos.*]

Hard and Soft Water.—I have long looked in your columns in the hope of finding an account of some process by which hard water can be so softened as to make it congenial to plants. I have noticed Clark's process, and no doubt it is extremely valuable for domestic and culinary purposes, but I wish to know if it produces a change suitable for tender plants. The water, both that obtained from the ordinary wells and the river or brooks in this neighbourhood, is so extremely hard that all plants are injured by it, and tender plants absolutely destroyed, if watered with it even moderately; and last year, the season being so dry, the water of the wells and brooks was so hard that I never knew it before. We had no admixture of soft-water to modify it, and it became pure spring water, and no consequence. I was not aware of could alter its effect on my plants. The soil at the surface of the pots became incrustured with a chalky substance, and soon destroyed tender plants. The providing a sufficiency of soft water by means of tanks for a large collection of plants in such a season as the last was no trifling matter, and no forethought could have remedied this, which was seen on referring to Mr. Symons' list of rainfall, which shows only a fall of 18 inches for the whole year, and the greater portion of this fell at the end of it. We have artesian wells in the neighbourhood which produce a good supply of remarkably soft water, and much used for culinary purposes, but for drinking not to be preferred to the water of the springs. The water of these wells, however, is worse for plants than the water of the springs and river, and in one instance I know of, the water of the springs in the neighbourhood, being applied freely to some rows of young *Solanum* and *Beans* in the evening, nearly the whole were found on the following morning entirely destroyed from its effects, and as though scorched by frost; but such was not the fact, as the night was both dry and warm. *George Wood, Rochford.*

Societies.

MANCHESTER BOTANICAL AND HORTICULTURAL. May 26.—The grand National Horticultural Exhibition of this Society, one of the most important in the kingdom, opened on Friday last, and was closed yesterday. As compared with that of former years, the show of the present season was decidedly less extensive, but not less meritorious. If it fell short in quantity as regards the miscellaneous elements which enter into the composition of a great show, it certainly showed no deterioration as regards the leading features, such as the collections of stove and greenhouse plants, the Orchids, the Roses, and the Ferns, all of which were well represented, and the first-named probably never so well represented before. Mr. Baines' premier group was as near perfection as it

seems possible to attain, and whether we look at his massive Azaleas, his noble Ixoras, his *Boronia pinnata*, his *Darwinia* (*Hedera*) *ulipifera*, his *Epacris*, his *Dipladenia amabilis*—lovely indeed in the charms of its blushing, nay, glowing flowers, or his *Sarracenia flava*, a plant with four or five plants in the pot, and forming a specimen a yard across, we must say that we have never before seen so perfect a collection exhibited. We were glad to see the Messrs. Cole produce a well-bloomed plant of the fine old *Gompholobium polymorphum splendens*, one of the gems of the old and in the same collection was a fine plant of the new white *Ixora Colei*, which will be a grand addition to our exhibition plants. One of the gems of the show was a mass of *Anthurium Scherzerianum*, about a yard across, with four or five plants in the pot, and the flowers coloured, indeed, which was its only defect; this came from the garden of S. Schloss, Esq. The Orchids were remarkably good. Mr. Williams had a finely coloured *Laelia purpurata*, with seven spikes, bearing 35 flowers. G. Smith, Esq., had a plant of the same species, with 15 spikes. Mr. J. Stevenson, of Timperley, had a massy *Cypripedium barbatum giganteum*, strikingly attractive for the size of its flowers, which were 33 in number. J. H. Fernley, Esq., had a grand *Cypripedium Stoneyi*, with four spikes, bearing 17 magnificently coloured flowers. He had also another of the same, with 15 flowers. A charming little plant, nicely flowered, of *Odontoglossum Phalaenopsis* came from the collection of S. P. Callender, Esq. These were some of the most striking Orchids. Among New Plants Mr. Williams had a *Moraea*, about a yard across, *Williamsii*, with glaucous leaves and large greenish-white waxy flowers, having the singularly twisted lip with its convex side turned inwards from opposite directions alternately along each side of the spike. He had also the *Platanus* well known to the collectors of *Platanus latifolia*, the tufted fronds of which bear a little resemblance to its type as can possibly be; and the rare *Gymnogramma Pearcei*. Messrs. Rollison had a pretty group of rare plants, amongst which their *Anthurium magdalenicum*, a white-flowered form of *Paspalum*, was very attractive. Many fine plants of *Ferns*, British and foreign, as well as some interesting *Palms*, *Cycads*, and succulents were shown, but they call for no special remark. For the rest we refer to the annexed report:—

The conservatory, in which were arranged the collections of plants, was a fine show in itself, so uniformly good were the productions arranged within it. The 16 stove and greenhouse plants in flower, with which Mr. Baines, gr. to H. L. Micholls, Esq., Southgate, took the 1st prize, were a fine collection. The 16 plants in fact, that it could hardly be credited these huge plants had travelled all the way from London to Manchester. The group consisted of *Azalea Iveryana*, *Cheloni*, and *coronata*, superbly flowered; *Erica* *Cavendishiana*, *ventricosa* coccinea minor, and *tricolor*; *Wilsoni*; *Exornata*, *ambrosiniensis*, and *coccinea*; *Dipladenia amabilis*, *Anthurium Scherzerianum*, *Epacris Ellipse*, two *Aphelias*, *Darwinia ulipifera*, and *Boronia pinnata*. Messrs. E. Cole & Sons, Winton, came ad with some excellent plants, amongst which a new white *Ixora Colei* was shown, and a flowered plant of *Gompholobium polymorphum splendens*, were the most remarkable. Mr. Thomas Kendal, Heathbank, Cheadle, was 3d. The groups of stove and greenhouse plants shown in other classes were highly creditable; in that for 10 kinds, Mr. Thomas Hobson was 1st, and Mr. Stevenson 2d. A splendid example of *Anthurium Scherzerianum* exhibited by S. Schloss, Esq., was of large size, and having some spikes like 75 spikes, and 15 flowers.

Groups of fine foliaged plants, whether shown by themselves or in classes containing flowering plants also, are always fine at Manchester, and comprised magnificent *Palms*, finely grown and well-coloured *Crotons*, *Theophrasti*, *impatiens*, and *Calceolarias*. The group of 6 foliaged plants in that for amateurs, the best group of 6 foliaged plants came from Mr. B. S. Williams. It was generally considered that the show of Orchids was one of the finest ever seen in Manchester, and while there was a large quantity of them, the quality was strikingly manifest. The best 20 competing for the prize of £20, offered by Mr. Sam Mendel, were staged by J. H. Fernley, Esq., next Mr. S. P. Callender, Whalley Range; the best 6 from Mr. John Stevenson; the best 4 from Mr. G. Smith, Timperley; and in the nurserymen's classes, Mr. B. S. Williams was 1st, Messrs. Brooke & Co. 2d, and Messrs. Rollison & Sons, Fernley, 3d, with last season's exhibitors, Messrs. Brooke & Sons 1st with 8, and Messrs. Brooke & Co. 2d. Mr. Ternley's group contained a splendid example of *Dendrobium Pierardi latifolium*, with four finely bloomed pendulous spikes; while other Orchids of note consisted of *Platanus* for purposes of the show, one of significant form was shown, *Cattleya Mossie*, in variety; *Odontoglossum Alexandrine*, and *O. Pescatorei*, *Oncidium scarce*, some very fine *Cypripediums*, &c.

The only group of 9 greenhouse *Ericas* came from Messrs. E. Cole & Sons, and contained some well-grown and flowered plants.

Azaleas were not so numerously represented as is usual at this show, neither were the plants so large in size as we have been accustomed to see them. The best 6 in the class for nurseries, and the best 12 in the class for amateurs, were staged by Messrs. E. Cole & Sons, and consisted of *Lovely*, *Duc de Nassau*, *Conqueror*, *Iveryana*, *Stanleyana*, and *Criterion*. The same exhibitors were 1st with 10 varieties in pots not more than 14 inches across, having very fair examples of *Stella*, *mauve*, *mauve*, *mauve*, *mauve*, *mauve*, *mauve*, *mauve*, *mauve*, *mauve*, *mauve*, reminding one of *Bougainvillea glabra*; *Adelaide de Nassau*, and *Cedo Nulli*, among others. In the amateurs' class for 6 varieties, Mr. J. Brierley, gr. to Thomas Kendall, Esq., Cheadle, was 1st, having *Iveryana*, *Symmetry*, *Illustris nova*, *Criterion*, *Empress*

Eugénie, and Juliana. These were the largest plants in the show, and were pretty well flowered. Mr. J. Stevenson, Timperley, came next, having Duc de Nassau, very finely flowered; also Cedo Nulli and Illustris nova, likewise good.

Roses in pots made an effective display, and formed one of the leading floral features of the show. Messrs. Paul & Sons, Cheshunt, were 1st, with 10 varieties in 14-inch pots, with excellent plants of Madame Caillett, Camille Bernardin, Charles Lawson, Madame Hamel, Margottin, and many of the new ones. Messrs. J. & W. H. Jackson, 10, St. James's Place, London, were 2nd, with 10 varieties in 8-inch pots. Five young healthy plants, bearing splendid flowers. This group included Mons. Noman, Elie Morel, Marechal Vaillant, Victor Verdier, La France, Mons. Woolfield, Madame Victor Verdier, Paul Neron, Marie Rady, and Maurice Bernardin; 2d, Messrs. Paul & Sons. A first prize was also awarded to Mr. M. Wilkinson, Esq., Chesham Hill, for 12 pots of Roses in flower.

There was a goodly number of Pelargoniums of the various sections into which they are divided, the larger flowered varieties being represented by big, finely-grown plants, suggestive of feeding, yet pretty well bloomed. In the smaller class, the plants were more suggestive of being in that refinement of growth and quality of bloom we are accustomed to see at the London shows. The most attractive examples were La Vésuve, Mr. Bradshaw, Madame Hilaire, Victoria, Readsman, and Desdemona, and the plants of the last named variety were of the same nurserymen's class. The amateurs' sixes were of an indifferent character, too much growth being infused into the plants at the cost of flower. Mr. Ryland was also distinguished with 8 fancy varieties in the open class, having fairly good specimens of the same. The plants of the amateurs' class they were smaller, and not so well flowered. The Zonal kinds are generally pretty well done at Manchester, and there was a goodly number of them; but they contained nothing worthy of notice with the exception of a few. Manchester was also distinguished for the fine quality and exquisite softness of hue of the so-called Zonal kinds, though of good size and well grown, were sadly wanting in leaf coloration; but perhaps the art of producing this is not so well understood in the North as it is in the South, while the atmospheric conditions of smoke at Manchester may be possibly a hindrance. Mr. Myers, gr. of J. Bonn, Esq., Timperley, had by far the best coloured plants, which consisted of Sophie Dumaresque, Edwina Fitzpatrick, Sophia Cusack, Countess Tyrconnel, Burning Bush, and Italia. A very large number of the plants of the last named variety of this kind, were contributed by Mr. J. E. Reynolds; Dr. Ainsworth had the best grown lot of 4 pots of Lilium auratum, but owing to their not being sufficiently in bloom, were awarded a 2d prize. Mr. Stevenson being 1st; and Cineraria and herbaceous Calceolarias were 1st of indifferent quality.

A most interesting feature was the collections of 50 hardy herbaceous variegated foliaged plants, the second hardy being widely interpreted. Mr. T. S. Ware sent a capital collection down from Tottenham, and was followed by Mr. Hardwarth of Tottenham, Mr. Sedums, a golden variegated Yarrow, and suchlike made up the group. The 2d prize was taken by Messrs. W. & G. Yates. Groups of 80 and also of 12 succulents were also sent in. The 1st prize was won by a group of plants rapidly rising into popular favour, they were regarded with much interest. The best 80 were staged by Mr. B. S. Williams, the 2d best by Mr. T. S. Ware, and the 12 by Mr. Hardwarth. Only one specimen from Manchester and the surrounding district was not represented in the competition. Such things as Agaves, Aloes, Echeverias, Sedums, Euphorbias, &c., made up Mr. Williams' group. Mr. Ware's collection contained some of the most interesting and novel plants, such as Echeveria agavoides being particularly attractive. Groups of hardy Conifers, the best of which came from Mr. John Shaw; Golden Yews and standard Hollies in the 12 group, were interesting. The 12 group was made up of pairs, displayed the exhibition, and served to relieve the masses of colour formed by the Azaleas, Roses, and Pelargoniums. Some boxes of cut Roses, inclusive of a box of Marechal Niel, were staged by Mr. John Cranston, and they contained very fine examples of some of the leading Roses.

Mr. Mills, to Lord Cardigan, Wycombe Abbey, staged the only collection of fruit, and comprised a fine Queen Pine, Golden Gem Melon, fine Black Circassian and Eton Pine Cherries, Brown Ischia Figs, and Royal Worcester Apples. The finest collection of grapes was by Mr. Smith, gr. to W. Blinkhorn, Esq., St. Helens, and consisted of two Black Jamaica and two Montserrat; a gr. J. Willis, gr. to J. Dixon, Esq., Astle Park, Congleton, was ad. The best 4 bunches of Grapes, two bunches each of black and white, were staged by Mr. Potts, gr. to J. Knowles, Esq., Heaton Grange, Bolton, and consisted of Black Hamburgh, Black Alicante, and Black Muscat of Black Hamburgh, the berries of large size and even, and two good bunches of Muscat of Alexandria, not quite ripe, but yet so good as to richly deserve the leading prize. Mr. Smith, gr. to W. Blinkhorn, Esq., was ad with the same kinds, but much inferior in quality. The best two bunches of Black Grapes also came from Mr. Potts, gr. to J. Knowles, Esq., Heaton Grange, Bolton. Black Hamburghs. Cucumbers, as usual, were numerous represented, and generally of good quality.

The best centre piece for table was staged by Miss A. M. Williams, of Holloway; it was most tastefully arranged, and much admired; Mrs Howard, of Balham, was 2d. A highly meritorious vase of flowers for the decoration of the dinner table (not for competition) was staged by Mr. R. S. Yates, of Manchester, together with some handsome bouquets, showing much artistic finish.

THE ROYAL NATIONAL TULIP SOCIETY: *May 26 and 27.*—This Society held its annual exhibition in conjunction with the Great National Horticultural Exhibition at Manchester on Friday and Saturday, May 26 and 27, 1902. There was a very large muster of subscribers, and the show was one of the best ever held, although the season has been a very unfavourable one for Tulips, owing to the prevalence of frost and wet. Mildew has appeared, and in many collections caused great devastation; despite this, however, and many large growers not being represented, the number and the quality of the blooms were much above the average.

Mr. Barlow, the hon. secretary, carried off the champion prize, a handsome silver cup, with a grand stand of 26 blooms, among which Ajax, Sir J. Paxton, Rutley's Queen, and Talsiman, were especially conspicuous. The first prize for a single flower was won by three flowers of the "Florist and Pomologist," kindly presented to the society by Thomas Moore, Esq., with a noble pair of flowers, Headley's Demosthenes (feathered bazar) and Willson's Sir J. Paxton (flamed bazar). The second prize for a single flower was the fine, flamed flower of the premier exhibition, Rutley's Queen, which won the feathered premier prize, was an equally noble flower. The grand pair, Ajax and Talsiman, raised by Dr. Hardy, of Warrington, were very fine, and the pair of flowers, Headley's Demosthenes and Willson's Sir J. Paxton, also were Storer's Dr. Hardy and Orison, Headley's Sarah, Headley, Adonis, and Demosthenes; Ashmole's Garibaldi and Lord Eryon. The usual old standard favourites, as Aglaia, Heroine, Bacchus, Walker's Duchess of Sutherland, and the other old favourites, were also in the fine condition. Among the newer and more promising flowers were Slater's John Peacock, Martin's 17 (both feathered byblons), Rachel (feathered rose), Henry Steward (feathered bazar), Martin's 101 (feathered byblon), and the other new and promising seedlings were also exhibited by Messrs. Barlow, Willson, Jackson, Burnett, Hague, Lea, and others.

There were 33 winners of prizes, above 40 competitors, and 66 subscribers this year,—numbers unprecedented, we believe, in the history of this society. After the judging 43 members dined together, under the presidency of Dr. Hardy, and it was unanimously resolved that the meeting for next year should be held at Manchester. Nearly all the gentlemen present put down their names as subscribers. We add a more detailed report of the flowers staged in the several classes:—

CLASS 1.—4 standards of 12 deciduous Tulips, 2 feathered and 2 hardy; 4 standards of 12, viz. the Champion Silver Cup, Mr. Samuel Barlow, with Aglaia, Talsiman, Masterpiece, Rose Celestial, Ajax, Rutley's Queen Aglaia (feathered), Heroine, Martin's 117, Sir J. Paxton, Walker's Duchess of Sutherland and the Queen of the North, 4 standards of 12, viz. the Champion Silver Cup, Madame St. Armand, Storer's No. 4, Mabel, Ajax, Lord Demian, Masterpiece, Violet Amiable, Sir Joseph Paxton, Talsiman, Reliance, Aglaia; 3d, Mr. David Barber, with Sarah Headley, the Queen of the North, the Champion Silver Cup, the Sovereign, Heroine, Duchess of Sutherland, Mrs. Pickering, Dr. Hardy, Thalia, Triumph Royal, Sir J. Paxton, (feathered); 4th, Mr. W. Hardy, with Demosheens Sarah Headley, Mrs. Pickering, Aglaia, the Queen of the North, the Champion Silver Cup, the Duchess of Sutherland, Ajax, La Vierge, the Queen of the North.

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CLASS 3. 6 SLIDS of 6 dissimilar Tulips: 1 feathered and 1 named in each class: 1st, Mr. Saml. Barlow, with Aghia, Charmer, Demosthenes, Ajax, Rutley's Queen, and Adonis; 2d, Mr. C. W. Hardy, with Royal Sovereign, Talisman, Rachel, Sir J. Paxton, Lady C. Gordon, Violet Amiable; 3d, Mr. Thomas Storer; 4th, Mr. William Lea; 5th, Mr. J. D. Hextall; 6th, Mr. John Turner.

CLASS 4.—5 stands of 6 dissimilar varieties, 1 feathered and 1 named in each class, for 10s. 6d. subscribers only—the winners of the 10s. 6d. prize to be a valuable contribution of bulbs presented by Mr. William Lee: 1st, Mr. Hugh Housley; 2d, Mr. James Hulme; 3d, Mr. S. Smedley; 4th, Mr. W. Wiseman; 5th, Mr. James Hutton.

CLASS 5.—6 stands of 3 feathered flowers, 1 in each class: 1st, Mr. J. D. Hextall, with *Horrie*, Sir Joseph Paxton, and Mrs. Packer; 2d, Mr. John Morris, with *Industry*, *Masterpiece*, *Charming*, *Amiable*; 3d, Mr. Saml. Farlow, with *Seedling*, *Charming*, *John*, *Peppercorn*; 4th, Mr. William Lee, Jun.; 5th, Mr. John Turner; 6th, Wm. Widdowson.

CLASS 6.—6 stands of three flamed Tulips, one in each class :
1st, Mr. Saml. Barlow, with Sir J. Paxton, Aglaia, Talisman ;
2d, Mr. Wardle, Duchess of Sutherland, Sir J. Paxton,
Triomphe Royale ; 3d, Mr. William Willison, Aglaia, Dr.
Young, Cotterill's Competitor ; 4th, Mr. Thos. Mellor ; 5th,
Mr. J. P. Sharpe ; 6th, Mr. Geo. Pickerrill.

CLASS 7. — 4 stands of two Tulips, 1 feathered and 1 flamed, in any class; this class for maiden growers only, and both the winning and the losing stands can compete in class 8: 1st, Mr. S. Smedley (not noted); 2d, Mr. Wiseman, Sir Joseph Paxton, flamed, do., feathered: 3d, Mr. Samuel Davenport, Sir J. Paxton, Heroine; 4th, Mr. John Spittle, Sir J. Paxton, Sarah.

CLASS 8.—7 studs of 2 Tulips, 1 feathered and 1 flamed, in any class; 1st, Mr. S. Barlow (prize, the three volumes of New series of "The Florist and Pomologist," presented by Thos. Moore, Esq.), with Headly's Demosthenes and Sir J. Paxton; 2d, Mr. Joshua Hague, with Heroine and Lord Denman; 3d, Mr. J. D. Hextall, with Mrs. Pickerrill and Dr. Hardy; 4th, Mr. Michael Potter; 5th, Mr. Geo. Pickerrill; 6th, Mr. Wardle; 7th, Mr. W. Willson.

CLASS 9.—*Feathered Bizarres*—to single blooms: 1st, Mr. Willson, Demosthenes; 2d, Mr. Willson, Royal Sovereign; 3d, Mr. Willson, Royal Sovereign; 4th, Mr. Willson, Duke of Hamilton; 5th, Mr. Willson, Henry Steward; 6th, Mr. Barlow, George Howard; 7th, Mr. Willson, John Sanderson; 8th, Mr. Willson, Seedling 1227; 9th, Mr. Postlethwaite, Alfred; 10th, Mr. L. Smith, Paul Pry. *Feathered Bizarres*, to double blooms: 1st, Mr. Warde, Mrs. Pickers; 2d, Mr. Barlow, Talisman; 3d, Mr. Barlow, Talisman; 4th, Mr. W. Lea, Maid of Orleans; 5th, Mr. W. Lea, Seedling; 6th, Mr. Shorthouse, Mrs. Barlow; 7th, Mr. Wm. Lea.

North; 7th, Mr. Willison, Abbott's Gem; 8th, Mr. Willison, Queen of North; 10th, Mr. Willison, Seedling *96*, *Feathered Roses*-single blooms; 1st, Mr. Parkinson, Heroine; 2d, Mr. Barlow, Patched; 3d, Mr. Travis, Heroine; 4th, Mr. Barlow, Aglaia; 5th, Mr. Barlow, Mollie; 6th, Mr. Barlow, Mollie; 7th, Mr. Barlow, Mrs. Lea; 8th, Mr. Barlow, Martin's 10th; 9th, Mr. Willson, Sarah Heady; 10th, Mr. Mellor, Mrs. Lea; 11th, Mr. Barlow, Mollie; 12th, Mr. Barlow, Mollie; 13th, Mr. Paxton; 14th, Mr. Barlow, Surpass Polyphemus; 15th, Mr. Burnett, Sir J. Paxton; 16th, Mr. Lea, Dr. Hardy; 17th, Mr. Barlow, Mollie; 18th, Mr. Barlow, Mollie; 19th, Mr. Willison, Seedling 1235; 10th, Mr. Wooley, San Joe; 9th, Mr. Morris, Polyphemus; 10th, Mr. Pickering, Garibaldi. *Flamed Zephyrus*-single blooms; 1st, Mr. Parkinson, Salvator; 2d, Mr. Barlow, Mollie; 3d, Mr. Barlow, Mollie; 4th, Mr. Barlow, Mollie; 5th, Mr. Barlow, Mollie; 6th, Mr. Barlow, Mollie; 7th, Mr. Barlow, Mollie; 8th, Mr. Barlow, Mollie; 9th, Mr. Barlow, Mollie; 10th, Mr. Barlow, Mollie; 11th, Mr. Barlow, Mollie; 12th, Mr. Barlow, Mollie; 13th, Mr. Barlow, Mollie; 14th, Mr. Barlow, Mollie; 15th, Mr. Barlow, Mollie; 16th, Mr. Barlow, Mollie; 17th, Mr. Barlow, Mollie; 18th, Mr. Barlow, Mollie; 19th, Mr. Barlow, Mollie; 20th, Mr. Barlow, Mollie.

CLASS 10.—The best feathered and the best flamed flower in the whole exhibition—the premier feathered flower: Mr. S. Barbow, with Rutley's Queen; the premier flamed flower: Mr. S. Barlow, with Sir I. Paxton.

CLASS II.—(Breeders)—4 stands of 6 dissimilar Tulips, 1 of each class: 1st, Mr. S. Barlow, with 6 seedlings; 2d, Mr. Joshua Hague, with Ariosto, Garibaldi, Maid of Judah, Unknown, Seedling 169, Seedling 26; 3d, Mr. Willson, with Polypheumus, Willson's King, Willson's Queen, Seedling 120, Magenta, Juliet; 4th, Mr. J. P. Sharpe, with Sulphur, Lea's No. 7, Earl of Warwick, Adonis. Maple, Lady Olivia.

CLASS 12.—(Breeders) 6 stands of 3 Tulips, 1 of each class :
1st, Mr. Samuel Barlow, 3 seedlings; 2d, Mr. Joshua Hague,
Seedling 182, Mrs. Longson, unknown; 3d, Mr. Thomas
Mellor, Storer's Seedling, Duke of Manchester, Agnes Strick-
land; 4th, Mr. David Jackson, 3 seedlings; 5th, Mr. Willson,
Willson's Queen, Willson's King, Seedling 1221; 6th, Mr. E.
Shorthouse, Industry, Hayne's Seedling, Van Amburgh.

CLASS 13.—*Bi-rare Breeder*—6 prizes for single blooms: 1st, Mr. T. Mellor, Sulphur; 2d, Mr. Barlow, Seeding; 3d, Mr. Dymock, Ariosto; 4th, Mr. T. Mellor, Fearless; 5th, Mr. Barlow, Talisman; 6th, Mr. Barlow, Earl Murray. *Bybloemen Breeders*—1st, Mr. Jos. Hilton, Duchess of Sutherland; 2d, Mr. Barrett, Seeding; 2d; 3d, Mr. Barrett, Seeding; 7; 4th, Mr. Jackson, Seeding; 5th, Mr. Barlow, Talisman; 6th, Mr.

Shorthouse, Princess Royal. *Rose Breeders*—1st, Mr. James Hulme, Mabel; 2d, Mr. Barlow, Celestial; 3d, Mr. Barlow, Lady Grosvenor; 4th, Mr. Jackson, Industry; 5th, Mr. Jackson, Seedling; 6th, Mr. T. Mellor, Modesty.

CLASS 14.—*Premier Breeder Tulip*—Mr. Samuel Hilton, Duchess of Sutherland.

The Apiary.

ENDOSMOSIS, OR FEEDING THE BEE LARVÆ.—In asking for information on these points, I do not believe they have been already exhausted, nor do I arrogate to myself any credit for a discovery. My fear is that we have jumped to conclusions in bee physiology, grasping at the honey, and the marvels of systems and of beehives.

honey, and some naturalists say that the honey bee has previously written has been published with some personal motive, or has been filched from another, with the addition of what has been suggested in bee history by our own vivid imaginations : thus there is confusion in the very words "feeding, as applied to the bee larvae," and I am most anxious to be corrected by clear statements of facts, based on personal observations. I cannot help calling attention to an excellent essay, published by the Entomological Society of London, some 20 years ago, wherein the figures and calculations relating to the life of the queen bee were most carefully and minutely verified. The Ligurian bee having been since that period (July, 1859) brought into England, proofs have been established by the distinct colours of the yellow-and-black Ligurian queens and the common brown bee, although there seems a discrepancy as to the age of the queen bee, and which I know is a difficulty with even the most impartial inquirer. I venture to state that Mr. Desborough (the writer of the essay) has struck the key-note upon swarming and forming stocks. This was never suggested even by Mr. R. G. Thompson's long experience, but it is given by the German bee-keepers, and is the key-note of the bee-culture in America, and has enabled many in this country to make lucrative investments in Ligurian bees, and the various "compound bar-frame hives." The facts of "Endosmosis" involve the great question of "Dzierzon's theory," upon which the Baron Von Berlepsch's extremely interesting experiments followed. But this matter must be left for the present; Dzierzon himself "became a doubter of his own theory," although the Professor Carl F. E. Von Siebold, at once seized on it as a basis for a new theory, and I have no doubt that the bee-keepers that the well-informed scientific naturalists will soon discover any error that may have crept into my observations regarding "Endosmosis;" I shall, therefore, beg to be allowed to approach the matter from "the egg to the larvæ stage."

As I have given the evidence regarding the larvae beginning to open their mouths as soon as hatched, and to scratch at the (wax) sides of their cells to draw the attention of the nurse bees to their wants, it seems a pity that the writer could not have mentioned if they were fed with wooden or silver spoons, as this might have been a guide to bee-masters to select the queen larvae. Lamenting the oversight, let me add what Dr. Bevan writes in his *Bees and Honey*. "When a queen larva is hatched it is a small white worm, covered with a silken mesh, and is called a milk-maggot, floating on a whitish liquid." The Rev. L. Langstroth has accepted the same expression and description, in his American stereotyped bee book; and it is further added, "When the larva has grown so large as to touch the opposite angle of the cell, it crawls out

up in the shape of a semicircle, or, to use the language of Swammerdam, it coils itself like a dog when going to sleep, and it floats in a whitish transparent fluid, which is deposited in the cells by the nursing bees, by which it is probably nourished." I have, then, to show that the larva in the early stages is not fed, and that the development of the fertilised ovum is the growth of the spermatozoid by "gemmation." This I must leave for another occasion. *W. A. Mann.*

Obituary.

DIED, at Goodwood, on the 14th ult., Mr. GEORGE CAMERON, for 35 years gardener to the late and present Duke of Richmond. The deceased was one of several eminent Sussex gardeners who acquired the rudiments of their horticultural knowledge under the direction of Mr. Callander, the then gardener to the late Lord Douglas, at Bothwell Castle in Scotland. Mr. Cameron was well known as an excellent cultivator, and was an occasional contributor to the metropolitan exhibitions, and a constant and general exhibitor at the local meetings of the Brighton and Chichester societies, where he usually obtained first-class honours, more especially in the Pine and Orchid sections of the exhibition. In consequence of the respect and esteem in which he was held, his remains were followed to the grave at West-hampton last Tuesday by about a hundred individuals, amongst whom were many nurserymen and gardeners from a distance; and the writer of these short notes, who has enjoyed the advantage of his friendship even before his appointment to Goodwood, has now the mournful gratification of adding this faint tribute to his memory. *N.*

—Died, at Cheshunt, on the 24th ult., EVAN, youngest son of the late Mr. ADAM PAUL, aged 45.

THE WEATHER.

TEMPERATURE OF THE AIR AND FALL OF RAIN AT DIFFERENT STATIONS.

During the week ending SATURDAY, May 27, 1871.

NAMES OF STATIONS.	TEMPERATURE OF THE AIR.										FALL OF RAIN.
	Highest.	Lowest.	Range of Day.	Mean of Day.	Mean of All Days.	Mean Range.	Mean.	Mean.	Mean.	Mean.	
Portsmouth ..	77.2	40.0	35.2	73.3	46.3	27.0	58.7	0.1	0.2	0.2	
Blackheath ..	75.5	38.8	40.7	70.3	40.1	24.1	56.0	0.7	0.4	0.4	
Bristol ..	70.0	42.7	27.3	66.8	47.1	19.7	55.9	0.7	0.7	0.7	
Birmingham ..	70.0	38.3	40.7	67.0	47.7	19.3	56.0	1.75	0.9	0.9	
Wolverhampton ..	70.0	40.7	29.3	65.8	47.1	18.7	55.9	1.0	1.0	1.0	
Norwich ..	74.0	38.5	35.5	66.4	45.7	20.7	54.3	0.6	0.6	0.6	
Nottingham ..	73.3	40.4	32.9	70.7	46.7	24.0	56.0	1.26	1.3	1.3	
Sheffield ..	78.0	40.0	38.0	70.0	45.0	25.0	58.0	0.6	0.6	0.6	
Leeds ..	73.3	45.1	28.2	69.2	46.4	22.8	56.0	0.86	0.86	0.86	
Manchester ..	75.5	35.0	40.5	66.0	45.0	21.0	54.0	0.7	0.7	0.7	
Salford ..	78.0	39.0	39.0	68.2	47.4	20.8	56.1	1.12	1.12	1.12	
Bradford ..	75.5	43.0	32.5	66.2	47.1	19.1	56.0	0.7	0.7	0.7	
Leeds ..	77.0	40.0	37.0	67.3	45.7	21.6	54.0	0.73	0.73	0.73	
Hull ..	75.5	40.0	35.5	66.2	45.7	20.5	54.0	0.86	0.86	0.86	
Newcastle ..	70.0	41.0	29.0	61.3	45.3	16.0	51.8	0.80	0.80	0.80	
Edinburgh ..	72.7	44.0	28.7	60.0	45.0	15.0	54.1	0.30	0.30	0.30	
Glasgow ..	75.5	43.5	32.0	60.0	45.0	15.0	55.7	0.39	0.39	0.39	
Bradford ..	75.5	43.0	32.5	66.2	47.1	19.1	56.0	0.7	0.7	0.7	
Aberdeen ..	68.2	41.4	26.8	55.0	42.0	13.0	52.2	0.19	0.19	0.19	
Glasgow ..	75.5	43.5	32.0	60.0	45.0	15.0	55.7	0.39	0.39	0.39	
Leith ..	74.0	45.0	29.0	60.0	45.0	15.0	54.3	0.36	0.36	0.36	
Ferth ..	74.0	45.0	29.0	60.0	45.0	15.0	54.3	0.36	0.36	0.36	
Dublin ..	69.9	39.5	30.4	55.0	42.0	13.0	52.6	0.05	0.05	0.05	

STATE OF THE WEATHER AT BLACKHEATH, LONDON, FOR THE WEEK ENDING WEDNESDAY, May 31, 1871.

1871. MONTH AND DAY.	At 9 A.M.									
	Reading of	Barometer reduced to 3 ^d Fahr.	Thermometer.	Wet Thermometer.	Dew Point.	Degree of Humidity.	Weight of Vapour in unit of Foot of Air.	Direction.	Force.	Rain.
25. Thurs.	25.66	30.66	59.0	59.0	59.0	88.3	7.2	Gr.	4.2	
26. Friday.	25.80	30.80	59.0	59.0	59.0	88.3	7.2	Gr.	4.2	
27. Saturday.	25.89	30.89	59.0	59.0	59.0	88.3	7.2	Gr.	4.2	
28. Sunday.	26.04	31.04	59.0	59.0	59.0	88.3	7.2	Gr.	4.2	
29. Monday.	26.08	31.08	59.0	59.0	59.0	88.3	7.2	Gr.	4.2	
30. Tues.	26.10	31.10	59.0	59.0	59.0	88.3	7.2	Gr.	4.2	
31. Wednes.	26.08	31.08	59.0	59.0	59.0	88.3	7.2	Gr.	4.2	

1871. MONTH AND DAY.	TEMPERATURE OF THE AIR.										WIND.	RAIN.
	Highest.	Lowest.	Range of Day.	Mean.	Mean of All Days.	Mean Range.	Mean.	Mean.	Mean.	Mean.		
25. Thurs.	79.5	58.4	21.1	67.2	58.4	8.8	67.2	0.0	0.0	0.0	S.S.E.	0.14
26. Friday.	67.2	47.8	19.4	57.5	47.8	9.7	57.5	0.0	0.0	0.0	S.W.	0.12
27. Satur.	66.6	47.7	18.9	55.3	47.7	7.6	55.3	0.0	0.0	0.0	W.S.W.	0.05
28. Sunday.	72.4	49.6	22.8	61.0	49.6	11.4	61.0	0.0	0.0	0.0	N.W.	0.00
29. Monday.	70.1	46.8	23.3	58.4	46.8	11.6	58.4	0.0	0.0	0.0	N.W.	0.00
30. Tues.	74.6	46.0	28.6	60.3	46.0	14.3	60.3	0.0	0.0	0.0	N.W.	0.00
31. Wednes.	69.3	45.0	24.3	55.5	45.0	10.5	55.5	0.0	0.0	0.0	N.E.	0.00

May 25.—Very fine; light clouds were prevalent till night. Overcast at 4 P.M., and rain fell heavily from 6 P.M. onwards.

26.—Generally cloudy till night. Variable after 3 P.M. A light shower of rain fell about 7.35 P.M.

27.—Very variable. Heavy rain, with frequent thunder, from 2 P.M. till 4 P.M.

28.—Overcast till noon; then cloudless. Rain fell between midnight and 1 A.M.

May 29.—A very fine day. Small amounts of cloud prevalent. — 30.—Very fine. Variable at times. — 31.—Cloudy till noon, and a slight shower of rain fell about 10 A.M.

JAMES GLAISHER.

Garden Operations.

(FOR THE ENSUING WEEK.)

PLANT HOUSES.

In *Aquariums* proper the *Victoria regia* and *Nymphaea* plants will now be growing rapidly. They will, therefore, require as much attention in the matter of giving air as any other class of plants. It is according to the amount of attention afforded them in this respect that fine fleshy leaves and plants of good bloom are produced. Frequently sprinkle the surfaces of the leaves to aid them by every possible means, "for 'tis their nature" to grow under such favourable conditions. *Globe Amaranths* should now be put into their flowering-pots, to encourage them to make as much progress as possible preparatory to blooming in July. *Cockscombs* (*Celosia cristata*) should be potted on liberally, as soon as they show the comb. Pot them in a compost consisting of equal parts of rich unctuous loam and thoroughly decomposed manure. Keep them well up to the glass, and afford them a liberal supply of root moisture. *Chrysanthemums* must now be frequently stopped, by pinching out the points of the shoots. Stop them in the larger pots as frequently as the roots have moderately filled those they are in. Always pinch them back before fresh potting, so that the young shoots may have time to form before that operation takes place. Damp the plants overhead frequently during dry weather at the early and latter part of each day. Many greenhouse plants of the hard-wooded section may now be placed in sheltered nooks out-of-doors in instances where room is required for other subjects. Those alone should be turned out, however, which have completed the main part of their spring growth, the young shoots upon which are moderately matured. Many of the hardier kinds of stove plants may in like manner be removed into greenhouses if at all desirable, taking every care to maintain an atmosphere free from draught for the first week or two, Japan lilies especially. *L. auratum* should not have too liberal a supply of water at the roots after the flowers have commenced to expand. By keeping them in a cool house, thereby maintaining the leaves in a green and healthy condition as long as possible, good sound bulbs are formed for another season's work. Attend well to all stove and greenhouse climbing plants. Cut back such as have already done flowering, to induce fresh growth. I may mention *Kennedya* as an illustration of the class I refer to.

FORCING HOUSES.

Writing in general terms, the operation designated as "forcing" becomes at this delightful season only a slight anticipation of Nature's operations. We must, however, endeavour by the aid of glass structures to guard against any over harsh or too sudden changes, which occasionally occur, though these changes in certain respects serve certain purposes, and should be represented indoors in their milder form. If, for instance, *Vines* have been grown in an atmosphere constantly surcharged with humidity up to the flowering period, we should at such a stage encourage a somewhat dryer atmosphere to induce the flowers to set more freely, and with the intent of affording the plants every opportunity to mature the leaves, wood, and general growth made. Having by such means given the plants a change, and a little rest for about five days or a week, we should again resort to the former practice, when the return to a more liberal regimen will be accepted with a zest, and a marked advance will subsequently be made. Give every attention to late Grapes which are now in flower, such as Lady Downe's Seedling, and West's St. Peter's. Sometimes the latter does not set so freely as could be wished even at this time, hence a more than usual amount of care should be taken with them. Give to the earliest of successional *Pines*, which have moderately filled their pots with roots, manure water rather freely.

HARDY FRUIT GARDEN.

Continue the necessary thinning out of the crops of *Peaches* and *Nectarines* upon walls, and on tall, or otherwise nearly secure the young shoots in their places as they continue to grow. Black and green aphid, red-spider, and other pests inherent to them, must now be carefully looked after, so as to detect them at the earliest possible moment, when the usual wash, made with 4 oz. of Gishurst Compound added to a gallon of warm water, with the addition of more soap to make it work freely, and such ingredients as a little tobacco, kerosene, sulphur, &c., will increase its destructive power without injury to the tender young leaves and branches, should be applied. — Do not apply it during bright sunshine, or too near to the time when the sun may be expected to shine powerfully upon such as are operated upon. Tack in the young growing shoots upon *Vines*, and pinch back the points of such as show fruit at two joints beyond the axil from which the bunches emanate. If the weather continues dry, occasional sprays at the latter part of the day of such wall-fruit trees, not only as an aid to growth, but as a prevention against red-spider. *Plums* and *Cherries* should also be in a like manner be attended to now.

HARDY FLOWER GARDEN.

Should the fine dry weather experienced whilst I write continue, the ground will become somewhat dry, so that in the case of all newly planted bedding stuff much watering will be necessary. Take care to always give a thorough soaking when you are about it, or else none at all, as there cannot be a greater mistake than the practice too frequently followed of applying water by mere surface dribbles during hot parching weather. *Verbena*, &c., will now want pegging down, but before doing so always hoe the ground well around them. Tie up the leaves upon *Crocus* in all instances where they are not to be taken up, and so make up the space occupied by them by planting in their vicinity some other of the many summer bedding plants. Finish at the earliest moment the planting out of *Dahlia*, stake them neatly, and after watering them well, apply a good mulching with decayed manure. Water beds of *Ranunculus*, if they seem to shrink at all from the sun's rays, but do not moisten the leaves. Shade *Auriculas* somewhat from the mid-day sun when very bright. Look over all *Roses*, removing every kind of insect pest, and tack in or tie up all such as need it. Break the capsules (seed-vessels) of *Tulips* immediately the flowers decay, and makes notes regarding the arrangements of colours and height of the plants for use at the next planting season.

KITCHEN GARDEN.

Here a succession of *Peas* and *Broad Beans* should be sown as soon as the last batches are seen to be coming through the ground. Sow a little *Cabbage* or Colewort seed, to succeed those already planted out. Thin out all seedling plants, and move the ground well amongst the crops. Transplant spring-sown *Cauliflowers* permanently, and also *Savoy* plants, when they are sufficiently large to move. Well water and mulch *Tomatoes* to ensure a speedy and an early growth. Where successional beds of *Asparagus* are grown, it will be advisable to refrain from cutting any more from the early ones, and, by pinching out the tops to grow freely, induce an early state of matured growth, having in view the success of the following season's crop. At this time much good may also be done by giving the beds a good dressing with salt, which, when washed in by rains, afford the best possible aid to the whole plant. Look well after the *Borecole* or Colewort tribe, &c., which are being now, or have been, recently planted. Keep them thoroughly mulched at the roots, and give them fairly good water. Gradually induce the ridge *Cucumber* plants to the full action of the air, by tilting up the hand-lights upon four bricks, in such a manner as to permit the young growing shoots to issue forth from beneath them. Pinch back the points of early *Peas* and *Broad Beans* which have set a crop, to assist the pods to swell more freely. Mould up the earlier rows of *Brussels Sprouts*, *Cauliflowers*, *Savoy*, &c., making successful sowings of *Walton's Cauliflower*, *Brussels Sprouts*, *Broccoli*, and *Cattail*; *Edible*, for succession, or to produce a late supply in May, 1872. If the weather continues favourable for hoeing, make a point thus early in the season to thoroughly master the weeds, thereby to destroy by a future periodical application all possible ascendency in regard to them. *W. E.*

Notices to Correspondents.

ANEMONE: *H.* The occurrence of a petal-like leaf is not very unusual in the situation indicated. It is interesting as confirmatory of the doctrine of the essential identity of leaves and petals.

BOOKS: *H. H.* Selby's "British Forest Trees" (Van Voorst).

DEFORMED NETTLE: *A. G.* This arises from the presence of Acidule urticae. *Acidium sambucinum*, a North American species, deforms the Elder shoots more remarkably. *M. J. B.*

GNAT-BITES: *Subscriber*. A drop of Harshorn (Liq. ammoniac) on the inflamed spot will relieve the pain. Be careful how you use it.

HEATING CONSERVATORY: *Reader*. Trotman's stove, advertised in our columns, will be likely to suit you.

LABURNUM: *H. H.* Your tree is the well known *Cytisus Adami*, of which so much has been said at various times.

LILUM GIGANTEUM: *T. D. M.* Thank you. We shall be glad to see the photograph.

NAMES OF PLANTS: *Curio*. The double-flowered *Saxifraga granulata* is not uncommon in gardens. Is yours a wild specimen? If so, it would be interesting to know the conditions under which it was growing. The other plant is *Lathraea Squamaria*—*T. S. Ware* (Tottenham). *Dolichos ligustris*—*J. M.* The Allspice tree (*Calystegia floridula*—*C. C.* *Saxifraga granulata* (Geum urbanum).—*A. L. P.* *r.* Paris quadrifolia; *2.* Orchis mascula; *3.* Pedicularis sylvatica; *4.* Polygala vulgaris; *5.* Lysimachia nemorum.—*P. C.* *Phlox divaricata*.—*G. G.* *3.* Mercularis perennis. *M. T. C.* *2.* *Aira praenans*.—*A. B.* *Saxifraga granulata*. If in such abundance as not to be destroyed by hand picking, you must salt your walks.—*W. M.* *Verbascum phoeniceum*, pale variety.

ORCHIDS: *Lower of Orchids*. The plants may be watered with water heated to the temperature of 65°, the being warmed by sun-heat up to 70°, and being usually kept at 60° to 65°.

PEAT: *W. S. & S. No. 1* is poor, but gritty; *No. 2* a fibry, but very light. The two mixed together would probably make a suitable soil for Heaths and hard-wooded plants.

ROOTS AND BOUGHS: *D. G.* The organisation of roots

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88, Piccadilly, W.; or 39, South Lambeth Road, Vauxhall, S.W.

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L. & J. Fraser, Lea Bridge Road), undertakes HORTICULTURAL

EVALUATIONS of every description. SALES BY

AUCTION, &c.—Warrington, Lancashire.

To Market Gardeners and Manure Contractors.

WANTED, about 200 TONS of long, fresh **STABLE**

DUNG, suitable for Strawberries. Address, stating price

delivered at Bricklayer's Arms Station, to

A. B. Messrs. Reynolds & Co., 19, Crescent, Belvidere Road,

Lambeth, S.

NURSERY BUSINESS TO BE DISPOSED OF.

Greenhouses, Pits, Frames, &c., and Three Acres of ground

about 100 miles from London, in a fashionable neighbour-

hood. Good jobbing and contract connection attached.

Apply to **J. A. R. KIDDERMINSTER, 11, H. A. R.**

FOR SALE, an old established **NURSERY** and

SEED BUSINESS, within a few miles of London, containing

about 14 Acres of General Nursery Stock, numerous Glass Structures,

and a Dwelling-house. Apply to **W. C. C. GARDINER, 2, Bedford**

Street, London, W.

TO BE DISPOSED OF THE LEASE of a First-class

GREENHOUSE, LIGHT CULTIVATOR, and well stocked

with choice Fruit Trees, situate about 5 miles from Covent Garden

and well-furnished, outbuildings, &c. Apply to **W. C. C. GARDINER,**

2, Bedford Street, London, W.

TO BE SOLD, a small FREEHOLD **NURSERY** and

SEED BUSINESS, within a few miles of London, containing

about 14 Acres of General Nursery Stock, numerous Glass Structures,

and a Dwelling-house. Apply to **W. C. C. GARDINER, 2, Bedford**

Street, London, W.

TO BE LET with early possession, an excellent

DWELLING-HOUSE, with Greenhouses, Hot-houses, Forcing

pits, &c., the whole containing several hundred feet of Glass, and about

100 Acres of Land, &c. heart, cherry, &c. in situ within half a mile

of the city of Norwich. A very old established business has been

carried on from the premises, and the particular advantages of the

business are too numerous to mention. Apply to **Messrs. BLAKE, KEITH,**

and BLAKE, The Chantry, Norwich.

NURSERY TO BE DISPOSED OF.—The Stock of

an old-established Nursery, about 18 Acres, near one of the

largest towns in the county, is for sale, with the buildings, and

dwelling-house, and about 4000 feet of Glass, with good connection.

An excellent opportunity for an energetic business man. None

of the kind has ever been offered so broad a field of

ill health. Stock at valuation, with a good percentage off.

Apply by letter to **W. C. C. GARDINER, 2, Bedford Street, W.C.**

TO BE LET ON LEASE, a superior Farm, comprising

100 Acres of which 18 are in good Pasture, with commodious

Family Residence and Homestead in the centre; approached by good

roads, 10 miles from St. Neots, 12 from Bedford. The fields are

large and open, and the land has been well drained. The Farm is to be

let under very advantageous circumstances, the unexpected death

of the tenant having opened up the farm to new occupation under a

22 years' Lease.

Apply to be made by letter, only, addressed to the Proprietor,

P. SQUIRE, Esq., 12, York Gate, London, N.W. To prevent unne-

cessary trouble, satisfactory references will be required, and none

newly arrived who cannot prove the possession of sufficient capital to well

Stock and Cultivate the Farm—say £4000

To Nurserymen, Seedsmen, Implement Dealers,

TO BE DISPOSED OF, by Private Treaty, the

OLD-ESTABLISHED and very EXTENSIVE BUSINESS, so

long and successfully carried on by the late Mr. CHURTON, but recently

transferred to the Firm of Messrs. HILL, MESSING and WEAVER, and known

as the **NORTH-WEST of ENGLAND SEED WAREHOUSE.**

Establishments, which are situated in the very best

part of the City of Chester (exactly opposite to the Grosvenor Hotel),

are admirably adapted for carrying on a large and extensive business,

and are close upon the great Markets, present the most

favourable position amongst Agriculturists which could be desired.

For full particulars, and to be granted to any incoming

to take the present Stock-in-Trade, Fixtures, &c., at a valuation.

Apply to and for further information, apply to Messrs. CHURTON

AND ELLIPCH, Auction Mart, Chester, or to Mr. HILL, Messing and Weaver,

by a Ram of Mr. Ellman's; and the whole will be found in a good

healthy condition, and of a very choice character.

Catalogues, with particulars, apply to **JOHN THORNTON,**

15, Langham Place, London, W.; or of Mr. VERNON, Buckhurst

Farm, Sunninghill, Berks.

IMPORTANT SALE OF PUREBRED ALDERNEY CATTLE,

SOUTHDOWN SHEEP, and BLACKBURN PIGS.

MR. JOHN THORNTON will SELL BY AUCTION,

without reserve, on **FRIDAY, June 23, at 10 o'clock,** at

Buckhurst Farm, Sunninghill, the property of Joseph Savory, Esq., the

late Mr. HERBERT, comprising **1000 PUREBRED ALDERNEY CATTLE,** and

the **FLOCK of pure SOUTHDOWN SHEEP** comprising about 200

head of young Ewes, Shagbush, and Wethers, and a large

solid number of **White and Black SUFFOLK PIGS.** This stock

has been very carefully selected and reared, the Cattle are mostly all

from the noted Herd of Miss Dore, Herby-on-Thames, and the

Cows are of the best of the breed, and the Pigs are of the best

of Mr. C. Hill, of Hornchurch; the Cows being excellent dairy cattle, and

the Stock are all of the best of the breed.

For full particulars, and to be granted to any incoming

to take the present Stock-in-Trade, Fixtures, &c., at a valuation.

Apply to and for further information, apply to Messrs. CHURTON

AND ELLIPCH, Auction Mart, Chester, or to Mr. HILL, Messing and Weaver,

by a Ram of Mr. Ellman's; and the whole will be found in a good

healthy condition, and of a very choice character.

Catalogues, with particulars, apply to **JOHN THORNTON,**

15, Langham Place, London, W.; or of Mr. VERNON, Buckhurst

Farm, Sunninghill, Berks.

High Leigh, Hoddesdon.

IMPORTANT SALE of this well-known COLLECTION of

STOVE and GREENHOUSE PLANTS, with the choice

specimens of **REDOUTTAE, and other rare and valuable**

plants, will be sold by **MR. A. MCKENZIE** being favoured with

instructions from **D. J. Kay, Esq.,** to announce that he

will sell by **AUCTION,** on the Premises, at **High Leigh, on**

THURSDAY, June 23, and following days, at 11 o'clock, the

choice daily, on account of the number of Lots, a very choice

PUREBRED ALDERNEY CATTLE, and a large number of

Ferns, two large Euphorbia, large plant of Medinilla (6 feet across),

and many other rare and valuable plants; fine specimens of rare and

valuable plants, and a large number of choice plants, and a

specimen **ACACIA OF VARIOUS KINDS, Amygdalus, specimen (Cyanophylus**

of fine high), and a number of Plants of very fine growth. Also 5000

BEDDING-OUT PLANTS, comprising the newest and best varieties

of **VERBENA, VERONICA, and other rare and valuable**

plants, and a large number of choice plants, and a

specimen **ACACIA OF VARIOUS KINDS, Amygdalus, specimen (Cyanophylus**

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plants, and a large number of choice plants, and a

specimen **ACACIA OF VARIOUS KINDS, Amygdalus, specimen (Cyanophylus**

of fine high), and a number of Plants of

cheese, which is made in the Leicester shape. The system appears to be extending. During the winter, Mr. SCHERMERHORN, who was the first to come over from the United States to start the factories in Derbyshire, went to Holland, where, under his advice, three factories have been fitted up, and are now at work. The largest of these is at Broek, in Waterland, North Holland, about half way between Amsterdam and Edam, which latter place is noted for its cheese. This factory was started by a London merchant, who pays 6 cents per litre for the milk, or about 54d. per gallon, and the whole produce, including whey, is then at his disposal. The factory receives the milk of about 800 cows. The two others are in South Holland, near Rotterdam, and are both undertaken by private adventure. They take the milk of 300 and 500 cows respectively, for which 5 cents per litre is paid, or 42d. per gallon; but the sellers of the milk receive back the whey. The extension of the system is also going on in England. In addition to what is doing at Tattenhall, in Cheshire, Colonel DYOTT, M.P. for Lichfield, has fitted up a corn mill at Freeford, near that city, as a factory, and it is being worked by the farmers, who pay rent for it, under a system of co-operation—Mr. JOHN COXON, the well-known breeder of Shropshire sheep, being the secretary. This factory receives the milk of 300 cows, and is now at work. Mr. SIMON, a maker of Cheddar cheese, near Market Drayton, in Shropshire, has been over to Derby to see the factory, with a view to starting one there, and another is about to be begun near Crewe, in Cheshire. These are important facts, and indicate the approach of a complete revolution in this branch of rural industry.

— Mr. MECHIE thus adds his prophecy to the many which are appearing regarding THE COMING HARVEST—

"A long and severe winter, a deep snow in March, and three weeks of white frosts in May, following heavy rains late in April, have retarded vegetation by keeping the soil at a low temperature, and have caused the crops, especially on heavy undrained lands, to look pale and unthrifty.

"Many light lands and fen lands have lost the whole or a portion of their Wheat plants by the extreme winter frost. Now that we have an agreeable change, with bright sunshine, Nature is making her grand effort, and the Wheat crops on drained, deeply-cultivated, and well-farmed lands are resuming their healthy colour, growing vigorously and rapidly, and promising an abundant yield. But, as regards heavy, undrained, shallow-ploughed, and poorly-farmed lands, the contrast is strikingly unfavorable, the plants not having tillered well, and the crops looking pale, the flag thin, narrow, and vertical. Last year, owing to the great heat and dryness, the unimproved clays produced very good Wheat crops; but the case is entirely altered now. Last year was a fatality for one for light lands and pastures, but this season the light lands have the advantage, and promise generally good crops, both Wheat and spring crops, where there is a full plant. There is a promise of plenty of Beans and Peas, and the winter Tares and Rye are first-rate. Permanent pastures (25,000 acres, or half the cropped land of the United Kingdom) promise an average crop, although somewhat deficient in the finer grasses, which, being shallow-rooted, are supposed to have perished in last year's drought. Clovers of last year's sowing are patchy and indifferent, the young plant having perished in last summer's drought. Mangel, where the land has been properly prepared before winter, plants well. Not many Potatoes are grown in this neighbourhood.

"All the crops on this farm, both on the light and heavy lands, promise abundantly, the only exception being a field of red Clover.

"Altogether, I have an impression that the quantity of human and animal food (including meat, butter, cheese, and milk) will, together, be greater this year than last, but that the Wheat crop on the heavy undrained clays will be much less than that of last year.

"There was an impression that harvest would be later than usual, but the crops on well farmed land are now making rapid growth."

NOTEWORTHY AGRICULTURISTS.

MR. CLARE SEWELL READ, M.P.

MR. CLARE SEWELL READ, the son of a West Norfolk farmer—himself for many years tenant of farms in his native county—born in 1826, educated at common commercial schools, near home—five years, after leaving school, learning farming on his father's farms—manager of land in Pembrokeshire before he came of age—agent between 1850 and 1854 to the Earl of Macclesfield in Oxfordshire—since then the tenant

service he was fatted off and slaughtered a short time ago. He was in every respect a superb animal, and for beauty, proportion, and quality of flesh he stood for many years unrivalled in every national or local show at which he competed for honours, having 'never been beaten.' His gigantic proportions and noble character and appearance were the admiration of the public, and especially of all Shorthorn cattle breeders. He was probably the sire of more bulls than any predecessor of the breed, and his progeny was sought for on all sides and by the most eminent breeders. If ever a special bovine benefactor to the country deserved an especial notice, that benefactor was ROYAL BUTTERFLY, for no animal has ever been the means of increasing the supply of prime beef to the like extent, and his strain of stock or 'blood' is more popular than ever. He was the property of Colonel Towneley, of Towneley Park, Burnley. The Colonel has repeatedly refused 1200 gs. for this bull, and has made fabulous prices of his stock, both male and female. The best proof of

their popularity was the result of his land steward's (Mr. Eastwood's) sale, about two months since, and from the same herd. It consisted of 12 cows and heifers, which realised the highest average as a herd on record—i.e., £181 8s. 6d. each.

The writer of the above letter to the *Times* also informs us that ROYAL BUTTERFLY was a son of MASTER BUTTERFLY, sold for 1200 gs. and sent to Australia.

This is, however, not true. ROYAL BUTTERFLY (16,862) was by FREDERICK (11,489), and from Butterfly by JEWELLER (10,354), g.-d. *Buttercup* by GARRICK (3863), 2d g.-d. *Barnpton Rose* by EXPECTATION (1088), &c. MASTER BUTTERFLY was also by FREDERICK (11,489), and out of Butterfly by JEWELLER, and therefore own brother to the Australian bull. Both were no doubt remarkable animals, and their pedigree is proportionately interesting. FREDERICK (11,489), the sire of both these bulls, was a grandson of *Barnpton Rose* by EXPECTATION, and therefore cousin to their dam. JEWELLER, their grandsire, was bred by Mr. J. Booth, Killyerby, and was by HAMLET (1216) by LEONARD (4210), and from *Braclet* by PRISM (2452). JEWELLER's dam, *Gravel*, was likewise by LEONARD (4210) and out of *Necklace*, own sister to *Braclet*.

— Mr. W. W.

Slye has, we understand, declined an offer of 1500 gs. for *Grand Duchess 20th*, and an excellent red and white bull, GRAND DUKE of THORNDALE, now six weeks old. Mr. Slye has also refused 1500 gs. for the dam apart from the calf. *Grand Duchess 20th* is by 4TH DUKE of THORNDALE, and from the beautiful cow, *Grand Duchess 8th* by PRINCE IMPERIAL, which connects this strain with the Broughton family of Booth Shorthorns. The singular manner in which this Broughton or Bliss blood has appeared in animal after animal in demand recently, has been most remarkable. Both Booth and Bates appear to have derived equal advantages from it; for, while we find *Lady Fragrant* and *Lady Grateful* on the one side, we have *Grand Duchesses 20th* and *21st* on the other, each pair of cows commanding bids of 3500 gs.

HORSES.

In a lecture recently delivered by Professor M'Bride before the Kingscote Association, and subsequently published in a separate form, several diseases incident to our live stock were passed in review. The Professor's remarks on horse feeding will be to most of



CLARE SEWELL READ, M.P.

of the Plumstead farms in Norfolk, and latterly of Honingham Thorpe, near Norwich—the writer of the Prize County Reports of South Wales in 1848, of Oxon and Bucks in 1854-5, and of Norfolk in 1858—a careful, trusted, and trustworthy judge of implements at many of the Royal Agricultural Society's shows—one of the Cattle Plague Commissioners in 1865—past president of the London Farmers' Club and of the Central Chamber of Agriculture, this year chairman of the Norfolk Agricultural Society—and since 1865 elected free of charge by his native county as its representative in Parliament, where he is an acknowledged power on all matters of agricultural interest. It is a career of which English farmers may be proud—one in which a man of great ability has served them and his generation laboriously, disinterestedly, and well.

OUR LIVE STOCK.

A LINCOLNSHIRE Shorthorn breeder, in a letter to the *Times*, thus bears testimony to the merits of that "Prince of Shorthorn cattle, ROYAL BUTTERFLY;—" "He had attained to full age, and being no longer of

oilcake mills; and Messrs. Garrett, of Saxmundham,

have a large display of barn machines and corn and manure drills. Messrs. Hornsby show reapers and mowers, ploughs, and barn machinery. We may refer to their drill-plough as containing a great many ingenious points, which the wood-cut (fig. 150) will illustrate. The anti-frictional principle is carried out, slides and other rubbing surfaces being entirely dispensed with, and wheels used instead; so-called radial breasts and shares maintain the surface true at joints. The wheels are constructed with movable flange-bosses and axles of the axle and side of the furrow, which renders them self-cleaning. A central lifting apparatus, shown in the cut, is brought into action when the lifting lever is pulled back, and admits of the plough being carried and turned within its own length, without the labour or assistance of the ploughman. This is effected by simply depressing an arm jointed behind the body of the front plough, acting in conjunction with the land wheel. A parallel straightening bridge ensures the straightness and uniformity of the furrows. It appears to be a perfect package of ingenious contrivances.

Mr. Baker, of Compton, Newbury, Berks, whom we remember with a single water-cart at meetings long ago, has prospered into quite a large stand of cultivators, water-carts, cattle troughs and ploughs. Messrs. Woods & Cockedge, of Stowmarket, show mills, root-pulpers, thatching machines, &c. At the next stand, Messrs. Wallis & Stevens, of Basingstoke, exhibit ploughs and harrows, horse-hoes and rakes and drills. Mr. Southall, of Rugeley, shows a very ingenious riding plough, remarkable for the simplicity with which the mouldboards are widened or narrowed.

Mr. Mellard, of Rugeley, exhibits an American revolving mouldboard-plough with a conical revolving cheek, of which some idea may be formed from figure 149. The "revolving mouldboard" is simply a wheel or disc (in lieu of the ordinary fixed breast), with concave and convex surfaces, the concave being presented to the furrow at a proper angle from the face on the land side. By a simple contrivance the mouldboard is adjusted to any required pitch, enabling the ploughman to adapt it at will to the varied requirements of the soil to be worked. It has won distinction at several English ploughing matches. Its pulverising power is rather due to its abrupt American shape than to its revolving mouldboard. There is here also another American notion, which proposes to take us back a generation or two in agricultural history—a hand threshing machine with revolving flails!

Messrs. Tasker, of Andover, have a good stand, and there is here one of the most useful novelties of the yard,—a two-wheeled straw elevator. It folds into compact form for travelling. The horse is taken out, and the ends of the shafts with the wheels are then the basement of the machine. The two ends are straightened out, and there is then a long steep slope, up which endless forks travel, carrying the straw or sheaf upwards. It is cheap, handy, and efficient. Mr. Wood shows a new American self-delivering reaper, which has a number of ingenious contrivances. Messrs. Ransomes, of Ipswich, have of course an admirable stand of machinery for barn, and field, and fold; threshing-machines, ploughs, both double and single, haymaker, and horse-rakes, chaff-cutters, &c. Messrs. Howard show steam cultivating machinery, ploughs, single and double, harrows, horse-rakes, moving-machines, &c. Both these firms compete also in the trial grounds. Mr. Page, of Bedford; Mr. Nicholson, of Newark; and Mr. Gower, of Winchfield, have good stands, with the several specialities of linseed-crushers, haymakers, or corn drills.

Mr. Affleck, of Swindon, has several ingenious contrivances, of which we give cuts—one a tire bending machine (fig. 147), which at once enables a country smith to bend cold iron up to 6 inches wide by 7-8th inch thick, to any diameter. They are constructed that a tire, after being welded, may be put between the rolls and made perfectly round, which is a great saving of time when bonding wheels. He also exhibits a very useful loose tire (fig. 148) in which to pack the wheels of moving machines for travelling on roads, or from field to field. Driving wheels that have ribs or projections necessary for their efficient working require this protection from wear or injury when travelling, also the machine itself is better for this protection from the continual shakes and sudden jerks caused by those ribs or projections when on rough or hard roads. The consequence of the projections becoming worn, and not driving the sickle is, that the machine is either thrown away as useless, or the expense of new travelling or driving wheels incurred. By using the patent loose tires when travelling the machine is kept more efficient, and the expenses reduced to a minimum.

Mr. Braggins, of Banbury, shows a very simple field gate lock, also gates in various forms. Messrs. Carson & Toone, of Warminster, have a good stand of chaff-cutters, horse-hoes, &c. Messrs. Reeves, of Westbury, have a good stand of drills. Messrs. Richmond & Chandler, of Salford, show chaff-cutter steaming apparatus. Mr. Bobby, of Bury, shows hay-makers. Messrs. Burgess & Key have a capital stand of reapers and mowers. Messrs. Clayton & Shuttleworth have a stand of steam-engines and barn machinery at work.

The last shed to be noticed is the first which meets the eye of the visitor. Messrs. Carter & Co. and

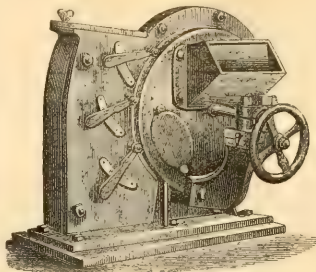


FIG. 146.—MR. PEACOCK'S DISINFECTOR.

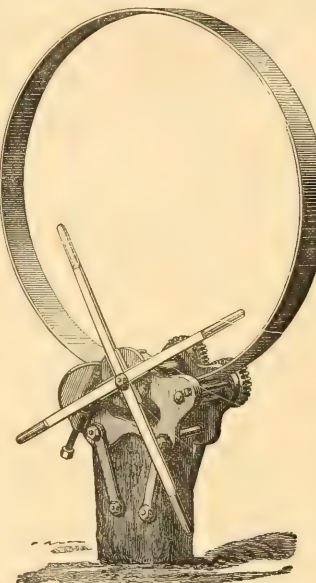
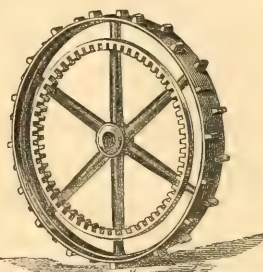


FIG. 147.—AFFLECK'S TIRE BENDING MACHINE.



Loose Tire.

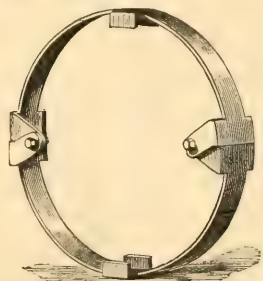


FIG. 149.—AFFLECK'S PATENT LOOSE TIRE.

Messrs. Sutton & Sons here do their best to illustrate the seed trade. The loss of their stands would be a great blank in the showyard. The capital illustration of grasses growing, and of roots of last year's growth, and still fresh and wonderful for size and form,—also of the power of Italian Rye-grass to turn sewage to useful agricultural account,—also of well grown seeds of all kinds in bags—which one sees here displayed in the largest scale and with great taste—is quite a leading feature in the yard.

The show of implements at work in the field took place during Monday and Tuesday, under the management of the indefatigable secretary, who did all he could to enable the manufacturers to show to the utmost advantage the working of their various machines so as to give ocular demonstration of the economy they claimed to effect—the agricultural public being here left to judge for themselves whose article works the nearest to their conception of perfection.

The programme consisted of trials of the new double furrow ploughs by Hornsby, Howard, Mellard, Perkins, and Ransome & Co. Messrs. Hornsby's man did a piece of very good work, but for want of steerage power the work for the man is severe. Their novel and effectual means of raising the plough out of work at the ends and turning it into work again is referred to elsewhere.

Messrs. Howard's man, George Brown, did good work throughout, considering the awkward state of the land, the complete and simple means of steering both the land and furrow wheel giving him easy command over the direction of the implement. The steel breasts were taken off, and a pair of digging breasts used; these smash up the soil, and turn it over in a much better state of cultivation than the fine, smooth, artistic square furrows patronised by our ploughing-match judges.

Messrs. Millard's American pulverising ploughs did some capital smashing-up work, but the advantages obtained were more than swallowed up by the enormous power absorbed.

Mr. Perkins, of Hitchin, showed his improved Pirie's patent plough, with which his man did some good plain work, with, however, an unsteadiness when at work which is irritating to the horses.

Messrs. Ransome & Co. worked a capital pair of Suffolk horses, the power being only excelled by the willingness with which they threw their strength into the collar, and they did very good work.

In the steam cultivation field there were represented Messrs. Aveling & Porter's double traction engines with Fowler's tackle, Fowler's engines and tackle, and Messrs. Howard with their stationary engine and roundabout system. They all showed good work, and gratified a large body of spectators. What the relative economy of the several methods was must be determined, not by short displays of this kind, but by prolonged experience on a farm.

The competition in reaping machines was close and severe; and the manner in which the self-delivering machines did their work might well inspire all who require their aid with confidence that any of the best firms can give them a machine that will satisfy their wants with both economy and that dispatch so highly necessary to crown the farmer's well-directed efforts with merited success, especially viewing as we did, these machines cutting and delivering a thick heavy crop of green Rye, between six and eight feet high, in evenly compact parcels, ready to be tied into sheaves, at the rate of an acre an hour, with two horses under moderate exertion. This heavy and tall crop of Rye was cut by the reaping-machines of Messrs. Burgess & Key, Mr. Wood, the Beverley Company, Messrs. Ficksley & Sims, Messrs. Howard, Mr. Samuelson, Messrs. Hornsby, Mr. Bamlett, Messrs. Brigham & Co. Mr. Wood and Messrs. Ficksley both show machines with revolving self-delivery arms, which are jointed and lifted individually in their course out of the way of the driver, dropping on to the platform as far as the driver, regulating them by a pedal, chooses.

Grass-mowers were shown in operation by all the firms showing reapers, and did fair work on a meadow land near the river. Hay-tedders and horse-rakes followed them, showing how efficiently hand labour can be dispensed with.

THE METROPOLITAN CATTLE MARKETS.

The British capital has four cattle markets,—two in town, viz., the home market in Copenhagen Fields, and the foreign market at the river side, and two in the suburbs—viz., Southall, on the Great Western line, and Romford, on the Chelmsford line. The foreign market is not yet erected, but a temporary one has been provided, capable of affording all the accommodation to the foreign trade which the new one is proposed to do. Some even affirm that it is better than the new one will be. The home market belongs to the Corporation of London, and so will the new foreign market when erected. The Corporation have also the new meat market, with lairs and slaughter-houses at the home market. If a fat bullock comes up from the country to the home market, and is there sold for the dead meat market, as a great many fat beasts weekly are, five separate charges go into the pocket of the

Corporation:—1st, lairage on arrival; 2d, stand, &c., in the market; 3d, return to lairage prior to slaughtering; 4th, the slaughter-house; and 5th, the dead meat market. Southall and Romford markets do not belong to the London Corporation, and the fat ox consigned to them has only to pay two items, one for carriage and the other for the market, both charges being lower. The sales in these two markets are greatly on the increase; those in the home market are the reverse.

Since the cattle plague cordon was drawn around the capital by the Privy Council, the Corporation of London have been gainers on stock sold in the home market, and farmers losers; butchers grumble that they have the second lairage and slaughter-house charges to pay; and no doubt at first they were losers, but farmers say that in this, as in all similar cases of commerce, buyers take care of themselves—at all events, they are getting less for their fat stock. It is now a well-authenticated fact that the dead meat market rules the live stock market, for if butchers get their meat cheaper in the former than in the latter they will not pay the extra lairage and slaughter-house charges to the Corporation.

Without wading further into the details of the trade present, enough has been said to show that a larger percentage of the live stock than prior to the cordon is now being slaughtered for

the dead meat market—the whole thus slaughtered for the dead meat market paying three extra charges to the Corporation; the stock slaughtered by butchers paying two extra charges to the Corporation of London.

And this is not all. Farmers complain that the reduction in the price of their fat stock exceeds the extra charges of the London Corporation; that stock coming up from the North by the Great Northern and Great Western are charged "10s. extra per head" (we quote the Blue Book evidence of cattle salesmen) when forwarded to Southall or Romford markets,—and yet, after this extra charge of the railways, Romford and Southall markets pay a larger price than the home market. Hence the increase of sales in the former, and decrease in the latter. Butchers, on the other hand, complain that the close system of the Privy Council cordon puts them to much extra trouble and expense, buy as they best can, and that they are consequently obliged to charge

markets in the kingdom; (3) how far the cordon or close market system, as at present conducted, is capable of controlling disease with the least public loss.

The first of the above three propositions, viz., the permanent exclusion of foreign cattle from all home markets, has already been answered as regards the metropolis; and what is requisite for the capital applies to all other live stock markets in the kingdom. If free trade requires the importation of foreign milk cows, breeding stock, and store cattle to keep down the home price, they should only be imported from places free from disease, by clean ships not carrying fat stock or offal, and be landed at ports of debarkation set apart for the purpose, and, as a further security, inspection under quarantine before they are allowed to go to market and the country.

The answer to the second question is also self-evident, so far as regards the two suburban markets of

them. On the contrary, it has driven them to Southall and Romford and other places for their supplies. Many of their customers, who go from and return to London daily by railway, belong to the well-to-do class, and must be served accordingly with the prime quality of meat daily. Whether a system can be devised to enable them to get their joints daily from the dead meat market of the capital by railway, at a reasonable cost, is a question which has not yet been rendered practicable, were there nothing else in the way than railway charges. For the prime Scotch cattle, "the southern trade," as it is sometimes called, *par excellence*, is the best, and in extent it comprises a very large proportion of the whole. This important branch of the Metropolitan trade in home cattle has been completely paralysed by the cordon around the market. It will, no doubt, be said that to extend the Privy Council cordon to Southall and

Romford would make the position of the Hereford and Essex butchers, who attend Romford, and those of the southern butchers who attend Southall, some degrees worse. Granted; but it does not follow that the trade would be worse than at present, for if these two rival markets, and other rival markets which might rise up in their place, were closed by the Privy Council cordon, "necessity, the mother of invention," would doubtless find means for getting through trains of

dead meat from the North to the large towns of the South, from which the smaller towns and villages could get their daily supplies without having to thank the Corporation of London for their costly market accommodation. The Central Chamber of Agriculture and several of the local Chambers have very timely taken up the question of cheaper railway conveyance of dead meat, so that present trade grievances may be redressed sooner and more effectually than some may imagine. In the meantime things are in a very unsatisfactory state, transactions being made with the uncertainty of what to-morrow may bring forth.

With regard to the spread of disease from rival markets, the cordon around the capital and the heavy railway charges are giving rise to the old system of jobbing and droving, which is very liable to spread foot-and-mouth disease, and also scab in sheep. A clean animal may be infected with foot-and-mouth disease days after a foul animal has walked along the same

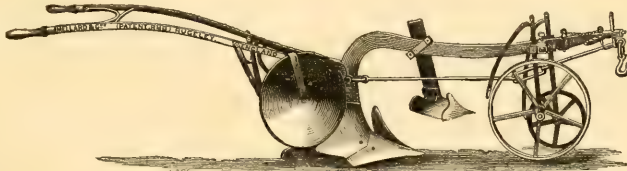


FIG. 149—AMERICAN REVOLVING MOULDBOARD PLOUGH.

the metropolis, viz., Southall and Romford. To fat stock markets in some towns in England, Scotland, and Ireland, supplied from their own localities, which may be clean at the time, exceptions may be taken; such exceptions, however, are worth little, for without the necessary security that diseased animals from diseased districts shall not be smuggled into such towns, they fall to the ground. Practically speaking, such security cannot be given. It follows that the cordon or close system should be general, in order to carry out the principle of "stamping-out disease" by the polexae.

This brings us to our third proposition—the principal one for investigation. The Privy Council will allow cattle to travel from the railway stations to the metropolitan home market, but they will not allow them to leave. The stamping-out process, with its exorbitant charges, then comes into effect; but the cordon does not include Southall and Romford, and so the stamp-

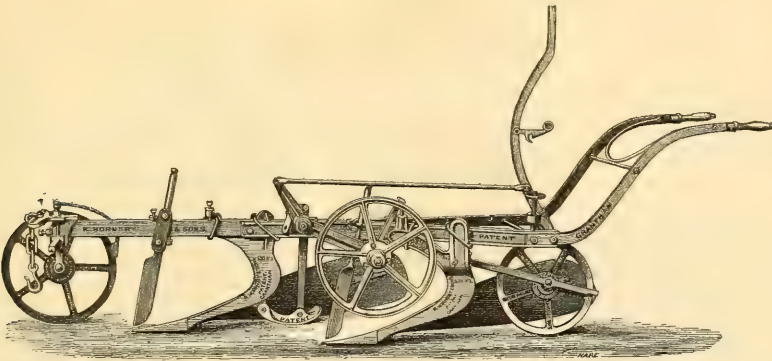


FIG. 150—HORNSBY'S DOUBLE-FURROW PLOUGH.

their customers an extra price. There never was, even in the memory of the oldest person living, such a wide difference between the producer's price of butcher's meat and the consumer's price as there now is in the capital and southern towns depending upon the metropolitan markets for their supply.

The sale of foreign cattle in the home market, and the treatment of home cattle as foreign cattle, is unquestionably at variance with existing statutes. So far the Privy Council are to blame. On this there cannot be two opinions, now that a temporary foreign market exists capable of disposing of foreign cattle in terms of statute. From the above and other complaints now being made, it is, therefore, the duty of the Privy Council to examine their untenable position relative to foreign cattle, and (1) at once exclude permanently foreign cattle from all home markets; (2) if disease at home renders a cordon around the metropolitan home market advisable, to take it into consideration whether that cordon ought not to extend to the Southall and Romford markets and to all fat stock

ing-out process of the Privy Council is confined to the central home market. This, perhaps, is a questionable one in cases of sheep scab and foot-and-mouth disease than in cases of lung disease and rinderpest, from the greater prevalence of the former in this country, and the manner both diseases are spread. But without making comparisons of this kind between diseases, from the well-known fact that Southall and Romford are rival markets, they ought to have been included within the cordon of the home market.

The soundness of this conclusion will appear more obvious if we examine the extent of the home market trade, and the greater liability of the two rival markets, Southall and Romford, to spread disease than the Corporation market in Copenhagen Fields, badly constructed as the latter is for preventing the spread of disease.

The principal butchers of Kent, Surrey, and Sussex, attend the Corporation market for their chief supplies. The stamping-out process, or compulsory slaughtering in the Corporation slaughter-houses, does not suit

road and drunk at the same watering troughs by the way. We once had a hundred head of cattle infected with foot-and-mouth disease this way some 50 miles before they reached home. If a farmer or drover is suspicious that his herd has got the disease by walking along a foul road or drinking at a foul watering trough, it is likely he will forward his stock to the Metropolitan Market, where detection, &c., would be inevitable, when he can send to and sell in Southall or Romford with comparatively little risk?

There are much more unseemly cases than this, where unprincipled jobbers buy cattle, knowing them to be diseased, and, driving them to the nearest market, sell them to butchers not over scrupulous, if they can purchase at a sufficiently low price. There may be worse cases than even this latter, for butchers and jobbers may join in the nefarious trade of diseased animals and meat. Now it is notorious that the rival markets in question are giving encouragement to illegal traffic of this kind; and from the manner droves cross and recross the country to and from

have such a knowledge of all the materials employed in the compounding of chemical manures as will enable him to dictate what should be used without the interested interference of the manure maker. He shall have some insight into the science and laws of chemistry as to make the reading and future study of scientific agriculture not only perfectly easy, but a delightful and intellectual enjoyment.

To carry out this important object three conditions are necessary—a good qualified teacher, a laboratory, and pupils. The first could be had for a very moderate salary; the laboratory, with the necessary instruments and materials, would involve no serious outlay; the third condition, the pupils, gives rise to the question, "How could farmers afford to send their sons to a school of chemistry as to make the reading and future study of scientific agriculture not only perfectly easy, but a delightful and intellectual enjoyment?" The want of such knowledge amongst the present generation must be so strongly felt that I believe they would be too glad to have the opportunity, especially if they knew that probably a moderate fee would more than pay the costs.

The site of the laboratory might be anywhere—a small country village would in many respects afford advantages superior to most of the towns. The erecting or hiring a building suitable for a laboratory, together with the instruments and materials, should be raised by subscription. The pupils' fees would, I have no doubt, pay all other charges, so that when once established it would ever after be self-supporting.

I am aware that certain schools exist where agricultural science is professedly taught, but I consider such combination of subjects at most of the time the two kinds of teaching cannot be well carried on together, and, what is most important, the mind must arrive at a certain maturity before it can grasp with sufficient reasoning power the beautiful and wonderful phenomena arising out of laboratory practice.

If the foregoing observations should be thought worthy of the serious consideration of persons interested in agriculture, I shall indeed be glad to receive any communications or suggestions in promotion of the object of this letter, and I am confident will support this object by the subscription of a sum equal to only a tenth of one year's savings effected through the agency of our association, I will devote myself most earnestly to establish a school laboratory in this village that I trust may serve as a model and example to be followed by many other localities in Great Britain.

I shall certainly not ask a single member of our Association to do that which I am not prepared to do for myself. The cost of soluble phosphate manure, of course, I buy no mixtures or nostrums; it is about 20 tons a year; and previous to the formation of our Association I paid to the most respectable makers £6 10s. per ton for manure containing 25 per cent. of water. The percentage of soluble phosphate was entirely a matter of speculation; according to an elaborate report of Anderson and Way, from an analysis of 171 samples, the average percentage of soluble phosphate was 25 per cent. The value of this manure was valued by these chemists at £7 5s. per ton. Therefore, if a 15 per cent. manure was worth £7 5s., a 26 per cent. manure would be worth £12 10s.; but our Association price for the 26 per cent. manure is now £3 18s. per ton in bulk, delivered free at any station in Lincolnshire, with a further advantage of a watchful system of analysis for any cost, to ensure quality and dry condition.

Myvington manure would be worth £3 12s. per ton, or a total of £172 on a consumption of 20 tons yearly. I state facts just as they are recorded by the most eminent chemists, and every farmer will believe me when I say that a very large proportion of the manure sold at that time had little or no value whatever, consisting as it did of dried mud and road scrapings, flavoured with a little gas water just to flatter the olfactory nerves of the wise and cautious farmer of that period. A ton of £172 would be worth £17 4s. for my contribution, but my requirements are much more modest. I think, therefore, I had better leave every member of our Association to form his own estimate of what he should contribute; suffice it to say that in the first instance the only contribution I ask for is a free and unprejudiced opinion as to the necessity and desirability of what I have in view—viz., the formation of a laboratory, in which agricultural chemistry shall be taught, in a small way, in a short time and in a practical way, to pupils who have received an ordinary education.

I have only alluded thus far to the material advantage to be derived from a brief course of scientific instruction. Allow me, in conclusion, to quote the language of one of the best and most highly gifted of our chemical philosophers as to its moral influence. The late Dr. Faraday says, "I think that the study of natural science is the glorious school that with the laws impressed on all created things by the Creator, and the wonderful unity and stability of matter, there cannot be a better school for the mind." Vain and foolish ideas, the fruit of ignorance, cannot be uprooted and destroyed by violence, the natural and more gentle method must be adopted, what in chemistry is called the law of substitution; the mind must be fertilized by knowledge, then truth and useful ideas will take the place of error and ignorant conceits. It is the absence of the exercise of the higher and intellectual faculties that leads so often to vacuity of the human mind, and the consequent indulgence in grosser and more material

excitements, injurious alike to body and mind. A better form of education would eradicate the greatest of all human enemies—ignorance and intemperance. *W. Little, The Hall, Heckington, Lincolnshire.*

Home Correspondence.

Clay Land Management.—It is a great pleasure to me to see such men as Mr. Gray, at p. 691, write upon "clay land management," for it is clear to me upon the face of his paper that he is a thinking as well as practical man, yet I hope he will pardon me for remarking upon a few of his words, by which I hope to enrich his thoughts and practice. Here is what he says:—

"My experience is this, that clay land after being winter-fallowed will always turn up if ploughed in spring. In a worse state, if left alone, as far as I understand the matter it is the summer fallow that does the chief good to clay soils. Though frost does good by crumbling the surface, it is only the drought of summer that mends the subsoil; and I find a single deep ploughing at midsummer will do more for my land than all my winter water and spring. I have, therefore, given up winter and spring work, with the exception of our deep autumn ploughing for one-sixth of the clay land, which goes in to roots, and another one-sixth ploughed after roots; and the rest I get in great part broken up by steam in winter and spring. In winter frost does for that third part of the farm all I want."

After this, Mr. Gray gives a six-course shift of cropping, and for that course of cropping his mode of working may be the best, but I will bring my practice to bear upon it. But before doing so, let me state that I agree with him "that clay land after being winter fallowed will always turn up if ploughed in spring in a worse state than if left alone," thereby showing that Mr. Gray condemns the old plough on clay land as much as I do. But I must get into my own practice to show that I have no objection to summer fallowing, especially necessary, is without foundation. My four old fields of heavy clay land under horse culture always had a dead fallow every fourth year, and their average produce, including the fallow, did not exceed 20 bush. an acre a year. The fallow always got sheep folded from some grass land, and this land received quite as much in the shape of cart dung as it does now, which always went on for Beans. A year ago I showed that this system of summer fallowing was thrown into one kind of cropping—Wheat, which gives a produce of 37 bush. per acre. This year these 39 acres have a crop of Beans upon them, and the Beans promise well. My average produce on this land in 1869 was 33 bush. of Beans per acre, and from appearances the now growing crop will give quite as much or even more; but whether it turns out so or not it matters but little, for we have evidence enough here to show that the old system of summer fallowing can be beaten. Put then the Beans of 1869 and the Wheat of 1870 together, we get an average of 35 bush. per acre—15 bush. per acre over a summer fallow system and horse work, and this is done upon land that has not had a fallow of any kind for 16 years. Next year, its seventeenth year under steam culture, it will be all planted with Wheat, and it will be in Barley for its eighteenth crop in 1873; therefore Mr. Gray has got my past practice to look back to and my future practice to look to. I have no fear whatever of resuscitating the grand secret of the whole is my winter fallows, planted without turning over in the spring. With these facts before us, it sets one thinking upon the writings of our learned lecturers, Dr. Voelcker and Messrs. Lawes and Gilbert. They do not only tell us, but prove, that "nitrogen" runs away largely from our land through our drains. This does not condemn draining, for when applied under old practice upon undrained land, they ran away down the furrows into the ditch, and away on the sea. The waste would depend on the quantity applied, and I take it that the waste would be quite as great upon undrained land as it would be through drains on drained land. Now, I want to know why we should spend a lot of money in this costly stuff beyond what our ordinary manure gives, to be thus wasted, when we can get all the extra needed for nothing, at all events on our clay land. Look to my own heavy clay land, it is 20 acres of Beans, a fine plant, growing on land on which I have never spent a penny in nitrates beyond those contained in the ordinary manure that has been supplied to it for the last 16 years; yet my average produce has increased from 20 bush. per acre, in 1855, to 35 bush. per acre, in 1871; and I am quite certain that that increased produce can be kept up without the aid of nitrates of soda. Do you think it is the guts out of the land, as well as cutting off itself. I do not use nitrate of soda for growing white-strawed crops year after year. I do not care to have a straw producing quality of manure either on my heavy or light land. I can grow straw enough on both kinds of soil; I like a corn producing quality of manure. What artificial I buy I like the best bone superphosphate that I can get made. In my field No. 6, light land, I have sown five white-strawed crops in succession, viz., the first crop of Wheat with four crops of Beans following. I shall have plenty of straw this year, especially if these rains continue for a time, for a finer plant of Barley than it looks now never was seen.

The manure used has been 6 cwt. of superphosphate per acre each year, for this and the last two crops of Barley. No cart manure whatever has been used for the finer crops; nitrate of soda would be of no use to it. It might give me an increase in my produce of straw, but it would not of corn. On my heavy land a good mucking for Beans is the best preparation for the next crop of Wheat. I cannot make enough, therefore I use a little superphosphate for my Wheat and Barley, when I grow the latter. This field, No. 6, is very clean, although it has this fifth white-strawed crop in succession, when it and this year's seed had cost only 6s. 3d. an acre—made in the autumn—a riding machine, a subsoil, and steam-power. *William Smith, Woolston, Blatchley Station, Bucks, May 27.*

Ploughing-up Wheat.—Hundreds of acres of Wheat have been ploughed up this year, mostly, I believe, by young farmers, who either lacked faith in the power of the Wheat plant, or who had never seen much thin Wheat. Had much of it been left till now they would have wondered at the result, and have been thankful that they trusted to the power which they mistrusted, or did not understand. Many years ago I met a farmer on his way home from inspecting a Wheat-sown field, having determined to plough it up. I asked, "Can you see any Wheat?" (this, I think, was in February or March)—he said, "Oh yes, some;" then I said, "Do not plough it up." At the edge of harvest I met him, and he asked me to inspect the crop, which, he said, "is the best I have ever got in this year, and this year I saved a piece of Wheat by mentioning it, and could have saved more had my advice been taken. A piece of Wheat of my own, far worse than much ploughed up, will, I have reason to believe, strengthen my assertion, that much Wheat has been hastily ploughed up—though it is now too late to prevent the mischief this year." *J. C. C., Berkshire, May 24.*

Quantity of Sewage Applied per Acre by the Metropolitan Sewage Company at Barking.—In the letter which Mr. Hope addressed to you on May 21, and which appeared in your last journal, he relies upon the general ignorance which I shared with others in 1865 to justify his denial of the correctness of my statistics in 1870, instead of giving your readers, as he ought to have done, some reasons for disputing the accuracy of the sewage gaugings given in my report. He, Mr. Editor, is a very good man, as you are, of the experience in sewage farming which has been obtained between the two dates above mentioned; and when I accepted the invitation of the Institute of Surveyors to report progress on this farm, I desired to give them the result of my experience extending over five years. Being quite unprepared for the unwarranted denial which Mr. Hope, at the discussion on my paper, gave to the quantities of sewage, I was obliged to have applied to you at the moment, put forth necessary evidence in support; but I lost no time in procuring from Mr. Hassard the results of the various experiments he had made in his official capacity of executive engineer to this company. Mr. Hassard's letter, which you were good enough to publish, not only shows the possibility of my returns being correct, but he states that the flow in the main trough on the farm during one of his visits agreed with the other measurement we are enabled to take, and that he did not surmise that I was hesitating to contradict him. Mr. Hope certainly qualifies his admission, that after all Mr. Hassard may be right, by adding that such statements "are quite beside the question;" but I cannot think your readers will join Mr. Hope in this conclusion, when the primary point which we are considering is, can the engine and pumps supplying the Lodge Farm deliver the quantity of sewage which I assert is poured on to the farm during a day, or a week, or a month, or a year? We have found it to be possible, and therefore, we have advanced one step towards a settlement of this question. As large quantities of sewage may be delivered, I have a right to say that during the working hours of the pumps they are delivered; and as no one plot upon the farm is able to take the whole quantity, division becomes necessary, not only for the requirements of the crops which depend upon the sewage for support, but in order to prevent an overflow of sewage, and the crops bear abundant evidence that the sewage does reach them in turn, the accompanying extracts from high authorities will show, and I challenge Mr. Hope or anyone else to point out where any sewage has been, as he states, wasted by being passed in large quantities "over the farm,"—meaning, no doubt, that the land has been unable to absorb it, and that it, therefore, passed off in an impure state. The only real situation of the sewage being, as I stated, of paramount importance, I have entrusted them to a friend of mine, Mr. Hebel, who lives on the spot, and who devotes himself entirely to this branch of the working of the farm; and I think your readers will agree with me in preferring to accept the results of his gaugings, taken and recorded constantly every day, and verified by me repeatedly, to the unsupported contradiction given by Mr. Hope, merely because he understood it and was endeavouring to establish. Mr. Hope makes various mistakes, which it is hardly necessary to correct; but I beg you to believe that, unless his assertions, by being opposed to the results

which practical knowledge affords us, are therefore opposed to the successful development of the sewage question, I never trouble myself to interfere with them, however much I may differ with the views he puts forth; but I must be permitted to draw attention to an inaccuracy in his letter, which is a repetition of an inaccuracy which he made in his statement before the Surveyors' Institute. Mr. Hope says that I assert that I used the entire sewage of 335 persons per acre on Italian Ryegrass in one year. Mr. Hope fancies, no doubt, he is correctly quoting from my paper,—but he is mistaken. Mr. Bailly Denton, in a paper that he lately read at Maidstone, stated the average number of tons of sewage per head to be 324 tons; and Mr. Denton, in speaking of the sewage, spoke of the power of land to cleanse sewage being equal to 400 persons per acre. Having just used very much larger quantities per acre for the purpose of growing crops on this farm, I said that I thought that Mr. Denton had rather undervalued the power of land to cleanse sewage; and, taking one instance of Italian Ryegrass, I said that, if I took his standard of quantity per head, it would be seen that the sewage of 335 persons, and not of 100, had been used in the attempt to maintain a crop. In the discussion upon my paper, Mr. Hope undervalued the power to exist in nature, and the London standard of about 50 tons per annum, and thus, by swelling the quantity applied to an acre, enable him to quote some chemists' equivalent in Peruvian guano, and so on, to the "transparent absurdity" which he says the statement exhibits. I have not undervalued to reconcile Peruvian guano with sewage, either in the way of value applied or in value obtained; but I have confined the experiments on the farm to the careful application of sewage whenever I think the crops will be benefited by it and in recording the quantities which we have used in producing the best crops that have hitherto been grown with town sewage. I had hoped that during the last year Mr. Hope would have been able to obtain upon his own farm such practical experience in the use of sewage as would have prevented him making theories the subject of his lectures and letters; but it is just possible that, owing to the want of means, as he stated to the surveyors, of doing the question, he has been unable to do so, and the impression that his previously formed notions are being worked out in practice. *Henry Morgan, Lodge Farm, May 29.* [Mr. Morgan also sends us the following extract from a letter from J. C. Morton, Esq., dated April 21, 1871:—

"I had hoped to have got down to the farm to-day. It has seemed to me on every visit I have made to have been constantly improving in appearance ever since I left it; and I never saw it looking in better, more systematic, and business-like order, or in more promising and satisfactory condition, than when I was last over it a month or two ago."

Endorsement on the above letter by Wm. Beadell, Esq., of Chelmsford, on April 22, 1871:—

"Having just finished an inspection of every part of the farm, I can most fully endorse Mr. Morton's opinion. Improvement is great."

Lord Vernon's Prize.—Allow me to add a word or two in reference to this prize. His lordship's object, as I read it, is to bring a combination of machinery for cultivating the soil within the reach of the holders of moderate-sized farms, restricting the price of apparatus to £700. But, excepting the "combination" consists of these necessary implements, the cultivator, plough, and harrow, the kind intentions of his lordship cannot, in my humble opinion, be realised. At the present moment the cost of the tools he uses is £1,000. Howard for £600 (assuming such to be the combination). The Messrs. Fowler's catalogue shows that 8-horse power traction engines can be had for £360; windlass, &c., £250 to total, £610. This brings me to another question, viz., horse-power. What does it mean? Are our makers of engines, traction or otherwise, guided by a certain standard? Do Fowler's and Howard's 12-horse power engines represent, and are they capable of being worked up to, the same power? I have no Mr. Fowler's pamphlet on steam cultivation; in Table 1 of the appendix I find No. 3, Howard's 12-horse power traction engine, worked on the direct system, cultivating 9 acres per day; No. 4, Fowler's 12-horse power engine, direct system, cultivating 124 acres per day; the difference in amount of work done would imply that one engine excelled the other in power. I have referred back to the several instructively written papers on steam cultivation which have appeared in the *Agricultural Gazette*, and on p. 506, 1870, over the signature of "G. A. H.," will be found the following:—"At present a horse-power means absolutely anything which the maker pleases to call a horse-power, and it is my full belief that if any unscrupulous maker chose to manufacture 4-horse engines and sell them for 8-horse engines, there is no law in the country which could stop him, or give him dispute in any redress. But if it was distinctly understood in the trade that a horse-power meant a certain definite thing, then that would become a trade custom; and if any fraudulent maker gave less, the buyer would have his remedy at law. If a baker or a grocer gives you short weight, you can recover damages against him, or, if you prefer it, you can have him punished as a fraudulent trader. Why should a different rule hold with regard to steam-engines?" The judges

at the Leicester show, in their tabular statement of the trial of implements, as reported in the Journal, give the nominal power of each engine; allow me to suggest that the actual horse-power the engine is capable of exerting be also recorded. R. A. S. E.

Societies.

THE AGRICULTURAL HALL.

THE LONDON HORSE SHOW.—This meeting has become a popular metropolitan institution. Among three millions and a quarter of resident people, and with easy access from provincial districts, a collection of 408 horses is sure to create a large amount of attraction, and draw to the Agricultural Hall a corresponding number of visitors.

Of the animals themselves, there is not much room for individual criticism in a journal which is not a sporting publication, for the animals mentioned are not only divided and subdivided into classes and sections, but each class has an avowed speciality of its own, and its representatives are "put through their paces" in the most elaborate or highly finished style, which amateur or professional accomplishments in equestrianism can suggest and devise. Whether or not these trials have been uniformly successful on the present occasion we are not able to pronounce, for with only one set of judges performing their professional duties at a time, the critical examination and deliberations extend over some days. With any one, however, whose duties do not limit his time for these and similar occasions, in which amusement is judiciously combined with utility, there is no doubt but that the assembly of judges, authorities, animals and riders, or drivers, in the ring, is, if we may judge from the attention and the interest which Saturday last, and the cheers with which the decisions were received, of a fascinating as well as instructive character.

Of the hunters—in which the company of Saturday evidently took the most lively interest—Mr. Anstruther Thompson took 1st for his fine bay, IRIS, and Mr. Van Wail's LOXLEY was hailed as a good 2d,—being a great horse on short legs and in close compass. Mr. Percival VANSEY was not so taking a horse with amateurs and the uninitiated public, but with his wife and otherwise hardy nature, together with his hunting style, he looks like being an awkward customer to beat across country. In class 2 there was confusion and redistribution of prizes in consequence of its having been discovered that Mr. H. Saunders's horse, THE FARMER, had not been properly qualified by a certificate, and after the 2d prize had been awarded to the Hon. Captain Greville's MONTROSE, he was put down a notch lower by being placed 3d; the reason, however, for his having merited a 3d prize while he could not under the rules take 3d, did not transpire. THE FARMER's smooth course had not yet ended, for singularly enough he was awarded the 1st prize in the next class, where he had been entered, but as one of the rules was to the effect that no horse could take two prizes, he was again disqualified, and Mr. M'Intosh's 7-year-old VOLTIGEUR, which has frequently appeared before, was placed 1st. In the next class, the hunters, Captain Barlow, who is a great enthusiast in horse-breeding, was placed 1st with his excellent brown gelding, bred by Lord Falmouth, to whom Mr. J. B. Booth, of Killybeg, was placed 2d for BRANDESBY, a fine chestnut.

In the class for riding horses there were 29, many of which were very inferior in appearance and defective in movements, the entries having been, no doubt, made more with a view to sale than to winning prizes. The cover hacks and roadsters were 24, and the park hacks and ladies' horses 28, the greater number of which were like the previous class as regards character.

In addition to the foregoing there were classes for carriage horses, harness horses, ponies, thoroughbred stallions, and half-bred stallions, besides other marked breeds.

Among the exhibitors in the above classes were His Royal Highness the Prince of Wales, the Earl of Yarborough, Mr. J. Anstruther Thompson, Mr. Jonas Webb, Major the Adjutant-General, the Hon. Frederick C. Morgan, Major Quentin, the Hon. Alexander F. Hood, the Hon. Captain Greville, M.P., Sir Arundel Neave, Bart., Captain Fitzgerald, Mr. H. Edwards, M.P., Colonel Loyd Lindsay, M.P., the Earl of Rosslyn, Mr. J. Merry, Viscount Chelsea, Lord Hood, the Earl of Hopetoun, the Earl of Craven, the Earl of Stamford and Warrington, Lord Norreys, M. A. Subervielle, who exhibits a pair of Mexican ponies, M. de la Motte, Administrateur de Compagnie Générale des Omnibus de Paris, the exhibitor of the celebrated Percheron stallions, and a number of metropolitan West End horse dealers.

The attendance during the week has been large, and otherwise very satisfactory to the Agricultural Hall Company.

The following is the list of awards:—

1st or 1st PRIZES. The Earl of Coventry, Colonel Kingscote, C.B., M.P., Captain Lane Fox, Esq., hunters and thoroughbred stallions; Captain Bastard, Capt. T. C. Douglas Whitmore, Esq., park hacks, and half-bred stallions; Mr. J. C. Morton, Esq., the Agricultural Hall Cup, value 50 guineas, for the best Hunter out of the four 1st prize horses in classes 1, 2, 3, and 4—Captain Frederick Barlow.

CLASS 1. Hunters, weight carriers, equal to not less than 15 stones.—1st (20), John Anstruther Thompson, Esq., for "Iris," 2d (16), George Percival, for "Loxley," 3d (20), Capt. Th. Percival, for "The Yankee."

CLASS 2. Hunters, without condition as to weight.—1st (250), The Captain Greville, M.P., for "Montrose," 2d (250), Lieut. J. M. Tattersall Musgrave, for "Marmalade," 3d (250), Mr. Henry Sanders, for "The Farmer." The judges commenced this class.

CLASS 3. Hunters, without condition as to weight, and not exceeding 15 hands 2 inches high.—1st (240), David Macintosh, Esq., for "Vultigeur," 2d (250), Sir Arundel Neave, Bart., for "King Charmant."

CLASS 4. Hunters 4 years old.—1st (250), Captain Frederick Barlow, for brown gelding; 2d (250), John B. Booth, Esq., for "Blanchy."

CLASS 5. Riding Horses, fine action and quality essential, of any height exceeding 15 hands 2 inches high.—1st (250), Frank Gurnell, Esq., for "Lily," 2d (250), Walter Gilbey, Esq., for "Marvel," 3d (250), John B. Baillie, Esq., for "Anita."

CLASS 6. Cover Hacks and Roadsters, weight carriers, not exceeding 15 hands high.—1st (250), Captain Fitzgerald, for "Queen of Trumps," 2d (250), H.R.H. the Prince of Wales, "Delight," 3d (250), Dr. Henry John Buck, for "Princess Louise."

CLASS 7. Park Hacks and Ladies' Horses, not exceeding 15 hands 2 inches high.—1st (250), Mr. C. Vanitsouri, for "Blue Bird," 2d (250), George Percival, for "The Squire," 3d (250), Mrs. Fitzmaurice, for "Duke."

CLASS 8. Harness Horses, not exceeding 15 hands 2 inches high, for the horses of the best shape with park action, exhibited in harness, and suitable carriages.—1st (250), Walter Gilbey, Esq., for "Lily," 2d (250), Messrs. W. C. & G. Salter, for "Defiance," extra (250), Thomas Worthington, Esq., for "Duchess."

CLASS 9. Park Hacks and Ladies' Horses, not exceeding 15 hands 1 inch high.—1st (250), Mr. George Gurnell, for "Blue Bird," 2d (250), the Earl of Rosslyn, for "The Beau," 3d (250), Viscount Chelsea, for "Mistake."

CLASS 10. Park Cobs, high steppers, not exceeding 14 hands 2 inches high.—1st (250), Mr. J. Anstruther Thompson, for "Colonel," 2d (250), Mr. Charles Greville, for "Cheerful," 3d (250), Samuel Lang, Esq., for "Chicken Hazard." The judges commenced this class.

CLASS 11. Harness Horses, not exceeding 14 hands 2 inches high.—1st (250), Mr. John Garham, for "Black Bass," 2d (250), Henry Frisby, Esq., for "Lily," 3d (250), forward.

CLASS 12. Horses, not exceeding 14 hands 2 inches high, in single harness.—1st (250), Mr. Thomas Mayston, for "Beauty," 2d (250), Thos. L. Gellibrand, for "Sultan," 3d (250), Charles Bernard, Esq., for "Forester."

CLASS 13. Stallions, thoroughbred.—The Agricultural Hall Medal and £50, the Earl of Stamford and Warrington, for "Cambrinus."

CLASS 14. Stallions, half-bred, not less than 15 hands high, for getting roadster trotters.—1st the Agricultural Hall Medal and £50, Mr. John Grouck, for "Fire King," 2d the Agricultural Hall Medal and £25, Mr. John Abell, for "Young Phenomenon."

CLASS 15. Stallions, of any breed, under 15 hands high, for getting hacks or cobs.—1st the Agricultural Hall Medal and £50, R. Mundell, Esq., for "Young Squire," 2d the Agricultural Hall Medal, Charles Grouck, Esq., for "Norfolk Hero."

CLASS 16. Stallions, not exceeding 13 hands 3 inches high, for getting ponies.—The Agricultural Hall Medal and £50, Charles Grouck, Esq., for "King Arthur," extra the Agricultural Hall Medal, the Earl of Hopetoun, for "Jill."

EXTRA CLASS HARNESS PRIZES.

EXTRA CLASS A. For the best Pair of Phaeton Horses, with park action, to be shown in an appropriate harness.—1st, Walter Gilbey, Esq., for "Lily" and "Lilac," extra the Agricultural Hall Medal, Mrs. Fitzmaurice, for "Duchess" and "Duke."

EXTRA CLASS B. For the best Pair of Ponies, in harness, not exceeding 14 hands 2 inches high.—1st, the Earl of Hopetoun, for "Black and White," 2d the Earl of Stamford and Warrington, for "Aristides Subervielle," Esq., for "Mexico" and "Puebla."

EXTRA CLASS C. For a well-appointed Tandem of Horses or Ponies.—1st, Charles Grouck, Esq., for "Young Squire."

EXTRA CLASS E. For any Animal of Extraordinary Merit, not qualified to compete in any of the sixteen classes.—£10, Monsieur Moreau-Chasson, for "Czar."

Farm Memoranda.

THE PRESENT APPEARANCE OF THE CROPS.

Berkshire, May 16.—If the absence of corn, hay, and straw ricks is as marked a feature in other districts as in this, and if the present report made at the present time possess unusual importance. The extreme shortness of every kind of farm produce in 1870, combined with the excellent quality of the straw, and chaff for feeding purposes, have brought about this result. Probably an average acreage of Wheat was sown, but the loss of plant, especially on the clover-lands, has been serious. A good many acres have been ploughed up, and many more drilled over again, without ploughing. The summer report made at the present time, and the time for re-drilling and for planting spring Wheat is most favourable. The appearance of the spring corn is upon the whole satisfactory, although warm weather is needed. The Oats have suffered much from wireworm, and weeds, where the roller has not been kept well at work, are troublesome on account of the fine and loose condition of the ground. All spring corn, including Oats, Barley, Beans, and Peas, came in well, and had not having been so late as the state by the frosts and dry winds. A large breadth of Beans and Peas has been planted where the grass seeds sown last year failed. Winter Beans and Oats suffered seriously from the frosts. The fallows are in a very forward and healthy state. Mangel Wurzel has been largely planted, and is coming up well; a few pieces of Swedes are sown, but farmers generally prefer waiting a little later. The prospect for Clover hay is very bad, so that the farmer who has not having waited a little longer, left in a most unsatisfactory state. The thin plants of Clover, Ryegrass, Trefoil, &c., can hardly yield an average crop, even on the limited acreage, although a warm genial period setting in at once might materially help them. Horse keep has been a serious item during the past winter, and such a season must surely point to the great importance and economy of steam cultivation, by means of which

the number of expensive horses is so considerably lessened, while the great power at our command can be so effectually concentrated when the favourable period presents themselves. Much work has during the past season been done by steam-farms in this district where, but a few years back, the prejudice against it was strong; but still its real and special advantages are but little appreciated at present. *W. Bulstrode, Mount Farm, Cookham Denk, Berks.*

Gloucestershire, May 25.—I consider the Oats and Barley in our neighbourhood looking moderately well. A good deal of the light land Wheat is much injured by the frosts, and, since then, the wireworms have got badly into it, so that there will not be half a crop. The rest of the Wheat land is looking pretty well, but I consider, taking it altogether, it does not promise an average crop. Winter Beans are very well indeed—mostly killed by the frost; spring Beans generally looking well. Peas and Vetches variable. *Giles Edmunds, Eastleach, Lechlade.*

Hereford, May 22.—The year 1870 will long be remembered as one of the most trying the farmers of this county ever experienced, and the winter which succeeded the severe drought of the past year has added greatly to the distress and perplexity not only of the stockowner but also of the tillage farmer. With the prospect of a long and dreary winter before him, the stockowner sold at a great sacrifice all the half-fledged animals, and the tillage farmer, who had to do with in the early autumn, yet the supply of hay and straw from Ireland and Scotland which reached this county was very considerable, or matters would have been even worse than they were. Hay realised £8 5s. per ton by auction in the market, and straw 5s. Under such circumstances it is natural to suppose that every blade of grass was met as the spring advanced, and thus large breadths of the pastures now present the appearance of a closely sown lawn. In April we were blessed with fine mild weather, which tended for a time to dispel our fears of another drought, and gave a good start to vegetation, but no sooner did our hearts rejoice at the blessing an ever-merciful Providence had bestowed upon us than biting north-east winds again set in; occasional hot burning sun by day followed by severe frost by night, which has very materially retarded all kinds of vegetation, and has again created an anxiety for rain, and unless that blessing is sent early, the crops of this year will be very light upon the cool lands and those which have been spring grazed. Of Clover it is quite the exception to see any, the drought of the past summer having killed a great portion of the plant, and that which was to be seen in the autumn has been destroyed by the winter frost, and the land ploughed up and planted with Peas, Vetches, Rape, &c., so that the present prospect is anything but cheering for the stockowner; and of the tillage it is even more gloomy. Where there was usually a good growth of clover in the autumn, owing to the very general fall of the root crop, but many hundreds of acres had to be ploughed up in the spring and drilled again, or drilled across the old plant with spring corn. The same may be said of winter Oats, Beans, and Vetches—in fact, it is quite the exception to see a good field of autumn-planted corn of any kind. The weather has been very favourable since spring tillage, and, where the ravages of the wireworms have not been so great, there is a prospect of good crops of Barley, Oats, Peas, &c., and an unusually large acreage has been planted from the facts before-mentioned, viz., the failure of Clover and of the autumn-planted corn. The fruit, both Apples and Pears, promised well, but the severe frosts, accompanied by blight, has not only cut off the blossom but many trees show symptoms that they will never bear another crop. The Hops, too, are by no means what they should be; the young shoots are killed by blight and dry, and the root attacked by wireworm. The fallows are well prepared for roots, and an unusually large breadth of Mangels planted. But up to the present time the agricultural prospects of this county are anything but cheering; we can only hope that an Almighty benefactor will shortly bless us with another fall of rain, and more genial weather to brighten our prospects for the coming harvest. *T. Duckham, Baysham Court.*

Worcester, May 23.—I am unable to give a favourable report of some of the chief corn crops in this neighbourhood. Wheat suffered much from the severity of the winter, and a great deal has lost plant. It has lately improved in colour, but is not tillering out equal to some seasons, although in this the effects of high cultivation are evident, yet there cannot be a sufficient plant for a full crop, and, as is generally the case when corn is thin, weeds get thick and hoeing is much required. Winter Beans and all autumn-sown corn, &c., have done badly. The spring-sown winter was favourable, and spring-sown corn, including Beans and Peas, with but few exceptions, present a good appearance for a fair crop, but the weather has lately been very dry and harsh, with cold nights during the last month, and warm rain is much wanted. As regards the provision for cattle and sheep, winter Tares are deficient, but Rye is better, and is now very useful, much being cut into chaff mixed with a little hay, but the latter and straw of all kinds also, is scarce and dear. Clover, from last year's drought, is a very deficient plant, and can only yield a partial crop, but pastures look well for a fair crop of hay, if rain comes

in time. The season has been favourable for preparing the land for roots, Mangels have gone in well and are coming up, and Swede sowing is going on. Fruit trees in gardens and orchards are much blighted. *Silas Rich, The Cedars, Farnall Heath, near Worcester.*

Miscellaneous.

MILKY TELL-TALES.—The detection of milk dilution by the presence of fish in milk, such as we mentioned two months since, must be rare; but the practices of some milkmen are very openly revealed by strange admissions on the part of the adulterators themselves. A very indignant tradesman assured us recently that the black mail levied by persons connected with the unions compelled him to adopt some means whereby he might not lose by his transactions. He recognised the iniquity of those who demanded a *douceur* but evidently failed to perceive that this was no justification for defrauding the paupers of the nourishment he had contracted to supply at a definite rate. Two blacks cannot make one white. On our receiving a sample of milk from a dairy at the West End, the proprietress asked, "Are you one of those gentlemen going to try the milk; because you must bear in mind, sir, this is the fourpenny milk we sell to the poor at home, and not the best that we send out." A milk carrier was recently accused for a sample of milk. Having supplied it, he was told that it had been bought for analysis. He instantly exclaimed, "You shouldn't have had it out of that can there; it is fourpenny milk; that's the fit penny churn," pointing to another vessel. A sample was obtained from this too, and whereas both proved to have been diluted, the milk from the cheaper milk contained more water. Analyses of milk are not unfrequently of late, and special samples are constantly prepared. It is only by procuring several quantities from different families or institutions, supplied from the same source, that a fair estimate can be made of the milk sold. The prepared specimens usually defeat the dairymen's object, for, with a wisdom common to deceivers, the business is overdone, and 18 or 20 per cent. of cream is shown by the lactometer, and we know that we are not dealing with fair samples. We simply ignore the results obtained, and adopt independent means for protecting ourselves against such a glaring deception. In the hearing of a charge of embezzlement at the Guildhall Police-court, on Saturday, March 4, it was elicited that two quarts of water were found in the possession of a defaulting milk carrier. This, it was explained, he had no right to have. The manager of the prosecuting company was asked whether he himself carried the milk. To this he replied, "No; they did not pay their servants to do it." Further disclosures were stopped by the magistrate suggesting that it was not necessary to go into the secrets of the trade in milk. It is, however, our object to investigate such cases, and Mr. Amos, the milkman in question, supplies his customers with milk both skimmed and watered, as may be seen by reference to our Laboratory Report. *The Milk Journal.*

HOW TO CURE HAMS.—The following recipes for curing 1000 lb. of pork hams carried off the premiums offered by the Maryland State Agricultural Society:—

First Premium.—Mix 2½ lb. saltpetre, finely powdered, with 2½ lb. brown sugar, 1 gall. molasses. Rub the meat with the mixture; pack with skin down. Turn over once a week, and add a little salt. After being down three or four weeks, take out, wash, and hang up two or three weeks, until it is dry. Then smoke with Hickory wood three or four weeks, then bag, or pack away in a cool place—not a cellar—in chaff or hay. *Thomas Love.*

Second Premium.—The meat after being cut out, must be rubbed piece by piece, with very finely powdered saltpre, on the flesh side, and where the leg is cut off, a tablespoonful (not less) of salt, a ham, a deer, or a pig, to each shoulder, and about half that quantity to each middling and jowl; this must be rubbed in. Then salt it by packing a thin coating of salt on the flesh side of each piece, say half inch thick, pack the pieces on a scaffolding, and hang them up in a dry place, and turn them all over it (that is, under the meat); the pieces must be placed skin side down, in the following order:—First layer, hams; second, shoulders; third, jowls; fourth, middlings—take the spare-ribs out of the middlings. The meat must be turned over once a week, and if the weather is mild, eight if very cold—the brine being allowed to run off freely. *J. Howard M'Henry.*

Third Premium.—½ bush. fine salt, 3 lb. brown sugar, 2½ lb. saltpetre, ½ gall. best molasses. Mix these ingredients together, and rub the pieces with the mixture until all are absorbed. The meat must be turned over of the pickle once a week for six weeks; the two first times the meat is taken out there is to be a plate of alum salt added to the pickle once a week for six weeks. *Mrs. William H. Morriss.*

Fourth Premium.—2½ lb. saltpetre, dried and finely powdered, 1 bush. best Liverpool salt, 3 lb. brown sugar, and ½ gall. molasses. Mix all in a vessel, rub the meat well with same, and pack with skin down.

The above is the exact manner required for 1000 lb. of pork. After being in salt three or four weeks, take out, wash clean the pieces, dry, and hang it up for smoking. Three weeks is sufficient to smoke them thoroughly—by fire made of Hickory wood. When smoked, take down and bag, or pack away in chaff or cut straw. Examine them occasionally, and if found to be at all damp, renew the packing with dry material. *Charles Jessop.*

A correspondent of the *Practical Farmer*, at Brighton, New Jersey, noted for having a superior quality of dried beef and hams, sends his recipe, which he has used for more than 40 years without a failure. It is as follows:—For every 100 lb. of beef, 7 lb. of salt, 2 oz. of saltpetre, 1½ lb. of brown sugar, 4 galls. of water. Boil and skim, and pour over the meat when cold. If properly packed, that amount of water will cover the meat. For pork, pack the hams and shoulders together. To every 100 lb. take 8 lb. of salt, 4 oz. of saltpetre, 1½ lb. of sugar, 4 gallons of water. The hams and beef for drying may be taken out after four weeks. To keep the meat after warm weather, the pickle will have to be boiled.

The Week's Work.

JUNE 3.—*Turnip Seed-time.*—Arthur Young says, in his "Farmers' Calendar," "This is the great season for sowing Turnips," and the advice then given continues to apply. The season, so far as gone, has been favourable for getting the land ready, and in places where the rains of the past two weeks have fallen, there will be sufficient sap below to start the plants. In exceptional districts, where little or no rain has fallen, the liquid-manure drill should be used liberally, for it must be borne in mind that the whole art of growing Turnips lies in getting the seed into a proper seed-bed, with a sufficiency of sap below to force forward the young plants rapidly into rough leaf. Those who have not liquid-manure drills capable of applying upwards of 1000 gallons of water per acre will do well so to treat their farmyard manure as liquid from the manure-tank, a week or so prior to its being carted out. Thus soaked it spreads more freely in the drills, and if covered immediately it supplies moisture in a more available way to the roots of the young plants than when applied with the liquid-manure drill in dry weather. The quantity of liquid that requires to be applied to the dunghill is a question of easy calculation, for practically it means as much liquid as the manure will carry to the land. Manure, when applied to the dunghill. When the crop is grown wholly with artificial manure, make shallow drills, and with a bifurked hose at the tail of the water-cart well drench the bottom; cover immediately by splitting the drills. Water thus applied, it must be borne in mind, is as much the food of plants as superphosphate, if not more. In short, the water is manure, and cheap manure too, and should be stored up in the winter time on farms where there is not a natural supply at this season. In the northern counties the sowing of the white and yellow-fleshed Turnips follows the sowing of Swedes, the White Globes and Tankards first, in order to get them consumed before the winter frosts set in. In southern counties white and yellow Turnips are now mostly grown as stolen stubble crops. The common calculation for seeding is 3 lb. per acre; but when drought is experienced it is better to sow 4 lb., and then single out in time should growing weather set.

Seaweed Grass is now plentiful on all seaweed farms, the yield for the current month being 10 tons per acre and upwards. The value of such a supply of green food for stock is inestimable. Where town sewage cannot be had guano or grass manure, washed into the land by water, will produce equally favourable results. It should always be borne in mind, at this season, that water is the most powerful stimulant that can be applied to grass, or any other crop, provided there is anything in the land to work upon. In point of fact, water doctored this way is better than town sewage, which of itself is not a specific manure for Italian Rye-grass or any other crop. It is even more defective for Mangel Wurzel and the healthy growth of root crops generally than farmyard manure, or the artificial grass manures now manufactured. Practically speaking, for the growth of root crops town sewage should be doctored with superphosphate to make the most of it. (Using it as is now commonly done involves a great waste, when we arrive at more economical times will be obvious.)

Soiling.—The season, so far as gone, cannot be said to be very favourable for soiling—the growth of most forage plants being unfavourable; but it is now otherwise, and those who have daily cuttings experience a great relief to their pastures. To overstock the pastures at this season is ruinous, and therefore as many of the "big mouths" as possible should be soiled in open yards at the homestead.

Graining Stock should now be frequently shifted from one field to another, and the pasture should be more or less sustained by cropping too bare. There is no branch of stock management that requires greater attention than this, for the exhausting evaporation from a bare surface is, on the one hand, much greater than is generally imagined, whilst, on the other hand, a fall bite prevents evaporation. There is an old proverb that requires to be borne in mind, viz., "grazing cattle eat with two mouths," and with the pasture being consumed by the mouth, with their feet than with their mouths. As a rule, whenever a thunder-shower falls and soaks the pastures, shift your stock from the close they are in, so as to gain the full benefit of the shower in starting the grass.

Irrigation of Pastures in dry weather should be

Great Reduction in Prices for 1871,

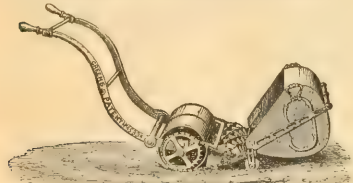
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AND COLLECTING MACHINES.

During the last few years our Machines have been submitted to numerous practical tests, and found to possess all the advantages in working and keeping a Lawn in the greatest possible state of perfection. We therefore have no alterations to report, as they are unnecessary.



The above Machines have carried off every Prize that has been given in all cases of competition.

They are warranted to be superior to any others. We guarantee them to give entire satisfaction, otherwise they can be returned, free of cost to the purchaser. With the increased facilities we possess for the Manufacture of Lawn Mowers, we are enabled to Sell them at a reduced rate on former years, as will be seen from the following Scale of Prices:—

To cut 8 inches	Price	£	s	d	
" 10 "	" "	3	0	0	Can be worked
" 12 "	" "	4	0	0	by one person.
" 14 "	" "	5	0	0	
" 16 "	" "	6	0	0	They can be worked
" 18 "	" "	7	0	0	by one person on an
" 20 "	" "	7	10	0	even Lawn
" 22 "	" "	8	0	0	By Man and Boy.
" 24 "	" "	8	10	0	

T. GREEN & SON have pleasure in announcing that the demand for their Lawn Mowers this season far exceeds all previous ones, and from this fact they are led to believe that the machines of their manufacture are held higher in the estimation of the public than ever.

Prices of HORSE, PONY, and DONKEY MACHINES on application.

Repairs executed with efficiency and despatch, both at Leeds and London Establishments.

GREEN'S IMPROVED
PATENT ROLLER,
FOR LAWNS, DRIVES, BOWLING GREENS,
CRICKET FIELDS, AND GRAVEL PATHS,
Suitable for Hand or Horse-power.



PRICES of HAND ROLLERS.

Diameter.	Length.	£	s	d	Diameter.	Length.	£	s	d
30 in.	32 in.	7	10	0	20 in.	22 in.	3	10	0
24 in.	26 in.	4	10	0	16 in.	17 in.	2	15	0

PRICES of ROLLERS, fitted with Shafts,
Suitable for Pony or Horse-power.

Diameter.	Length.	£	s	d	Diameter.	Length.	£	s	d
30 in.	32 in.	10	0	0	30 in.	60 in.	15	10	0
30 in.	36 in.	10	15	0	30 in.	72 in.	17	10	0
30 in.	42 in.	11	15	0	30 in.	84 in.	17	10	0
30 in.	48 in.	13	10	0					

These ROLLERS possess many advantages over all others; they are made in two parts, and are free to revolve on the axis, affording greater facility for turning, and the outer edges are rounded off, or turned inwards, thus avoiding the unsightly marks left by other Rollers. They are manufactured of the best materials, and are got up in a manner surpassing any ever yet brought out.

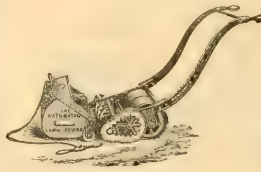
The ROLLERS, 24 by 26 inches, 20 by 22 inches, and 16 by 17 inches, are also made in one part, at a reduced price; and for Rollers of that size, will be found to answer many requirements, as the handle can be reversed to either side of the Roller at pleasure.

PRICES.

24 inches by 26 inches	£	4	0	0
20 " 22 "	"	3	2	6
16 " 17 "	"	2	10	0

Delivered Carriage Free to all the principal Railway Stations and Shipping Ports in England, Ireland, and Scotland.

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THE "AUTOMATON" LAWN MOWERS,
THE BEST, SIMPLEST, AND MOST DURABLE MACHINES.

They leave no ribs in the Grass, and are unsurpassed for keeping a Lawn or Croquet Ground in first-rate order.

They will either Collect the Cut Grass in the box according to the approved English method, or leave it on the lawn, by taking the box off.

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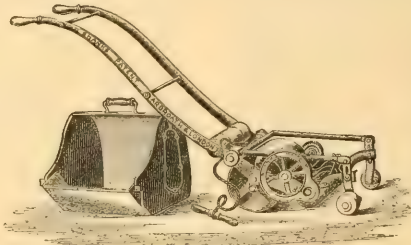
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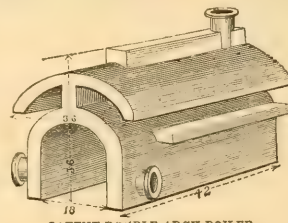
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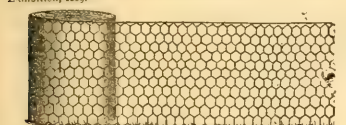
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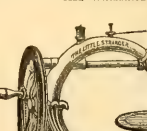


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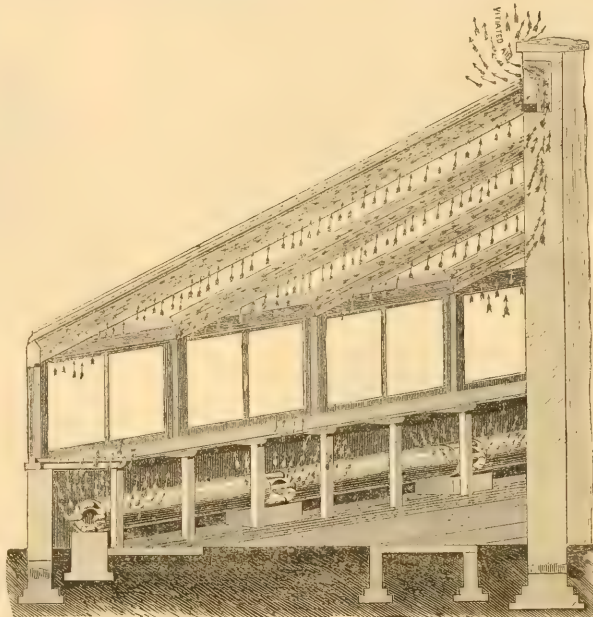


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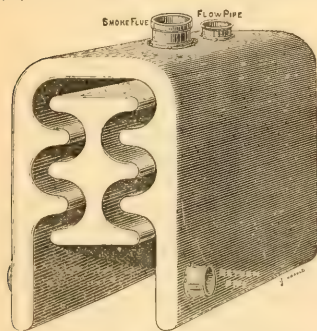
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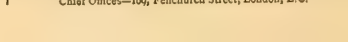
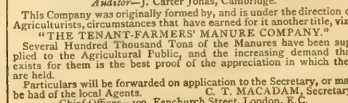
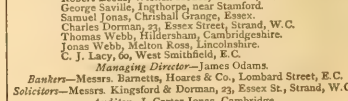
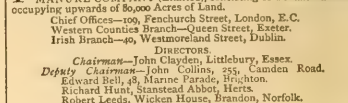
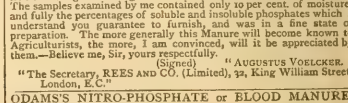
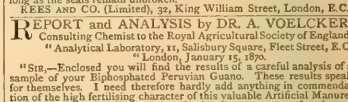
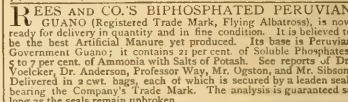
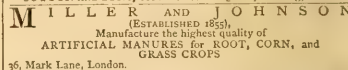
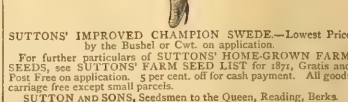
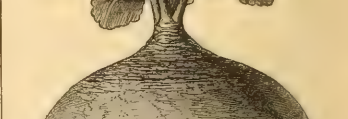
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Consulting Chemist to the Royal Agricultural Society of England.

"Analytical Laboratory, 11, Salisbury Square, Fleet Street, E.C."

"London, January 15, 1870."

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ENGLISH BEES—Stocks and Swarms may be obtained as heretofore.
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 For ALTERATION OF STABLES a competent person can be sent to any part, to inspect and give Estimates.

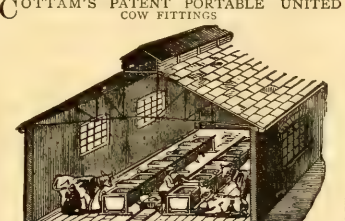
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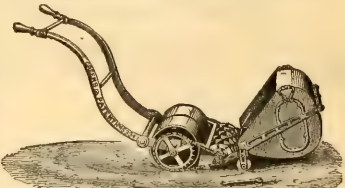


Their advantages are—Portability, no fixtures, removable at pleasure; no Work or Particulars to impede Ventilation or breed Vermis; Hay Rick dispossessed with an unnecessary increased width and depth of Feeding Troughs; Water Cistern, and Patent Door Cover to prevent overgorging. Clean, durable, and impervious to infection, being all of Iron. Price of Fittings per Cow, 55s.
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The above Machines have carried off every Prize that has been given in all cases of competition.

They are warranted to be superior to any others. We guarantee them to give entire satisfaction, otherwise they can be returned, free of cost to the purchaser. With the increased facilities we possess for the Manufacture of Lawn Mowers, we are enabled to Sell them at a reduced rate on former years, as will be seen from the following Scale of Prices:—

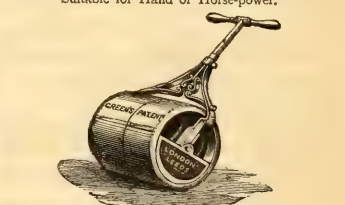
To cut 8 inches	Price £	Price 10 0	Can be worked by one person.
" 10 "	" 3 0 0	" 3 0 0	"
" 12 "	" 4 0 0	" 4 0 0	"
" 14 "	" 5 0 0	" 5 0 0	"
" 16 "	" 6 0 0	" 6 0 0	"
" 18 "	" 7 0 0	" 7 0 0	"
" 20 "	" 8 0 0	" 8 0 0	"
" 22 "	" 9 0 0	" 9 0 0	"
" 24 "	" 10 0 0	" 10 0 0	"

T. GREEN & SON have pleasure in announcing that the demand for their *Lawn Mowers* this season far exceeds all previous ones, and from this fact they are led to believe that the machines of their manufacture are held higher in the estimation of the public than ever.

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30 in. 32 in.	7 0 0	22 in. 24 in.	3 10 0
24 in. 26 in.	4 10 0	16 in. 17 in.	2 15 0

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24 inches by 26 inches	£ 4 0 0
20 " 22 "	" 3 2 6
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 3d, Mr. J. Wheeler, Gr. to F. Phillips, Esq., Stamford Hill, **5** d.
CLASS 2.—5 EXOTIC ORCHIDS. (Amateurs.)
 1st, Mr. B. Williams, Nurseryman, &c., Upper Holloway, **4** d.
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CLASS 3.—4 EXOTIC ORCHIDS. (Open.)
 1st, Mr. J. Linden, Nurseryman, Brussels, Ghent, **4** d.
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 Extra, Mr. W. Bull, **1** d.
CLASS 5.—5 STOVE AND GREENHOUSE PLANTS. (Amateurs.)
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CLASS 7.—5 FINE FOLIAGE PLANTS. (Amateurs.)
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 2d, Mr. A. Dalliere, Nurseryman, Ghent, Belgium, **5** d.
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 Extra, Mr. J. Carr, Gr. to F. L. Hinds, Esq., Byfleet Lodge, Weybridge, **5** d.
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CLASS 10.—6 GREENHOUSE AZALEAS. (Nurserymen.)
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 1st, Mr. C. Turner, **18** d.
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 3d, Mr. H. Soley, Gr. to O. Hanbury, Esq., Hove Hatch, Brentwood, **18** d.
CLASS 19.—19 PÆONIES, cut blooms, distinct. (Open.)
CLASS 20.—19 PÆONIES, cut blooms, in 12 varieties. (Open.)
 1st, Mr. C. Godding, Gr. to H. Little, Esq., Cambridge Villas, Cambridge Park, Twickenham, **19** d.
CLASS 21.—24 PINKS, cut blooms, distinct. (Open.)

CLEMATIS GEM.—A new and beautiful hybrid, raised by G. BAKER & SON, and exhibited at the Horticultural Society's meeting at South Kensington, August 17, 1870, by whom it was awarded a First-class Certificate. It is a most profuse bloomer, and continues in bloom until destroyed by frost; colour, rich blue, like Standish, size of lanuginosa. Plants are now being sent out, price 6d. each.

The following gratifying Testimonial has been received from Messrs. Waterer:—
 "American Nursery, Bagshot, Surrey, Sept. 6, 1870.
 "GENTLEMEN,—In reply to your inquiry as to our opinion of your Clematis Gem, we have great pleasure in saying—and we speak from the experience derived from several visits during its blooming stages, which are continuous from May throughout the whole summer and autumn—that it is one of the deepest azure-blue, for exelling in brilliancy and intensity any of the new varieties with which we are acquainted. It is of great substance, very large, and of the most exquisite shape. It is doubt well to be hailed as a great acquisition, and it will be a striking novelty amongst the more purple varieties, such as Jackson's, &c. &c. &c.
 G. BAKER & SON, American Nursery, Bagshot, Surrey.

Bedding Plants.
ARCHD. HENDERSON'S Descriptive and Priced CATALOGUE OF BEDDING PLANTS is now ready, containing all the Novelties of the past two years. The stock is in fine condition; for extent and vigour unsurpassed.
AGRICULTURAL SEEDS of every description.
KITCHEN and FLOWER GARDEN SEEDS from the most celebrated English and Continental Growers.
CATALOGUES to be had gratis, and post free on application.

Established 1793.
JOHN K. KING, SEED GROWER, Coggeshall, Essex, will be happy to supply his unrivalled stock of SEEDS, such as—
WURZEL, SWEDES, and other **TURNIP SEEDS** (carefully selected from large roots), at moderate prices.
 Large purchasers supplied at special moderate prices.
FARM SEED LISTS post free.
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 Large purchasers supplied at special moderate prices.
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CLASS 22.—COLLECTION OF FRUIT, 8 dishes.
 1st, Mr. W. Lynn, Gr. to Lord Boston, Bedford, Bedford, **5** d.
CLASS 23.—3 FINE APPLES, Queens. (Open.)
 1st, Mr. G. Ward, Gr. to T. Miller, Esq., Bishop Stortford, **3** d.
CLASS 24.—1 FINE APPLE. (Open.)
 1st, Mr. R. H. Smith, Gr. to H. Walker, Esq., Calderstone, near Liverpool, **1** d.
 2d, Mr. G. Miles, **1** d.
 3d, Mr. G. Miles, Gr. to Lord Carrington, Wycombe Abbey, High Wycombe, Bucks, **1** d.
CLASS 25.—BASKET GRAPES, not less than 12 lb. (Open.)
 1st, Mr. G. Osborne, Manager, Kay's Nursery, Finchley, **4** d.
 2d, Mr. T. Bannerman, Gr. to Lord Ragot, Blithfield Hall, Rugby, **4** d.
 3d, Mr. W. Coleman, Gr. to Earl Somers, Eastnor Castle, Leicestershire, **4** d.
CLASS 26.—BLACK GRAPES, single dish. (Open.)
 1st, Mr. T. Bannerman, **4** d.
 2d, Mr. J. Douglas, Gr. to F. Whitburn, Esq., Loxford Hall, Ilford, **4** d.
 3d, Mr. W. Coleman, **4** d.
CLASS 27.—WHITE GRAPES, single dish. (Open.)
 1st, Mr. J. Douglas, **4** d.
 2d, Messrs. J. Standish & Co., Royal Nursery, Ascot, **4** d.
 3d, Mr. G. Miles, Gr. to Earl Brownlow, Blenheim Palace, Berks, **4** d.
CLASS 28.—PEACHES, single dish. (Open.)
 1st, Mr. J. Brown, Gr. to Earl Howe, Gosport Hall, Atherstone, Leicestershire, **4** d.
 2d, Mr. H. Harris, Gr. to G. A. Ashby, Esq., Naseby Woolley, **4** d.
 3d, Mr. G. Miles, **4** d.
CLASS 29.—NECTARINES, single dish. (Open.)
 1st, Mr. W. Lynn, **4** d.
 2d, Mr. G. Miles, **4** d.
CLASS 30.—APRICOTS, single dish. (Open.)
 1st, Mr. G. Miles, **4** d.
CLASS 31.—FIGS, single dish. (Open.)
 1st, Mr. G. Miles, **4** d.
CLASS 32.—STRAWBERRIES, single dish. (Open.)
 1st, Mr. J. Douglas, **4** d.
CLASS 33.—CHERRIES, single dish. (Open.)
 1st, Mr. J. Burnett, Gr. to Mrs. Hope, The Deerpens, Dorking, **4** d.
 2d, Mr. G. Ward, **4** d.
CLASS 34.—MELON, Green-fleshed. (Open.)
 1st, Mr. G. Ward, **4** d.
CLASS 35.—MELON, Scarlet-fleshed. (Open.)
 1st, Mr. G. Masters, Gr. to the Earl of Macclesfield, Shilburn Castle, Leicestershire, **4** d.
CLASS 36.—MELON, Green-fleshed. (Open.)
 1st, Mr. W. Lynn, **4** d.
CLASS 37.—MISCELLANEOUS, for Fruit not mentioned in Schedule.
 1st, Mr. W. Gardner, Gr. to F. Shirley, Esq., Lower Eatonington Park, Stratford-on-Avon, for a box of Peaches, **4** d.
 2d, Mr. G. Miles, for a box of Peaches, **4** d.
PRIZES OFFERED BY MESSRS. JAMES CARTER AND CO.
CLASS 37.—3 DISHES OF PEAS (to include Alpha and Iovetia), &c., early white, early round blue, and early wrinkled Peas.
 1st, Mr. G. Brown, Gr. to E. Mackenzie, Esq., Fawley Court, Henley-on-Thames, **3** d.
 2d, Mr. J. Garland, Gr. to Sir T. D. Adland, Bart., Killerton, Exeter, **3** d.
CLASS 38.—MISCELLANEOUS.—EXTRA PRIZES
 Messrs. J. Veitch & Sons, Royal Exotic Nurseries, Chelsea, Group of 6 Plants.
 Mr. B. Williams, Collection of New and Rare Plants.
 Mr. W. Bull, Collection of New and Rare Plants.
 Mr. R. Parker, Hardy Herbaceous Plants.
 Messrs. W. Rolison & Sons, Nurseries, Tooting, Group of Gloxinias.
 Messrs. J. Waterer & Son, Nurseries, Bagshot, Group of Rhododendrons.
 Messrs. F. & A. Smith, Nurseries, West Dulwich, Group of the Specimen Tree Ferns.
CLASS 39.—PRIZES FOR DOUBLE FLORETS in Pots.
 1st, Mr. G. Webb, Culham House, Calcut, Reading, a Stand of Cut Roses, **4** d.
 2d, Mr. J. Veitch & Sons, Royal Exotic Nurseries, Chelsea, **4** d.
 3d, Mr. J. Veitch & Sons, Royal Exotic Nurseries, Chelsea, **4** d.
 4th, Mr. J. Veitch & Sons, Royal Exotic Nurseries, Chelsea, **4** d.
 5th, Mr. J. Veitch & Sons, Royal Exotic Nurseries, Chelsea, **4** d.
 6th, Mr. J. Veitch & Sons, Royal Exotic Nurseries, Chelsea, **4** d.
 7th, Mr. J. Veitch & Sons, Royal Exotic Nurseries, Chelsea, **4** d.
 8th, Mr. J. Veitch & Sons, Royal Exotic Nurseries, Chelsea, **4** d.
 9th, Mr. J. Veitch & Sons, Royal Exotic Nurseries, Chelsea, **4** d.
 10th, Mr. J. Veitch & Sons, Royal Exotic Nurseries, Chelsea, **4** d.
 11th, Mr. J. Veitch & Sons, Royal Exotic Nurseries, Chelsea, **4** d.
 12th, Mr. J. Veitch & Sons, Royal Exotic Nurseries, Chelsea, **4** d.
 13th, Mr. J. Veitch & Sons, Royal Exotic Nurseries, Chelsea, **4** d.
 14th, Mr. J. Veitch & Sons, Royal Exotic Nurseries, Chelsea, **4** d.
 15th, Mr. J. Veitch & Sons, Royal Exotic Nurseries, Chelsea, **4** d.
 16th, Mr. J. Veitch & Sons, Royal Exotic Nurseries, Chelsea, **4** d.
 17th, Mr. J. Veitch & Sons, Royal Exotic Nurseries, Chelsea, **4** d.
 18th, Mr. J. Veitch & Sons, Royal Exotic Nurseries, Chelsea, **4** d.
 19th, Mr. J. Veitch & Sons, Royal Exotic Nurseries, Chelsea, **4** d.
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 21st, Mr. J. Veitch & Sons, Royal Exotic Nurseries, Chelsea, **4** d.
 22nd, Mr. J. Veitch & Sons, Royal Exotic Nurseries, Chelsea, **4** d.
 23rd, Mr. J. Veitch & Sons, Royal Exotic Nurseries, Chelsea, **4** d.
 24th, Mr. J. Veitch & Sons, Royal Exotic Nurseries, Chelsea, **4** d.
 25th, Mr. J. Veitch & Sons, Royal Exotic Nurseries, Chelsea, **4** d.
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 27th, Mr. J. Veitch & Sons, Royal Exotic Nurseries, Chelsea, **4** d.
 28th, Mr. J. Veitch & Sons, Royal Exotic Nurseries, Chelsea, **4** d.
 29th, Mr. J. Veitch & Sons, Royal Exotic Nurseries, Chelsea, **4** d.
 30th, Mr. J. Veitch & Sons, Royal Exotic Nurseries, Chelsea, **4** d.
 31st, Mr. J. Veitch & Sons, Royal Exotic Nurseries, Chelsea, **4** d.
 32nd, Mr. J. Veitch & Sons, Royal Exotic Nurseries, Chelsea, **4** d.
 33rd, Mr. J. Veitch & Sons, Royal Exotic Nurseries, Chelsea, **4** d.
 34th, Mr. J. Veitch & Sons, Royal Exotic Nurseries, Chelsea, **4** d.
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 37th, Mr. J. Veitch & Sons, Royal Exotic Nurseries, Chelsea, **4** d.
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 41st, Mr. J. Veitch & Sons, Royal Exotic Nurseries, Chelsea, **4** d.
 42nd, Mr. J. Veitch & Sons, Royal Exotic Nurseries, Chelsea, **4** d.
 43rd, Mr. J. Veitch & Sons, Royal Exotic Nurseries, Chelsea, **4** d.
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 47th, Mr. J. Veitch & Sons, Royal Exotic Nurseries, Chelsea, **4** d.
 48th, Mr. J. Veitch & Sons, Royal Exotic Nurseries, Chelsea, **4** d.
 49th, Mr. J. Veitch & Sons, Royal Exotic Nurseries, Chelsea, **4** d.
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"THE ROYAL SEEDSMEN"
CARTER'S
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GENUINE SEEDS.
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however, seems to have overlooked the fact that the difference here pointed out is one of degree only, as in all grafts a thin layer of tissue dies, as pointed out by Mr. MURRAY in some specimens laid before the Scientific Committee of the Royal Horticultural Society on a recent occasion. Mr. SCOTT goes on to describe the singular appearance produced by the attachment of the parasites to the leaves of the Oleander, and also records the circumstance that *Loranthus longiflorus*, which is naturally evergreen, becomes deciduous when growing on deciduous shrubs. Another interesting fact, ascertained by Mr. SCOTT, is that the Sandal Wood (*Santalum album*) is a true parasite. Various circumstances lead Mr. SCOTT to the important conclusion, that parasitism is formerly a more essential phenomenon in the case of the Sandalwoods than it is now, that the tendency is, so to say, dying out in proportion as the power of sustaining themselves increases. Several of the Indian *Loranthi* (and of the African also, as we are informed by Dr. WELWITSCH) are of a highly ornamental character, and are well worth cultivating. To effect this, says Mr. SCOTT, a proper foster tree should be selected (of which a list is given), a notch cut in the bark on the cooler and more shady side of the tree, and a seed of the parasite inserted therein, or grafting might be practised as with the Mistletoe in England. Taken as a whole, Mr. SCOTT's paper is a very valuable contribution to vegetable physiology.

— The 28th anniversary festival of the GARDENER'S ROYAL BENEVOLENT INSTITUTION will be held at the London Tavern, Bishopsgate Street, on Tuesday, June 20, at 6 p.m. under the presidency of his Serene Highness Prince TECK. The object of the institution is to provide relief by means of pensions to aged and infirm gardeners, their widows, and others connected with horticultural pursuits. In common with similar institutions it is to be feared that the "Gardeners' Benevolent" has suffered from the great demands that have been made on the liberality of the public in consequence of the war in France, and this circumstance should induce those who have the opportunity to come forward for the relief of their less fortunate brethren at home. Contributions of fruit for the dessert will be acceptable, and notice of such contributions, as well as those of a more substantial nature, should be sent to the secretary, E. R. CUTLER, Esq., 14, Tavistock Row, Covent Garden, London, W.C., or to the treasurer, ROBERT WRENCH, Esq., London Bridge, E.C.

We have received the first annual report of the "Toxteth Park and Aigburth GARDENERS' MUTUAL IMPROVEMENT SOCIETY," which gives great promise of proving successful. The objects of this Society are to cultivate friendly intercourse among gardeners, and to impart information by the reading of papers and the discussion of subjects connected with the science of gardening. These objects it appears have been strictly adhered to: the following papers (which we enumerate to furnish an idea of their nature and scope) having been read and discussed:—"The making and keeping of grass laws," by the President, Mr. J. H. Mason; "The Potato and other members of the Nightshade family," by the Vice-President, Mr. Thomas White; "The origin and nature of soils," Mr. George Thompson; "What to plant in parks and gardens," Mr. Frederick Brown; "Garden Peas," by the Secretary, Mr. C. C. Muschler; "The W. H. Waddington," the latter completing the course for the first half-year. The second half-year was opened by the Vice-President, on "Ferns," followed by Mr. Joseph Hutchinson, "The pruning of hardy fruit trees;" Mr. Brown, "The culture of Melons and Mushrooms;" Mr. Joseph Gore, "The Fuchsia;" Mr. E. Roberts, "Pruning;" Mr. James Stewart, "Forest Trees;" Mr. Thomson, "Variegated Pelargoniums;" and the Vice-President, on "Epiphyllums and the Cactus tribe." Besides these, many other matters of interest have from time to time occupied the attention of the Society, and much profitable discussion has arisen. We should like to see similar organisations all over the country, with a central body in London. Such an institution might fairly take cognisance of all matters connected with the politics of horticulture, garden customs, and the like.

— Dr. R. MACDONNELL, of Dublin, according to the "Journal of Botany," has recently been making some experiments on the COLOURS of FLOWERS grown in DARKNESS. He grew Hyacinths of the three primary colours in a perfectly dark cellar. The green leaves were perfectly blanched, while the flowers of the red variety were quite white; those of the yellow practically so; but the violet-blue were unaffected.

— It is remarkable how often an observant eye, in surveying this or that garden, picks out a subject of rare and striking merit, which, by some unlucky chance, has missed popularity, and hence, being neglected by one generation, has become almost unknown to the next. One striking instance of this kind is afforded to some time ago; the *Malus floribunda* of the Belgian gardeners, a deciduous spring-flowering tree of rare merit. Another, of the same class of subjects, we noticed a few days ago, in the case of what is known in the Surrey gardens as WATERER'S LABURNUM, which is so much superior to the ordinary Laburnum that it seems a mystery how it has happened that it has not been everywhere the

adopted type of Laburnum. It is suggestive of the Scotch Laburnum (*Cytisus alpinus*), but is neither so large in the foliage nor in the individual flowers, although it may possibly be a cross between this and the common sort. Imagine racemes a full foot long or more of the brightest of yellow flowers, hanging in countless profusion from the somewhat vigorous branches, and some idea of the splendid effect of this tree may be formed. Its distinctive merits lie in the profusion of its flowers, the great length of its racemes, and the bright colour of its individual flowers. Here, at least, is one hardy deciduous ornamental tree that should not again be lost sight of by planters.

— We are glad to be able to report that the MANCHESTER NATIONAL HORTICULTURAL EXHIBITION has been in every way successful. Our report of last week will have shown that it was so viewed as a horticultural display. Now we are able to add that, financially, an equally satisfactory result has been realised, since, during the week, it was visited by 50,000 persons.

— Some remarkably cheap and good STENCIL PLATES have been submitted for our inspection. Instead of being cut as usual, they are formed by a process more nearly resembling etching. The result is, not only that they can be produced much more cheaply, but the lines are more evenly and cleanly cut. The plates in question are adapted for garden tallies, plans, book-plates, linen, &c. They are manufactured by Messrs. BERKELEY.

— From intelligence received from GENEVA, we learn that the famous HERIARD of DELESSERT, we long one of the attractions of Paris for the botanist, to whom it was thrown open with the greatest liberality by its possessor, is now deposited in a building attached to the Botanic Garden of Geneva, and its re-arrangement has been entrusted to a committee of zealous botanists. The fact that three such large and well ordered collections as those of the late Baron DELESSERT, of M. DE CANDOLLE, and M. BOISSIER are now to be seen in Geneva, and that the extensive library of the two last named botanists are open to visitors, foreigners included, must render Geneva a perfect paradise for Continental botanists.

— With the last week in May we naturally look for fine, warm weather, but on this occasion only to be disappointed; although the first three days were warm, the temperature on the remaining four was very low. The extreme MINIMUM TEMPERATURES in England during the week ending June 3 ranged from 75° 8' at Nottingham to 65° at Newcastle, with a mean for the eight southern stations of 76° 7', and for the eight northern of 72° 9', or for the whole country of 74° 9', which is 5° above the mean for the seven stations in Scotland, where the extremes were 76° (at Glasgow) and 64° (at Perth) respectively. The extreme MINIMUM TEMPERATURES were slightly lower in the southern stations of England than in the northern: the lowest being registered at Portsmouth, viz., 35° 2', and the highest at Leeds, viz., 42°. In Scotland, with the lowest 38° and the highest 45°, the mean for all stations was 41° 8', which is 2° 7' above the mean for England (39° 1'). MEAN TEMPERATURES.—These values are lower than those recorded during the preceding week, when 58° 1' and 56° 7' were registered. During the week under discussion 56° 9' at Portsmouth and 55° 5' at Manchester were the highest, while 48° 5' at Newcastle and 49° 4' at Hull were the lowest, and for the sake of comparison we subjoin a Table giving the mean temperature of each week in the two countries, during the month of May:—

	Week ending	England.	Scotland.	Difference.
May 6	47° 4	45° 0	2° 0
.. 13	47° 4	45° 0	2° 0
.. 20	47° 0	44° 0	3° 0
.. 27	53° 3	50° 1	3° 2
June 3	53° 4	50° 5	2° 9

RAINFALL.—Very little rain fell at any of the stations in either country, 0.34 inch at Norwich and 0.22 inch at Birmingham being the largest falls. The means for the two countries for each week during the past month are given in the following Table:—

	Week ending	England.	Scotland.	Difference.
May 6	0.17	0.30	0.33
.. 13	0.03	0.34	0.03
.. 20	0.06	0.06	0.00
.. 27	0.08	0.04	0.04
June 3	0.07	0.09	0.01

— A new SHALE PAINT has been introduced by Mr. J. JOHNSON, of West Hartlepool. He takes shale and reduces it to an impalpable powder, and this on being mixed with linseed oil, or other vehicle, can be ground in the ordinary manner adopted by paint grinders, and makes a pigment of various tints of umber. To obtain different shades of colour the shale is calcined in either of the following ways:—By exposing in an oven or furnace from one to three hours, thereby making black; or from three to eight hours, making dark and light umber colours; by firing the shale,

which readily ignites in its natural bed in the earth, when yellow and different shades of red are produced; or by mixing the powdered shale with water, moulding it into bricks, drying, and afterwards burning them in an oven or kiln, in the usual manner employed for bricks and tiles.

— Mr. BROUGHTON, the Government quinologist at Ootacamund, has succeeded in extracting CARBOLIC ACID from the *Andromeda Leschenaultii*, a common plant on the Nilgeries. The acid thus obtained differs in some respects from that procured from coal-tar, being less deliquescent and far more pure, so that it would be an admirable substitute for carboic acid in delicate cases. The plant is said to be inexhaustible, but the process of extraction is rather costly; nevertheless the Madras Government considers that Mr. BROUGHTON'S discovery is one of importance, and that it should be made known in England as well as in India. The acid is now employed to so large an extent as a disinfectant, and for medical purposes, that it is worth notice that, in the event of war, we should not be wholly dependent upon Canada and America for our supplies.

— We are informed that in addition to the extra prizes already offered by the Rev. E. HAWKE for Hollyhocks, and Mr. KEYNES for Dahlias, at the AUTUMN SHOW of the METROPOLITAN FLORAL SOCIETY, Mr. W. CHATER will offer a PRIZE of one guinea for the best seedling HOLLYHOCK.

— There is a small-berryed variety of COFFEE CULTIVATED in JAVA which a little animal, known as the Musang (*Pardoxurus Musang*), is particularly fond of. The animal, though naturally a destroyer of rats and mice, consumes such extensive ravages in the coffee plantations that it is commonly called the coffee rat. It prefers the small-berryed fruit above referred to. Its habit is to devour the ripe fruits, masticate and digest the pulp, and reject the horny seeds, which are afterwards collected by the natives for use.

— The rationale of the process adopted by M. MORANGE in his treatment of TREES affected with CARRIES, and to which we have already alluded, is sufficiently simple. He removes the decayed tissues with a gouge, pares the edges of the wound, and fills the cavity with Portland cement—*voilà tout*. In the case of a tree still young and vigorous, this proceeding is said to be, and we have no doubt it is, very satisfactory. Mr. MORANGE'S testimonials are of the highest character, and his address is No. 5, Exmouth Villas, Richmond.

— From time to time the subject of a SUBSTITUTE for LAWN GRASS comes before our notice, and, as in the case of *Sagina pilifera*, which was so widely advocated some years since, most of the plants proposed to be introduced have failed to attract any prominent interest in some particular. Sir R. SCHOMBURGK has introduced *Cynodon Dactylon* to the lawns of the Adelaide Botanic Gardens with considerable success; but the latest innovation in this direction is that recorded by Prof. ARCHER, who tells us that in the Governor's garden at Europa Point, Gibraltar, *Sampshire* is used instead of grass to form a green sward round the flower-borders; the small lawn in front of the house being a carpet of *Sampshire*, with a few small flower-beds. In the Zoo of the Garden of Brussels we were surprised to find *Plantago lanceolata* used for this purpose.

New Garden Plants.

LYCASTE LINQUELLA, n. sp.

Bractea cucullata ovarium exsertit; sepala oblonga acutis, lateralibus deflexo-curvatis, medio connatis, extimiformiter retortis; petalis rhombicis, utrinque oblongatis apice obtusis acutis; labello elongato basi utrinque angustis constrictis laciniis lateralibus dilatatis antrorsum oblongis angustis, laciniis media a basi antrorsum ligulatis, lobis brevibus, brevibus, utrinque latissimis retuso emarginato porrecto inter lacinas laterales basin laciniae unguis, tegenti, lacinia elevatis per lacinae terminis; columnae brevissimae.

A species having a close affinity with *Lycaeste ciliata* and *lanipes*, but widely distinct in consequence of the very original callos and middle lobe. It may come from Peru. Flowers whitish. We are indebted for it to Messrs. Veitch. H. G. Rehb. fl.

ONCIDIUM BRYOPHYLLOIDUM, n. sp.

(*Heteranthera basitata*) pseudobulbis ligulato-pyriformibus acutis parvis congestis; foliis lanceolatis angustatis raris densissime floribus stellatis obtusis foribus evolutis paucissimis efferentibus; sepalis ligulatis acutis; petalis subobtusatis bene distinctis; labello panduriformi, brevibus, utrinque angustis, amplis, isthmo brevissimo, angustissimo, lacina media reniformi, subcucullata, callo quinquieserato in basi pseudobulbi, callo parvo trilocari, extorsio parvo reniformi, rostellis orthorhynchis, buccis emarginatis, alis semiovalatis lobatis basi acutangulis mucinis.

The heteranthous *Oncidia* are very peculiar plants, on account of their dimorphic or polymorphic flowers, but we cannot remember amongst them any such elegant plant as the one we now describe. It has a basal peduncle, wide panicles, full of greenish stars of greenish needles, forming a mossy mass—hence we have given the name of *bryophyllum*. Between these green masses stand single gay golden flowers, with rich purple streaks and blotches. One might compare the whole to the German Christmas tree—"the Christbaum,"—the Fir on whose branches nectaries consisting of fruits, lights, sugar and

spice are suspended for the benefit of good children, or even of those who are no longer children.

This lovely gem is one of the recent introductions from Central America, by Messrs. Veitch. *H. G. R. fl.*

DAVID MOORE, Ph.D.

In more senses than one the subject of this notice may be called a representative man. Dr. Moore forms one of a brilliant galaxy of botanists and gardeners, who have constituted an era in gardening. Not to speak of botanists past and present, with whom Dr. Moore has been more or less associated, the names of the following, among many of Dr. Moore's horticultural compeers, will prove the correctness of our assertion:—Messrs. McNab, of Edinburgh; Murray, of Glasgow; Cunningham, of Comely Bank, Edinburgh; Aiton, of Kew; Paxton; Cameron, of Birmingham; the Shepherds, of Liverpool; the Baxters, of Oxford; Marnock, of Regent's Park, and many others known to fame.

Dr. Moore's career is a specially instructive one for young gardeners. Born at Dundee, David Moore

was early apprenticed to the late Mr. Howe, then gardener to the Earl of Camperdown, at Camperdown, near Dundee, whose garden was one of the most complete at that time of day. After occupying for some time the post of foreman in that establishment, the young aspirant passed some time in the nurseries of the late Mr. James Cunningham, of Comely Bank, Edinburgh, famous at that time for the extent and variety of its collections. From this establishment, in the year 1838, Mr. Moore proceeded to Ireland, in the capacity of assistant to the late Dr. Mackay, the director of the Botanic Gardens of the University of Dublin. Five years later, we find Mr. Moore engaged on the geological survey of Ireland, a position which afforded him the opportunity of visiting a large portion of Ireland, and enabled him to make numerous botanical discoveries.

In 1838, Mr. Moore became the curator of the Royal Dublin Society's Botanic Gardens, Glasnevin, an office he continues to fill, in a manner which has been as beneficial to the garden as it has been honourable to himself. During this lengthened period Mr. Moore's contributions to various branches of science have been numerous and important. We cannot here enumerate a tithe of these publications, but we may state in general terms that they have reference to vegetable physiology in general, the growth of wood, the description of plants new to the flora, especially Cryptogamous plants, the grasses best suited for agricultural and other purposes, and last, not least, the valuable "Cybele Hibernica," in conjunction with Mr. A. G. More, and which is replete with interesting observations on the climate of Ireland and its relations to vegetation—a portion of this appeared in the report of the London Botanical Conference in 1866.

Among new plants, the introduction of which is due to Dr. Moore, we may cite *Glycerium argenteum*—the Pampas Grass, *Franciscia latifolia*, *Lilium giganteum*, *L. Wallichianum*, various Water Lilies, Passion-flowers, &c. Dr. Moore was also one of the first, if not the first, to raise foreign Orchidaceous plants from seeds (see *Gardeners' Chronicle*, 1849, p. 549). Dr. Moore's travels on the Continent in search of plants, and while engaged on scientific missions, have been numerous. The details of many of them have been given in our own columns. Dr. Moore formed one of the representatives of British horticulture in Paris during the Exhibition of 1867, and also in St. Petersburg in 1869. In fact there is scarcely a country in Europe which Dr. Moore has not visited in the cause of horticulture and botany. Dr. Moore's services to science were appropriately recognised in 1865 by the

University of Zurich, which conferred on him, at the instance of the well-known geologist, Heer, the degree of Doctor of Philosophy.

From this hasty and condensed sketch it may be seen how Dr. Moore has risen through all the ranks of gardening to his present position. No one who knows him personally, or even by repute, will grudge him his well earned honours, for a more thorough horticulturist and a better friend it would be difficult to find.

ALPINE FLOWERS.

If plant-hunting in general is a delightful and instructive pursuit, it becomes doubly so in a mountain country. Not only are most of the alpine flowers particularly beautiful in themselves, but the variety of elevation and consequent temperature enables us to study many of them under very different circumstances. Many others refuse altogether to modify their habits, and evidently declare that they will only live at a particular height above the level of the sea, or in one particular kind of situation; and it is a matter of no small

in the neighbourhood of Zermatt. Thus, while some flowers give a kind of barometrical indication of their situation by the season at which they bloom, others tell the same tale by their stunted or luxuriant proportions. The same remarks of course apply to all hill regions, and I have been equally interested among the Organ mountains of Brazil in watching the gradual diminution of the magnificent bamboos, from 60 to 80 feet in height to about a third of the size, as we ascended a few thousand feet above the hot and teeming forests of the lower land.

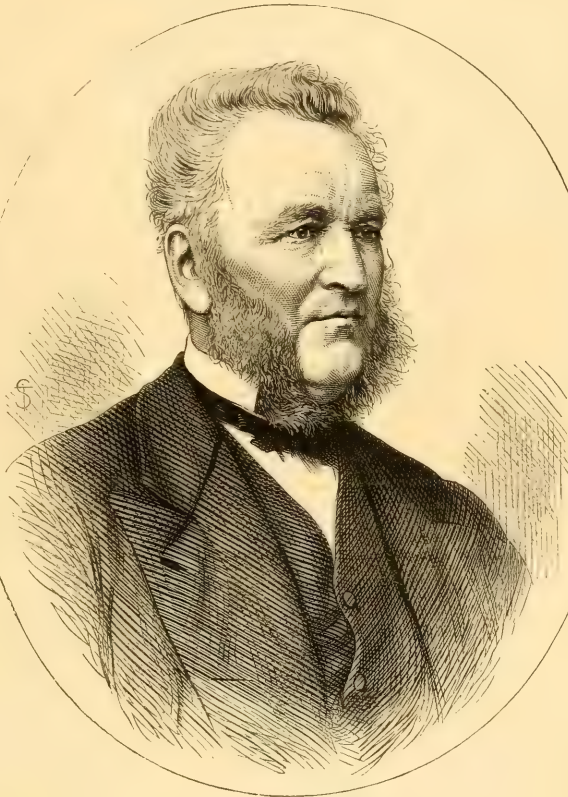
So also with respect to Ferns. The Swiss Alps contain, I believe, no species of Fern that is not occasionally found in Great Britain; while, on the contrary, after many years of looking through most parts of Switzerland, I have never there found a single specimen of *Scolopendrium* or *Asplenium Adiantum-nigrum*. If, however, we include the Alps from the Adriatic to the Mediterranean, we soon add to the British Ferns several which, like *Pteris cretica* and *Nothochloa Marante*, require protection in an English winter, as they do not frequent great heights above the sea.

But some of the harder species which are common to both England and the Alps, have a very great range of elevation among the latter; and those who collect them will be much struck by observing the difference of appearance imposed upon them by a difference of conditions. Take, for instance, the Holly Fern, *Polystichum Lonchitis*. The finest specimens I have ever seen of it were in the Creux des Champs, at the foot of the Diablerets, where the fronds rose in magnificent crests, some of them being 2 feet 4 inches in length. About a third of the way up the Faulhorn from Grindelwald, they are almost as fine, and far more numerous; at the base of the Fée Gletscher Alp, and on the lower slopes of the Weissmies, the diminishing process may be seen; while hidden in the interstices of a group of loose rocks not far from the foot of the Riffelhorn, at a height of about 8600 feet, I know of a few specimens which, though very interesting in respect of the elevation at which they contrive to exist, are scarcely larger than those for which the Keswick guides endeavour to extort fabulous prices. Close to these, and concealed by the same friendly stones from all but the most inquisitive eyes, may be found a few tufts of *Asplenium viride*, with fronds of about half the usual length, but double the usual number—evidently the very best arrangement that could be devised for their protection at such an unaccustomed altitude. *Cystopteris fragilis*, in the same place, is not only

dwarfed, but much beaten about by weather. About 100 yards further, however, in the recesses of a cave facing the Gömer Glacier, and entirely protected from the possibility of a chilling blast, it may be found in thick bunches of delicate green fronds, as perfectly developed as if they were at the bottom of an Italian valley.

Very different from this audaciously ubiquitous Fern is the beautiful and comparatively rare *Cystopteris montana*, which confines itself exclusively, as far as I know, to one level. I have never found it except on the northern side of the central chain which extends from the Wetterhorn to the Diablerets. It is to be found within a few minutes' walk from the Rosenluth Inn; it is close to Kandersteg, at the foot of the Gemmi, and in an exactly similar situation at the foot of the parallel Rawly Pass; and it is found again in a scramble among the lower rocks on the north side of the Diablerets. All these habitats have much the same elevation, and I have never found a single specimen more than a few hundred feet higher or lower.

With the exception of the Woodsias, by far the rarest Fern in a Swiss collection will probably be



DAVID MOORE, Ph. D.

interest to watch for and determine these very differently regulated plants. The *Gentiana acaulis*, for instance, whose dark blue trumpet-shaped flowers are well known in our gardens, seem exactly the same in size and colour at the level of the sea as in its native Alps, from 5000 to 7000 feet higher. Here, in Essex, where I am writing, we had in the spring about fifty blossoms at the same time on a plant one foot in diameter. The *Gentiana campestris*, on the other hand, has a much wider range of elevation, but varies in proportion. On the Riffelberg and Eggischhorn—i. e., from 7000 to 8500 feet—it appears in myriads during August and September, but is seldom more than two inches above the ground; in the Lower Alps it may be seen somewhat earlier about 6 inches high; but in the woods of Baron Rothschild, near Tring, in Hertfordshire, I have seen it of double that size, and with far finer flowers. The common Alpine Roses, *Rhododendron ferrugineum*, may be roughly said to range through elevations of from 4500 to 8500 feet without any diminution of their size and luxuriance, but in certain unfrequented rocks of the Riffelberg I have found them covered with bloom two or three weeks after the disappearance of the last blossoms

the beautiful *Asplenium fontanum*. I have carefully examined banks, and hollows, and rocky clefts, in almost every part of Switzerland, and have never found a specimen of it except, strange to say, by the side of the carriage road from Aigle to Sépey, where it is in great perfection and abundance, but only within an area of a few hundred yards. It is said to exist still upon the *Selvê*, near Geneva, but I have never been there. One of the most interesting objects of search is the *Asplenium Capivi-Veneris*. In spite of the assertion of a too enthusiastic lady, that she had found plenty of it in the Gasteren Thal, it may be pretty confidently stated that this Fern does not exist in Switzerland proper, north of the main chain of mountains. Everybody who has been in Italy knows how universally it ornaments each shady rock from the Borromean Islands and the Grotto of Eggeria to the extremities of the Two Sicilies. Where, then, is the natural frontier or barricade of climate beyond which the universal favorite cannot pass? In the course of crossing almost all the highways and byways from Switzerland into Italy, I have always kept an eye open for the first traces of this Fern; and, for the benefit of any one who may like to look for it in the same place, I may say that the point where I found it nearest to the great mountains is among some small rocks about half-way down between Valtournanche and Châtillon. Here, thanks partly to the protection of a magnificent Chestnut tree, its conservative mantle of seclusionary existence, and was greatly interested in seeing this luxurious child of the South reduced by starvation and unfavourable circumstances to the very edge of its grave. The tender little fronds were in no case more than 2 inches in length, and were almost destitute of the branching form. They looked so small and frail, so frightened perhaps at having got comparatively near the Matterhorn, that I thought one night of extra severity might destroy them so completely that the "place thereof should no more be." I have never seen them since.

These are but a few samples of the circumstances of climate and situation which may give additional interest to the search for, and observation of, particular plants; the whole subject is full of attraction to anyone who has made the first start in it, and has found that "Ce n'est que le premier pas qui coûte." One fact cannot be too strongly impressed on those who wish to worship at the shrine of Flora Alpina—they must, if possible, visit the country between the late and the early, and the first week of August, after which time not ten flowers out of a thousand remain to be seen; it may be said pretty safely, that those who cannot leave home till the fashionable season, have no idea whatever of this peculiar glory of the Alps. The lower elevations should, of course, be chosen first for examination; Saas, Zermatt, or the Eggischhorn will keep for a week or two after such a warm corner as the Diablerets. Thus we pay a visit to the latter at the expense of the former, and the latter is more difficult to find a more beautifully-placed high-road than that by which we wind up to Sépey from the valley of the Rhone. Rather more than half-way up, where steep rocks on the left look down into the profundity of the forest-clad valley on the right, there, as I have said, you may find to your joy the *Asplenium fontanum*. Feast your eyes upon it, for you will see it no more. As you turn to your right from the pretty valley of Sépey you will see the tall stems of the large yellow Foxglove, with long spikes of Aconit-colored blossoms, and make a note to bring home some of its seeds if you pass by any of them in the autumn. As to the Hotel of the Diablerets, it is then a house surrounded by a sea of flowers. As the peasant makes play with his slashing scythe, we wonder what kind of hay he expects from a crop which consists chiefly of Geraniums, Polygonums, Orchises, purple Salvias, and gigantic Dandelions. These woods, and the wild open spaces at the base of the mountain, are a magazine of flowers and Ferns. Here are the flowers of our garden Columbine and Aconitum Anthora, the yellow Monkshood, mixed with exquisite clumps of the *Thalictrum aquilegifolium*, waving long pendulous bunches of lilac fern. Inside the woods, the ground is in many places carpeted with the delicate white blooms of the *Maianthemum bifolium*, younger cousin of the Lily of the Valley, which is itself to be found in a few places here and there. Near the top of the dream, the *Pyrola media* is accompanied by groups of *Pyrola rotundifolia*, whose tall spikes of white flowers and orange stamens would do credit to the most refined of nosegays. Yet a little further in the wood, and at first singly, then in sheets of white, come the lovely blossoms of *Pyrola uniflora*. The white wax-like stars of this gem of flowers, which for a few days scent the air around with a delicate oriental perfume, would alone be worth going far to see. T. W. Henshiff, in "Alpine Journal."

(To be Continued.)

RUSHES.

UNDER the above head several distinct plants might be enumerated, such as the common Rush (*Juncus communis*, Mey.), the Bulrush (*Scirpus lacustris*, L.), and *Typha latifolia*, L., the Flowering Rush (*Butomus umbellatus*, L.), the Bog Rush (*Scheuchzeria nigricans*, L.), the Dutch Rush (*Equisetum hyemale*, L.), &c. The most important of these, in an economic point of view, are *Juncus communis*, *Scirpus lacustris*, and

Typha latifolia, and the commercial value of these plants is indeed greater than many persons would expect. A variety of articles, such as chair-bottoms, mats, baskets, &c., are made from the stems of the Bulrush, and coopers use them for filling up spaces between the seams of casks. The common Rush (*Juncus communis*) is that which is used for making the wicks of rushlights. Gilbert White, in his "Natural History of Selborne," gives some interesting facts on the mode of gathering, preparing, and using Rushes. He says:—

"The proper species of Rush for this purpose seems to be the *Juncus*, or common Rush, which is to be found in moist pastures, by the sides of streams and under hedges. These Rushes are in best condition in the height of summer, but may be gathered, so as to serve the purpose well, quite on to autumn. It would be needless to add that the longest and longest are best. Decayed labourers, women and children make it their business to procure and prepare them. As soon as they are cut they must be flung into water, and kept there, for otherwise they will dry and shrink, and the peel will not be so pliable. The first person would find it no easy matter to divest a Rush of its rind or bark, so as to use the leaf regular, narrow, even rib from top to bottom that may support the pith; but this, like other feats, soon becomes familiar even to children, and we have seen an old woman, some blind, performing this business with great despatch, and with little fatigue to herself, and with the most regularity. When these *Junci* are thus far prepared, they must lie out on the grass to be bleached, and take the dew for some nights, and afterwards be dried in the sun."

"Some advice is required in dipping these Rushes in the grease, but this knack also has to be obtained by practice. The careful wife of an industrious Hampshire labourer obtains all her fat for nothing, for she saves the scummings of her bacon-pot for this use; and if the grease abounds with salt, she causes the salt to precipitate to the bottom by setting the scummings in a warm oven. Where hogs are not much used, the scummings, by the seaside, the coarser animal oils will come very cheap. A pound of common grease may be procured for 4d., and about 6 lb. of grease will dip 1 lb. of Rushes; and 1 lb. of Rushes may be bought for 1s., so that the dipping of Rushes and ready made mats will cost 3s. If men that keep bees will mix a little wax with the grease, it will give it a consistency, and render it more cleanly, and make the Rushes burn longer. Mutton suet would have the same effect. A good rush, which is well dried, and has been bleached, and burnt only three minutes short of an hour, and a Rush of a greater length, has been known to burn one hour and a quarter."

"These Rushes give a good clear light. Watch lights (watered with oil), it is true, shed a dismal darkness; but then the wicks of those have two ribs of the rind, or peel, to support the pith, while the wick of the dipped rush has but one. The two ribs are intended to impede the progress of the flame and make the candle last. In 1 lb. of dry Rushes, avoirdupois, which I caused to be dipped in tallow, I have found one hundred and thirty individuals. Now suppose each of these burns, one with another, only half an hour, then a poor man will purchase 800 hours of light, a time exceeding 33 entire days, for 3s. According to this account each Rush before dipping costs merely 1d., and a farthing, and one-eleventh afterwards. Thus a poor man will enjoy five weeks and three days of comfortable light for a farthing. An experienced old housekeeper assures me that 1 lb. of Rushes completely supplies his family the year round, since working people burn no candles in the long days, because they rise early to bed at day-break, and go to bed at day-break in the short days, both morning and evening, in the dairy and kitchen, but the very poor, who are always the worst economists, and therefore must continue very poor, buy a halfpenny candle every evening, which, in their case, of course, does not burn much more than two hours. Thus have they only two hours' light for their money instead of eleven."

I have quoted so much of this interesting account to show that Rushes, which are now little used for lighting purposes, and are yearly becoming less so, were about 90 years ago really important plants in this branch of economy. In Hampshire, at the present time, Rushes are little, if ever used, and about Selborne, Gilbert White's own neighbourhood, the modern paraffin lamp has almost entirely superseded the old rushlight. Nor are Rushes gathered so much for other purposes as they used to be; not many years since small rush-baskets were made in great numbers about Selborne, now they can only be had occasionally.

In Norfolk, which has always been a noted Rush country, on account of its numerous fens and marshy flats, they are still collected in large quantities, but the supply has of late years fallen off, owing to the improved drainage of the land in many districts. They are gathered chiefly by women, the best quality being gathered from the margins of old water courses. After being gathered the Rushes are submitted to a system of soaking and drying, after which they are peeled and prepared by women and children for market. This Rush market, or fair, was formerly held in connection with that called the "Magdalen fair," an annual gathering at Sprowston on August 2, but this was discontinued so long back as 1826, in consequence of its disorderly nature; since that time the fair has been held in the yard of the Artichoke Inn, Norwich.

The quantity usually brought for sale to this fair is about 800 gross, each gross contains 12 bundles, a bundle 12 whips, and a whip about 50 Rushes. The price used to average about 6s. per gross, but in last

year's fair they fetched from 7s. 6d. to 8s.; this increased value was owing to the smallness of the supply, 600 gross only being offered.

The Bulrush (*Scirpus lacustris*) is a common plant on the margins of ponds and lakes. In Norfolk it is called Boulder, and the leaves are largely used for chair-bottoms, covers for bottles, hassocks, and matting for the floors of dwelling-houses and churches, for the outside of bee-hives and horse-collars, for thatching houses, and, when very neatly plaited, it makes excellent baskets, known as "frail baskets."

The Cat's Tail, or Reed Mace, or, as it is also sometimes called, Bulrush (*Typha latifolia*), is likewise a valuable economic plant in many parts of England. In Norfolk, where it is known as the Gladden, two kinds are recognised, one called the male Gladden, and the other the female, which is used to the exclusion of the male; they are finely combed and dressed, and are used for the insides of horse-collars. Whatever uses this Rush may be put to in other countries, it is not known in Norfolk.

Instead, to whom I am indebted for much of the information on Norfolk Rushes, that in that county they are seldom, if ever, used for mats or chair bottoms, and the best, which are gathered early, are used almost exclusively for lining horse collars; sheds are occasionally thatched with them, but they are decidedly inferior for this purpose to the Boulder. Those which are gathered after they have attained a certain growth, and are called "extra long" for covering Mangels. They are tied up into bundles, and sold under the name of "shove stuff," and it has become a most valuable and profitable article. These Rushes make far better manure than any other water or marsh plants, and, except the small common Rush, are most useful as a bedding for stock. John R. Jackson, Kenw.

BOTANY FOR BEGINNERS.—IX.

It requires a certain amount of moral courage to avoid the expression of one's feelings about a Rose. The temptation to introduce one of the many pretty sayings concerning it, handed down from the time of Herodotus to that of Reynolds Hole, both inclusive, is almost too strong to be resisted, and would be quite so, but for the "speak about Roses" of the latter author.

We pass at once, then to the "comparative anatomy" of the Rose. It is perhaps fitting that we begin with the prickles. The beginner need hardly be assured that the primary object of these appendages is not that he may prick his fingers. They are rather to be regarded in the same light as the "crampans" which alpine travellers attach to their shoes to enable them to keep their footing more firmly; so these prickles assist the plant in maintaining itself in the hedgerow, and in climbing on to the hedges, and enable the branch to get with a lesser outlay of woody materials than would be the case if they had to support themselves by their own exertions. Again, the prickles form an effective defence. These explanations, we fear, will hardly hold good in the case of the garden Roses, but as these are but the civilised descendants from a once wild stock, they inherit some of the asperities of their ancestors. When we spoke of the prickles as "appendages," we did so advisedly, as we had in our mind the prickles which botanists appear between a prickle and a spine or thorn. In ordinary language the two are confounded, but the more precise botanist recognises that one is a mere outgrowth from the bark, while the other is a stunted, sharply pointed branch, and as such may bear leaves, sometimes even flowers. No one ever saw the prickle (*aculeus*) of a Rose bear leaves. The nearest quickest hedge will show plenty of spines (*spina*) bearing leaves.

A little pressure at the base will suffice to detach the prickle, because its attachments are superficial; but a spine proper cannot be removed without breaking the woody cylinder of the branch, with which it is continuous. Let this serve as a hint to the beginner, never to trust to superficial resemblances in natural history. Things may be very much alike and yet widely different in their nature.

The leaf of the Rose is a compound leaf (see p. 676), and of that particular variety of compound which is called *pinnate*, and is made up of leaflets, one on each side of a main stalk, somewhat as the barbs of a feather (*penna*) do from the quill. At the base of the leaf are the stipules (see p. 581), in this case *adnate* to, or rather only partially separate from, the leaf-stalk. The upper end of the flower-stalk or thalamus (see p. 581) is dilated into a fleshy cup, which forms what boys call the "hip," and which varies much in form in different kinds of Roses. From the edge of this cup spring five sepals, the leafy nature of which is very apparent in some Roses. In the bud the sepals overlap, imbricate as it is termed, and generally in such a manner that two are completely outside, two completely inside, and one sepal half in and half out. In other words the two outermost sepals are not overlapped at all, the two innermost are overlapped at each edge, while the intermediate sepal is overlapped on one side, and overlaps on the other. This arrangement can be seen in any young Rose bud, but there are some varieties which show it better than others, because the two outer sepals are more leaf-like than the rest. Each one of the outer sepals has on either side a supplementary lobe, so that it resembles a compound leaf of three leaflets. The

two inner sepals are quite destitute of these supplementary appendages, while the intermediate one has a lobe on its outer or exposed edge, and is destitute of any such growth on its inner or overlapped margin. As it is of a strictly scientific character, there can now be no harm in yielding to the temptation of employing the following details, which express the peculiarity just described with that terseness and precision which should characterise botanical descriptions.

"*Quinque sumus frates, unus barbatus et alter, Imberbesque duo; sum semiberbis ego.*"

The petals of the wild Rose are five in number, roundish, and scarcely stalked; the stamens are very numerous and spring together with the sepals and petals from the edge of the receptacle cup. But in the cultivated Roses the flowers are "double," and doubling arises from various causes in different flowers. Sometimes the corolla, or the petals, are really increased in number without other change, as in the hose-in-hose Primrose, but the doubling which we meet with in the case of the Rose is of another character. Here the stamens are more or less completely replaced by petals. The little cellular tubercles, which constitute the first stage of stamen-life, instead of developing into perfect stamens, assume, as they grow, a petal-like form. Sometimes, as in the flower before us, the change is not perfect, and we meet with some bodies part staminal, part petaloid. Our flower, then, differs from the wild type of Rose in the substitution of petals for stamens, or, as it is sometimes, but less correctly, called, the metamorphosis of stamens to petals. This statement is incorrect, because the organs in question never were anything else than what they now are.

The florists often horrify the botanists by the artificial and arbitrary character of their rules and "points." The botanists have their revenge, for does not a botanist call a double Rose a "monster?" and such, anatomically, it is. It so happens that monsters among animals are repulsive (except to an anatomist, to whom nothing that God has created is absolutely repulsive), while among plants they often constitute the most useful and most ornamental of all vegetable products.

The pistil of the Rose consists of a number of carpels springing from the bottom of the receptacle. Each carpel is shortly stalked (fig. B), and consists of an ovary with a single ovule (seen in section at C in fig. 153), a long style, and a small terminal stigma. If the reader will now look back to the Apple described and figured at p. 581, he will see that, so far as the flower is concerned, there is a great resemblance between the Rose and the Apple; the principal differences between them are, that the leaves are simple in the Apple, compound in the Rose; while in the flower (setting on one side the "double" condition above alluded to), the chief difference is, that the carpels become in time incorporated with the receptacle, as already explained; while in the Rose, although the receptacle swells and becomes succulent, the carpels remain free from the receptacle throughout.

In fact, the Rose and the Apple are included by botanists in the same natural order, Rosaceæ, but in two different subdivisions of the order—the Roseæ and the Pomaceæ—characterised specially by the fruit, as already explained.

Home Correspondence.

Cool Treatment of Orchids.

A pressure of other work has prevented me from taking part in the discussion that has been going on with reference more particularly to cool Orchids. I hope to be able in a short time to write more fully upon the subject. Meantime I hasten to reply to "Ex-Cantab's" queries (see p. 712). In reply to the first question: "Did he find any *Odontoglossums* grown as recommended by 'G. H.?' I did, in one or two places; but the plants, instead of being cultivated, as I understand the meaning of the word, seemed in a bad plight. A continuance of the hot dry atmosphere in which they were confined would certainly kill them. On the other hand, in reply to the second question: "In what condition were the plants in the cool houses visited by him up to that time?" I have to report most favourably. I found in at least three, if not four, of our well managed Orchid establishments a proper state of cultivation. I found that the imported plants, instead of having their pseudobulbs desiccated, and the young growths becoming less and less under the artificial régime,

were increasing in bulk, and that the leaves, instead of being elongated and wanting in substance, were rigid looking, and rustling to the touch. Moreover, instead of the chlorophyll being stolen by too great heat and light combined, it was heightened in colour to the extent described by your correspondent, and docketed by yourselves with an example before you (see p. 677). The houses where the best examples were grown were low—the plants quite in proximity to the glass, and the temperature during early summer such as one would expect an ordinary conservatory to be. They had been wintered in houses of corresponding temperatures to what your "Home" correspon-

course, we must have all the light at command from October to March, and the plants would only have to be taken to such a house as a summer residence. In fine, it is but justice to say that "G. H." has written some very good letters, particularly about warm Orchids, and the advantages that result from some such medium for dispensing moisture and ammonia, &c., as has been said; but, in justice to your readers, and to such of them as seek instruction from your pages, it must be said that he totally misunderstands the climate necessary for the cultivation of many of the choicer *Odontoglossa*. He will find it more profitable to himself, and for the gems he wishes to cultivate, to abandon his extreme idea of 70° as a mean for winter temperature, and to follow the plan recommended by "Ex-Cantab," "Scrutator," and others, of growing them under the cool, moist influences their letters recommend. James Anderson, Meadowbank, Uddingstone.

Good Herbaceous Plants.—In the paper you did me the honour to insert last week, *Doronicum Chasii* should have been *D. Clusii*. I would recommend all lovers of hardy herbaceous composites to grow *Senecio Doronicum*; it is very tidy in its growth, and its large, deep orange-yellow flowers come in most usefully when the last of the Leopard's Bones are fading away. *Pascalia glauca*, too, is a handsome thing in this line, but it has a habit of running about like *Twich* under the ground, and appearing promiscuously on the surface, which is rather troublesome. I am very much pleased this year with *Arctotis aureola*, a half-hardy Composite, with enormous deep orange Gazania-like flowers, and silvery foliage, very like that of *Cineraria maritima*, most ornamental for summer bedding. There are several other very beautiful species of *Arctotis* which ought to be grown in every summer herbaceous garden. I do not know where to get hold of them, or I would try. Can any of your correspondents tell me where I can get a young tree of *Pyrus spectabilis*? I saw it in bloom this spring for the first time in my friend Mr. Ellacombe's beautiful garden at Bitton, and have dreamt of it ever since. I am also anxious to recover *Psoralea palestina*, which every one admired in my garden last summer; but it would not strike or ripen its seeds, and the severe winter killed the old plant. Does any one cultivate it? *H. Harpur-Crewe, The Rectory, Drayton-Beauchamp, Tring.*

Aquilegia glandulosa.—We beg to send for your inspection a specimen of our *Aquilegia glandulosa*. This improved variety of the glandulosa was raised by us upwards of 20 years ago, and is not a new plant; but as we think it is rarely found in the English gardens, and having observed some other kinds recorded lately as the finest of the Columbeæ, we are induced to send you the accompanying specimen. Being grown in open ground, much exposed, the plant is less vigorous than usual, arising from the unfavourable spring and recent severe frosts, yet, in this quarter, it is the most ornamental herbaceous plant of the season. *John Grigor & Co.* [We can only repeat what was said in these columns, June 17, 1848. It still remains one of the handsomest hardy perennials in cultivation, and is far too little known. EDS.]

Insect Agency in Malformations.

—I was very much struck the other day with the abnormal appearance of some of the branches of a small tree of *Fraxinus lentissolia*. Instead of the long, narrow, distant leaflets of the ordinary leaf, these branches exhibited leaves with much shorter, broader, and more crowded leaflets. At first sight I took it for a sport, but the paler green of the leaves induced me to examine them, and I found that the under surface was literally covered with aphids. This may be a common occurrence, but I have not observed it before. There are many well known cases of malformations caused by insects, but the most remarkable I have seen or heard of are the vesicles of the petioles of many *Melastomaceæ* shrubs of the genera *Toococa*, *Calophya*, &c., which are almost constant. *H.*

Seedling Orchids in a Cool House.—The extract from the "Orchid Growers' Manual," given by me at p. 712, will be found in the third edition of that work. At p. 713, "G. H." favours your readers with his views upon the resting of Orchids. I shall not follow up that subject at present, as we have not yet finished the discussion upon cool treatment. I find that I omitted a very important item in my note at



FIG. 152.—MARÉCHAL NIEL ROSE.



FIG. 153.

A, Section lengthwise through the flower; B, Carpel separated, showing a stalked hairy ovary, surmounted by a long style, at the end of which is the stigma; C, Section through the flower; D, Intermediate organs, partly petal-like, partly stamen-like.

dents have already given, and what I have myself always insisted upon—something like the temperature necessary for wintering *Pelargoniums*. Allow me to add that lengthened practice has confirmed the wisdom of the practice adopted for our modern system of growing the beautiful species of plants in question. I find the greatest difficulty in keeping many of the *Odontoglossums* cool enough during our summers, and in very warm weather have to temper the sun-heat with extra shade. I believe, to grow the choice sorts that come from 6500 feet above the sea, and upwards—about Bogota, for instance, and some of the Peruvian *Cordilleras* of that and a higher elevation, where Orchids have been found—that a north-asp summer-house is really in demand. I had grave doubts about that at first when it was proposed by Mr. Bateman, but I see now the value of some such a medium. Of

is soft and elastic, like the Wellingtonia and Taxodiums. T. Wynne, Gr., Holbrook Rectory, Suffolk.

Pot Vines at Casewick Hall.—Reading Mr. Gilbert's account of Casewick, I was much surprised to read 20 to 25 bunches upon pot Vines grown there. This will certainly make some of us toss up the sponge. I have always considered 12 to 13 bunches a large crop, and 8 bunches an average crop—bunches weighing from 3 lb. to 1½ lb. But 25 bunches—why, this is a crop for an established Vine to carry, pruned on the spur system, on a trellis 16 to 18 feet long. I shall feel obliged to Mr. Gilbert for a little more information on the aforesaid Vines—what sized bunches and berries they were, and how they coloured. Perhaps Mr. Calder will exhibit a plant at Nottingham, or the 25 bunches from one plant. I am sure it would be very gratifying to the profession and the public generally. John Edwards.

Unseasonable Weather.—We have had frosts every morning in June here, with cold N.E. winds. This morning we had 4° of frost: Potatoes blackened, tender varieties of Strawberries much damaged—many as large as Hazel Nuts killed, and all the flowers killed of most sorts. Iresine Lindeni damaged, French Beans cut up severely. In my experience of gardening, which has been 14 years, I have never known so early a time of low temperature as we have had this season at this period of the year. Personally, I would much prefer a hot summer, like the last. Gardner, Hackwood Park, Basingstoke, Hants, June 5.

Cytisus Adami.—As this interesting tree is now in full bloom, I wish to enlist the assistance of those possessing it, to ascertain whether the "male" or either of the parent forms bears perfect seed. By many gardeners the ripened form is considered to be a vegetable mule, and, like its analogue in the animal kingdom, to be quite barren; but I think this point can scarcely be considered as beyond dispute. I believe there is no doubt that both parent forms, when they separate in trees of C. Adami, are as fertile as they would be under ordinary conditions. If a number of observers in different localities were to record their experience later in the season, we might have a better foundation to work upon. H.

Meteorological Observations.—The observer at Hull remarks, with reference to the low temperature recorded at that station, viz., 33°, on the 21st, that Dahlias were slightly injured by frost on that night, and that on the 23d and 24th, although the weather experienced during the day hours was very fine, the nights were cold, 36° having been registered on both nights, which is several degrees below the minimum recorded at any other station. The highest day temperature on the 24th at Hull was 58°, which is 10° below that at any of the other stations. James Glaisher.

Blue Polyanthus.—With reference to the remarks at p. 679, I beg to say that the blue Polyanthus, or rather, Primrose, was common formerly in my neighbourhood, but it is now quite neglected, probably from the dulness of its colour. For many years I tried to seed it, but in vain. I examined the flower, and found it apparently perfect, and embryo seeds were present in the germen. At last I was informed by Major T. Clarke that the pollen would be found fertile, and thereupon I crossed a very beautiful Polyanthus with it. The seed ripens in a number of plants were raised. Some had a shade of blue, but all the flowers were coarse and of bad quality. I kept the best of the bed, and for two years past have endeavoured to fertilise the blue Primrose with its pollen. The attempt has been unsuccessful. G. S.

—I am very pleased to find that the above plant is in cultivation in various parts of the country, and I am equally surprised to find that the nurserymen who possess it have not given it greater prominence. I sincerely hope they will take the hint thrown out by Mr. Crewe, and endeavour to propagate it extensively, which, by timely division of the roots, may easily be done, taking care to water the sets if the weather be dry. I think it probable that it may be known more commonly in Scotland than in England. James McPherson.

Heracleum giganteum.—I have this day tried, plain boiled, as a vegetable, the young stems and stalks of the Heracleum giganteum, and found it very good. W. C. Trevelyan, Wallington, June 5.

The Proposed Trial of Boilers.—Most cordially do I reciprocate the suggestion of Mr. Fish (p. 710) as to the desirableness of a trial of the different kinds of boilers, with reference to their applicability for horticultural purposes, so as to test, by careful experiment and calculation, their heating power and economical effect. But how and where such a trial can be carried out to a satisfactory issue, appears to me to require the most careful consideration, as it is absolutely necessary that some standard of proportion be adhered to, or as near an approximate as can be arrived at, considering the various forms and constructions of boilers. For instance, if in the Cornish, saddle, or longitudinal boilers, of whatever construction of flues, the standard was taken at 4 feet 6 inches, or any given length

approved of, so that they are kept within manageable dimensions, that would be a near guide. On the other hand, it may be contended that the quantity of water contained in the boiler should regulate the standard of capacity. Whatever the proportion agreed on, one thing is very evident, that the great variety of boilers now brought before the public, with the highest eulogiums on their merits, comprise some in which the merits are assumptive or which are doomed to oblivion without a trial at all, as they are rarely heard of after the first *début*. This fully justifies the necessity for a trial of merit in horticultural boilers, as all boiler-makers would readily agree. It would be the means of placing in the hands of the public the most efficient form of boiler, and would to a great extent obviate the chances of failure, which are now so general. Geo. Westland.

Setting of the Muscat of Alexandria Grape.—A good deal has been said lately respecting the setting of fruit in certain conditions of the atmosphere. &c. Whatever exceptions may try to prove, yet the old rule, "Sun and showers," still holds good for the setting of good crops of most fruit, provided that other matters are right. Hence the old saying, or rather the saying of old folks, "What a beautiful shower for the blossom." They have not said this after a close study of the structure of the flowers, or the state of the pollen, but after three or four seasons of observation—the result of such weather. Perhaps of all fruit without or within doors, none are more precarious in setting than the Grape known as Muscat of Alexandria. From observation, extending over many years, I have always found that there is a decided difference in the setting of the bunches according to the position they may be at the time of blooming. Those bunches in the full sunshine and nearest the glass are always the most thickly set; those enjoying the most light are always better than those shaded. Now, although those nearest the glass are, from the accumulated moisture which at night covers the glass, more



FIG. 154.

liable to get hurt by it than those further away from it, yet it is not so proving perhaps that a certain amount of moisture in the air is necessary to the well maturing of the pollen, and that sunshine is not absolutely necessary, provided the blossom is exposed to light for its ripening, although the air may be charged with moisture. Having these thoughts on my mind I treated a bunch of this variety of Grape on a young Vine started in January. It was fully exposed to the sun, and with the exception of the time when the sun actually shone, was in the time of its blooming subject to an extraordinary amount of moisture in the air. It was cut, May 20, as "yellow as a guinea." It was, however, not quite ripe, although yellow as gold for a week or two previously. These facts confirm me in an idea I had long ago of training this Muscat, if opportunity offered, and which I illustrate here (fig. 154), subject to any one who may think proper may try it if they intend planting Vines of this kind. The sketch is intended to show the mode of training, on looking in from the outside of the front of the house, the direction in which the sun shines upon the Vines. The wires, with the exception of the upper one, which is intended for the extension of the wood beyond the bunch, are strained on perpendicular "eyes, which are fastened to the principals. This gives a miniature upright trellis to train the young shoots of the Vine. The Vine having all its shoots on the upper side, the shoots would grow up the bunch and down the side of the house. This arrangement, with a little regulation of the leaves, would, I believe, give exposure to the bunches, and success both when setting and ripening the fruit. Henry Mills.

Horticultural Boilers.—I was much pleased to see the woodcut of Mr. Z. Stevens' improved Cornish boiler. The experience related is very gratifying to me, as I designed a somewhat similar one, and it has heated my Orchid-houses for more than eight years. Mine differs in three points from Mr. Stevens', and I think if he will adopt them, the improvement in heating power will satisfy him. 1st. I believe mine was the first boiler ever made with the end containing water, some are now called terminal boilers. 2d. The flange in mine passes through two large tubes, surrounded by water; they strike against the terminal end, and are turned downwards sideways along two flues, one on each side the

boiler, then return again along the sides lower down, and into the chimney. 3d. The upper part of the boiler should be covered with sand, which, when dry, is a good non-conductor of heat. My notion is, that by having a flue over the boiler, heat is abstracted from the boiler. Robert Warner, Broomfield.

Tree Fern with Branching Growth.—In your number of May 13 a sketch was given of a Tree Fern with branching growth, and a statement made to the effect that the branch or crown was the result of accidental stoppage in the growth, which I admit might have been the case, but I have more than once in my travels seen similar examples. In fact in our large conservatory here we have three out of four plants of Dicksonia squarrosa, producing crowns or axillary (?) buds on the stems, and on stems that are perfectly straight, and which seem never to have had the slightest check. We have also raised fine plants of this particular fern from roots or suckers, and I apprehend the crowns which have made their appearance on the stems are the results of roots becoming thickened, then forming buds, and latterly plants. I am led to suppose this from the fact that I have raised plants of Platycerium grande from roots under similar circumstances. William Payne, Norwood Nursery, Yorkshire.

Nightingales in Warwickshire.—In your paper of the 20th Mr. Wynne, writing from Holbrook in Suffolk, after expatiating on the delights of nightingales, says, "I never heard one in Cheshire, Warwickshire, &c." My memory tells me of nightingales singing in Warwickshire for more than 50 years, but to satisfy Mr. Wynne I annex the last 10 years' dates of their first arrival being noted at Holbrook in Warwickshire, adding for general information those of swallows and cuckoos:—

Year.	Swallows.	Cuckoos.	Nightingales.
1862	April 17	April 18	April 28
1863	" 17	" 20	" 20
1864	" 12	" 19	" 21
1865	" 4	" 17	" 21
1866	" 13	" 21	" 19
1867	" 8	" 19	" 18
1868	" 13	" 22	" 22
1869	" 7	" 18	" 22
1870	" 10	" 13	" 13
1871	" 5	" 17	" 18

Charles M. Caldecott, Holbrook Grange, Warwickshire, May 29.

The Blight.—Unfortunately my experience fully coincides with Mr. Barnes' account of the ravages of caterpillars, maggots, aphids, and honeydew. The trees in the vicinity of Brighton, and especially the Currant bushes, are infested to a degree that I never witnessed before. Many of the Currant bushes are already quite denuded of their leaves, and the berries shrivelled up, and I fear that another week or so will see that crop at least totally destroyed. The under surface of the leaves is literally covered with green-fly, and the upper surface with honeydew. The rooks and starlings, and other birds, are very busy in the Apple trees, &c., looking after caterpillars. Gooseberries are good and abundant, and scarcely touched by caterpillars, and even those growing amongst Currants free from green-fly and honeydew. Strawberries flower profusely, though the late frosts seem to have affected the early blossom, and warm showers are required now. H.

Foreign Correspondence.

MOROCCO, May 5.—Here we are in Morocco at last, after a four days' rather hard journey from Mogadore; for, though the weather was not over hot, we did so much botanising on the march (of about 30 miles a day), and were kept up so late at night putting our plants in paper, that we were getting very fatigued towards the end. Our route for the first day and a half was through the Argan (Argania Sideroxylon) forest; the country was hilly and often picturesque, the trees all small and scattered; they are evergreen, and at this season loaded with flowers and Olive-like fruit, curiously enough, no other sort of tree is found throughout the greater part of the Argan forest. Many of the trees are gnarled and stunted, from being browsed by the goats; and it is not uncommon to see a misshapen, knotted, and gnarled tree, 20 to 30 feet high, tenanted by goats, perched on the branches like birds, shaking their ears, and nibbling away at the young foliage. Beyond this forest we crossed a few miles of fertile hilly region, and then nearly 100 miles of vast stony plains, reaching from the foot of the Atlas to the south, to the horizon on the north and east; brown and yellow stony, rocky, or sandy desert land, broken here and there by low isolated hills, or short ranges of naked, flat-topped hills, with horizontal stony strata near the summit, and sloping sides. Sometimes these plains are white with an Artemisia, or yellow with thin withered grass, or spotted green with Salicornia and other saline plants. The Zizyphus (a kind of thorny Jubae), like Syon, and the abbeys of Syon, and the fruitless, small evergreen bushes, are about the only green things of 6–10 feet high, to be seen, occurring as scattered individuals. Here and there a spring issues, fed by underground streams from the Atlas

(50 miles distant), and produces an oasis, indicated at a distance by a clump of Olives, and rarely a Date Palm and some fields of Barley, now being cut. On the grey slopes around these oases there is generally a village, so called by courtesy, consisting of a square area fenced with dead grey branches of Zizyphus, piled up as a low wall, and enclosing a few wretched straw hovels like beehives blown on one side, and a few black Arab tents, looking as usual like bloated brown spiders, from their squat form and long black ropes of hair. Moreover we met with a *Caid* or governor's house, a large square mud-walled building with low towers at the angles, no windows, and desolate-looking beyond conception. We saw few birds or insects but sluggish black beetles, and no wild animals; but the ground is riddled here and there by the holes of a field-rat or mouse, and we also saw many holes grubbed by wild boars.

Scorpions are abundant, ugly yellow creatures, 2 to 3 inches long, which career along the ground with great rapidity after their prey, in curious circular sweeps. Of snakes we have not seen one. Storks occur in every village. There are no jackals, and the dogs are wonderfully quiet. As we approach the city of Morocco, and, when still 18 to 20 miles off, the tower of the great mosque appears on the horizon, the ground is more covered with bushes of white *Atriplex*, with *Zizyphus*, *Salicornia*, and *Lycium barbarum*; a few streams, bordered with glorious bushes of *Oleander* and *Albizia*, flower; wind across the plain, the subterranean courses of others are marked by wells sunk down to them through the gravelly soil by the Arabs, for the purpose of irrigation; but nothing is seen of the city till it is just reached, its position only is marked out in the near distance by groves of Date Palms (which do not ripen well), and by a few more mosque towers.

The days on these plains are dry, warm, and dusty, and must be intensely hot in summer; the nights are cool, and dew falls nearly so at this season. It would do an English gardener's heart good to see how well *Oleanders* grow and flower; or rather it should put him to shame for his gross mismanagement of so superb a plant, which wants abundance of water in the wet season, and drought in the flowering one, followed by a thorough drying.

Morocco itself is the most wretched city I ever beheld; the stronghold of fanatic Mussulmans, and a scene of unrelenting and unchristian intolerance to inhabit there, but one in it now, and few leaves to-morrow! The Palm trees around it are magnificent, both in stems and foliage; the former are used for lintels, rafters, beams, &c., and the latter for sweeping floors. Except on the side where these Palms grow, and where are many so-called gardens, enclosed by low mud walls, the environs are bare, hot, and dusty, and not safe by night, on account of robbers. The extent of the hills is enormous; they are lofty, cracked, and absolutely ruinous in many places; the huge lancers and shapely fortifications (crowned or rather crested with storks and their nests) are literally crumbling down; masses of brick and mud rubbish, several feet high, encumber the streets; open swamps of fetid sewage load the air with noisome stenches; and here and there a beautiful Moorish gateway is seen, piercing a black mishpan wall 50 feet high. Over the walls peep rounded masses of bright green Figs, silvery white pears, and green apples; and a few Palms, with here and there a Celtis. Except a few white-washed houses near the walls, roofed with green enamelled tiles like those of the Kremlin at Moscow, from outside no house is visible. The towers of several mosques are very beautiful; square, with the faces tessellated with blue and green tiles, but much cracked, and presenting great patches of yellow mud or brick where the tiles have fallen out.

Much of the part of the city we have yet visited consists of bare, rocky, and mud and sand visible, no boulders or brick tiles, and crowned with withered herbage; entered by low apertures, and displaying within heaps of square hovels lower than the enclosing area walls—so low that one cannot stand half upright in them, and without windows, doors, or other break of surface, and all squalor within.

To-day we have had an audience of the governor, El Grawi, the most potent chief in Morocco, who rules all the Atlas provinces, and who has just been given orders to provide us with entertainment, guards, and every facility. We entered a courtyard with a mud wall, full of filth and rubbish, left our mules there, stooped under a low door, and, mounting a very narrow, steep staircase, were ushered into a gem of a room as large as that in the Crystal Palace at Lambra, covered with hexagonal tiles of the loveliest patterns and colours, and surmounted by a lantern with a profusely ornate and woodwork. El Grawi is almost a negro, about 60, utterly ignorant, not able to read or write; he received us most graciously, gave us green tea with mint, in English coffee cups, and several dishes of food; and chatted pleasantly, through our interpreter, promising us every facility for starting in a couple of days.

And now a word about the Atlas: it presents a long range of either lofty, not very rugged-toe mountains, which are estimated to be about 12,000 feet, and rise a steep face to the North, deeply seamed with gulleys that are full of snow, which extends downwards for apparently half their whole height; none are

snow-capped, nor do they present any fields of snow or glaciers, neither do the snow streaks reach to the tops; in this respect, of the long far-descending lines of snow, not connected with any snow above, they are quite unlike any mountain range I have seen. We are all very curious to ascertain the structure of this chain, both topographically and geologically; the maps are ridiculously wrong—in fact, Morocco is an unknown region in every sense, and a very difficult one to get any knowledge of. The Sultan and his officers are violently opposed to Europeans, and the English, whom alone they respect, are only tolerated. The permission granted me to visit the Atlas is regarded as unique, and it could only have been gained by very strong representation. The mountains abound in iron, copper, lead, and other metals; but the Sultan will not have them worked, as it would admit European capital and influence.

Camp, Atlas Mountains, May 19.—You will be glad to hear that we have been to the top of the crest of the Atlas, nearly due south of Morocco, though not to the highest point, after a hard climb and in a heavy snow-storm. I do not think we should have got up at all had I not found a mule track leading to a pass into the (trans-Atlas) Sus Valley, for we were vehemently opposed by our guides, whom we had to bribe to permit us to go on, and who, poor wretches, were bare-legged, and two of them barefooted! The top of the pass (the track to which followed a stream in a gully) was about 11,500 feet, the upper 3000 feet of which are very steep indeed, very rocky and stony, with a good deal of snow, and, after all, neither Bull nor I got to the very top! We had lagged a little behind, botanising, and Maw went ahead, and just managed to reach the top in a hurricane of snow, and temperature 24° Fahr.; he returned at once, and joined our guides in dissuading us from attempting the last 2000 to 300 feet. It was well we descended, for the storm raged furiously, and for 2000 feet of the descent the sleet and hail beat against us. Of course we saw nothing from the upper regions, and I do not suppose that there was much to see except rugged rocks, peaks, and slopes, like those we ascended, almost bare of vegetation. The flora of this upper region is excessively poor; we did not find a single really alpine plant, and few plants of any kind; no *Gentians*, *Primroses*, *Anemones*, *Ranunculi*, or other types of an alpine flora. The rocks were chiefly a very hard porphyry, red, black, and grey, with granite here and there, and beds of limestone, all hard and obdurate, and very difficult to climb. These steep upper cliffs of the Atlas are alternately roasted by a blazing sun, or parched by a Sahara sirocco, or swept by moist north-west Atlantic gales, which bring heavy snowstorms as we experienced, probably throughout the year.

The flora up to 7000 feet, on the contrary, is exceedingly rich, varied, and beautiful; and I think our collections will prove of very great interest and considerable value. Moreover, the plants are finer than elsewhere, limited, and there are an abundance of *Roses*, *Bramble*, *Elder*, *Honeysuckle*, *Ivy*, *Ash*, *Poplar*, &c. *J. D. Hooker*.

Societies.

ROYAL HORTICULTURAL. June 7.—James Bateman, Esq., F.R.S., in the chair. The international character of the exhibitions held here this season was further characterised by the presence of the following distinguished Continental horticulturists:—Professor Reichenbach, Hamburg, delegate from the Imperial Government of Germany; Professor Morren, of Liège, delegate from the Belgian Government; M. Doucet, delegate from the Belgian Government; M. Cor van der Maeren, Belgian Commissioner to the International Exhibition of 1871; M. Wautier, delegate from the Société Centrale d'Horticulture de France; and M. Marabot, delegate from the Société d'Horticulture de la Seine-Inférieure. Rouen, who were officially introduced by the Mayor of London, and their official capacity was further defined by the usual preliminary business was proceeded with.

Mr. Berkeley then addressed the meeting, first directing attention to a very interesting group of Lilacaceous plants exhibited by Mr. W. Bull, the most remarkable of which was an interesting *Attalea* species, the only plant figured in "Andrew's Repository," which, though not so brilliant in colour as many of the new species, was particularly interesting on account of its very distinct habit; and a new form of *Eucalyptus amboinensis* (shown by Mr. E. J. Barron, of the Eastern Archipelago). Mr. Bull has introduced from the island of Ternate, in the Eastern Archipelago. The only difference between the plant shown and the one figured in the "Botanical Magazine" was, that the crown of the latter was entire, whereas in the former it was deeply lobed. The latter were also, said Mr. Berkeley, two other plants in the same genus, one coming from the Solomon Islands, and the other from Australia, which he believed were mere forms of the same species, which is one of great interest. A new *Ivy*, named *Hedera congenerata*, was then acknowledged, and introduced by Mr. J. D. Hooker, on account of its distinct habit; and the speaker concluded by referring to several objects of general interest brought before the Scientific Committee, of which particulars will be found below.

The Chairman exhibited to the meeting Messrs. Veitch's specimen of the lovely *Lælia majalis*, which, after an interval of two or three years, he was glad to see in flower again. It was one of those grand Mexican *Orchids* which he had read about in his youth, the *Orchid* in which he was interested, and which he had given it by a Spanish botanist, to be a span across,

but which he had never seen until comparatively recently. The plant had also been earnestly sought for by the Hamburg professor, who came into the world about 20 years later than he did, and the Professor even meditated a journey to Mexico to search for this and other notable plants, but in the meantime, most of them, including the subject of these comments, were introduced to British and Continental gardens through the perseverance of several noted plant collectors. It comes into flower in May, and keeps beautiful for a long time. There is yet, he believed, a plant in Mexico which would be a small fortune to any enterprising nurseryman who could introduce it, namely, a monster *Cypripedium*, with spikes of large inflated flowers. One plant of this was at one time in the country, but it died, and the grand acquisition had since been heard of. It was then announced that the annual meeting of the Society would take place on July 4, and that on the Thursday following a dinner would be given at Richmond in honour of the foreign delegates.

Scientific Committee.—A. Murray, Esq., in the chair.—On this occasion the proceedings were rendered the more interesting from the presence of the foreign delegates mentioned elsewhere.

Members of the curious *Cytisus Adami* were exhibited by Mr. B. Burdett, and several intermediate forms between the yellow *Cytisus Laburnum* and the purple *C. purpureus*.

Mr. Berkeley exhibited flowers of *Lychnis dioica* affected with *Ustilago antherum*, and confirming the statement of Mr. Miss. Burdett, that the fungus is not a parasite. Mr. Berkeley also showed a root of *Vine*, the tissues of which were penetrated by *Fungus* spawn. The specimen was sent by Mr. Willard, of to the Baroness Burdett Courts, Holly Lodge, Highbury.

Mr. Berkeley also showed drawings of the roots of *Scilla bifolia* var. *alba*, with thickened roots, like those sometimes met with in *Crocus Imperati* and *Oxalis*, as shown by Mr. Munby at a recent meeting (p. 584). 2. Leaves of *Cattell's Eclipse Broccoli*, coherent at the apex, so as to form a hood over the flower, which was thus protected from frost (see p. 586). 3. Several specimens of *Roses*, from Mr. Fish and others, attacked with the *Orange Fungus*, *Coelosporium pingue*, which seems to be very prevalent this year in widely separate districts.

Mr. Berkeley remarked that this *Fungus* was propagated by spores contained in water, which, when the plants were watered—a hint to cultivators to take special precautions in this matter.

Mr. Fish in his communication stated that neither sulphur nor soot availed aught in stopping the ravages of this *Fungus*.

Specimens of Apple branches destroyed by the caterpillar of a moth, *Chematobia brumata*, sent by Mr. Alexander Dean, Bedford, with the following communication:—

"The accompanying branches were gathered from an orchard at Bedford, and are samples of the mischief and destruction that has been wrought upon hundreds of large Apple and Pear trees by the caterpillar of the winter moth, *Chematobia brumata*. The larger branch, and which has its foliage literally charred, is a sample of the mischief appearing on the trees in the orchard, and in the orchard, line after line of trees looking as though the consuming fire had passed through them. The other Apple branch represents the nature of the damage done to the major portion of the remainder of the orchard, scarcely a tree being found whereon the foliage of which has not been more or less injured. The smaller branch, which I have just sent also shows how the caterpillars, after they had stripped the Apple foliage, came down to the Currant and Goussberry bushes beneath, and served them as they had the trees above. This sweeping damage has unfortunately not been confined to the orchard, but has extended to many of the market gardens in West Middlesex, and will of necessity entail upon their proprietors a very heavy loss, as not only is the prospect of a crop on many hundreds of trees entirely annihilated for the present year, but the damage has such a tendency to be permanent, that I feel much doubt as to it. It is worthy of notice that the Pear trees have not suffered so largely as the Apple trees have, and also that the trees of dwarfier growth have suffered more largely than the taller ones. This specially noticeable was the entire damage done to the currant line, and the currant line, and the Currant the crowns of the stronger growing Wellingtons were comparatively untouched. On the whole it would be difficult to conceive a sadder specimen of the mischief insects are capable of bringing to horticulture, than was presented in the orchard. I have elicited the somewhat obvious fact that entomological knowledge was not very widely distributed amongst the market garden fraternity here. Little or nothing seemed to be known of the character or habits of the moth, or fly, usually termed here, but because there were a considerable number of large flies seen hovering over the bloom of the trees in the month of April, it was generally assumed that the eggs from which the caterpillars germinated were then deposited. Not a little of the blame is laid to the drought of last summer, and to the prevalence of the north-easterly winds during the blooming period, and which, by generating a very dry atmosphere, no doubt tended largely to assist the caterpillars in their work of destruction. The attempted remedy of dusting the trees with slacked lime was largely tried, but with little effect. Indeed, to perform this operation with any degree of success upon large trees of 40 years' growth and upwards, is a matter reasonably to be doubted.

"The most effectual preservative that can be found is to make the ascent of the trees as impossible means of ascent to the female moth, which, being without wings, has to crawl to the branches of the tree to deposit its eggs, and which operation is usually performed during the winter months. To accomplish this desideratum, a band of iron, several feet wide, and 12 inches high, is recommended, but this soon hardens, and requires frequent renewal. A considerable infusion of *gum* is

Fruit Committee.—G. F. Wilson, Esq., F.R.S. in the chair. Mr. Temple, Balrime, Glasgow, sent some beautiful Bay of Biscay grapes, which had been kept under conditions reported upon at the last meeting; and were announced as having been of the very highest flavour. Messrs. Barr & Sugden exhibited several varieties of Parsley, including the best of the curled kinds, and a very distinct variety, called 'The Lady's Finger'. The vigorous waxy large, and peculiarly curly leaves. Mr. W. Gardiner, gr., Lower Easington Park, Stratford-on-Avon, had a Special Certificate for exceeding well-kept specimens of eight varieties of Apples; he also had Mr. Tillery, Welbeck, for six varieties of Apples, also had a dish of the new seedling of the Duke of Downe's Seedling Grape, which had been kept for a long time. Mr. Douglas, gr. to F. Whitbourne, Esq., Lo-

ford Hall, exhibited a specimen of the Loxford Hall variety, green-fleshed, of very fair condition; and Mr. C. Skinner, gen. to C. W. Frinzel, Esq., Frankfort Hall, Clevedon, sent a seedling green-fleshed Melon from Canada, large, rather watery, but of very fair flavour. Mr. Cox, Madresfield Court Gardens, sent a specimen of Cambridge, the Royal Melon, a very compact Cabbage variety, from seed sown in the open ground on February 18, and rev. C. C. Ellison, Bracebridge Vicarage, Lincoln, sent specimens of the Brown Batavian, to show how early it begins to bear.

MESSRS. JOHN WATERER & SON'S ANNUAL EXHIBITION OF AMERICAN PLANTS, in the Royal Botanic Society's Garden, Regents Park, is just now in high perfection; and to judge from the great number of buds yet to expand into veritable bouquets of every shade of colour, we may reasonably be expected to continue so for ten days to a fortnight longer. The weather, which, in London all events, has so far been as unlike the pleasant month of June as it well could be, has, however, been very favourable to the Rhododendron, inasmuch that it has retarded the blooming of the latter flowering section, so that these and the later ones, excepting of course, here and there an individual specimen, are all in flower together, forming as it were a waving and undulating mass of well harmonised colour, the whole of which, taken in the gloom of the evening, presents a very striking effect. Near the broad walk, forms a picture, the like of which can only be seen at this, and the similar exhibition of Mr. A. Waterer, at South Kensington, to which we alluded last week, and which is still in great perfection. Of the plants exhibited, we saw and saw several very promising additions to the list of popular favourites, including *Perfrundum*, flowers large, smooth, pale lilac shaded with rose, and blotched with cinnamon-red on the upper petals; *Loquendum*, very bright rose with a white eye, a good variety, very attractive; and *Victoria*, bright rose, spotted black, a new shade of colour. It produces nice compact trusses, and these freely. Of older kinds, the following are especially fine in size, colour, and profusion of bloom, and well maintain the high character which has already been bestowed upon them—*Bonnie Lionel*, a flower of a remarkably fine rosy-pink flower, and probably the most admired specimen in the show. It produces a profusion of close, handsome trusses, and retains these in excellent condition for a long time of time; *Luciferum*, one of the best whites; *J. R. John*, a salmon-pink flower; *Lady Eleanor Cathcart*, a grand trusser, and very showy under canvas, being of a clear and decided rosy tint, with crimson spots; *Fantherium*, a rather peculiar flower, with fringed edges, deep rose, and darkly spotted all over; *Princess Mary* of Cambridge, white, edged with rose, and having a large bold flower; *Princess Victoria*, Gloriosa, white, large bold flower; *Distinction*, rosy-crimson, prettily spotted, has rather small trusses, but valuable as a late bloomer; *Byssianum*, white, tipped with bright crimson, very attractive; and *Vandyke*, bright crimson, a capital trusser, and free.

BATH AND WEST OF ENGLAND. AGRICULTURAL (Gleanings from the Horticultural Department).—The exhibition of flowers in connection with this agricultural gathering was not as successful as the lovers of floriculture could have desired, but the cause is not far to seek. There were no prizes, and consequently no judge, so that no horticultural exhibition could be expected. There were, however, some honourable mentions. The gentlemen who permitted their gardeners to exhibit, brought out their plants "for love." The general management and direction of this department was placed in the hands of the Hon. and Rev. T. J. Boscawen, whose labours were unceasing. The exhibition was held in a large museum, having the sides and ends of wood and glass, and the roof of canvas. The south end was set apart for specimens of Japanese plants, exhibited by Mr. Maurice Young, of Milford. Among them were examples of *Raphiolepis*, *Osmanthus*, *Crocydium*, *Thunbergia*, *Asclepias*, *Ligustrum*, *Hydrangea*, *Acanthopanax*, *Acer*, *Retinospora*, *Juniperus*, *Aralia*, *Biota*, *Thuja*, and there were some very fine standard Bays. To cultivate these plants successfully, they should be planted on a northern aspect, as they delight in cool shade and dry positions. The most valuable contributor was Mr. Ramsden, Esq., whose gardener, Mr. Kitson, had spared no pains to do justice to the famous gardens of Busbridge Hall. Conspicuous among Mr. Ramsden's plants was a good specimen of *Anthurium Scherzerianum*, whose curious reflected bracts of bright scarlet caused general admiration. Mr. Ramsden also exhibited *Cissampelos*, *Cycas revoluta*, *Seasthria elegans*, *Corypha australis*, and a splendid collection of *Caladiums*, remarkable alike for the freedom of their growth and their beautiful shades and pencillings of yellow, crimson, purple, silver, gold, and as the plants were exhibited, a few feet in height, a parti-coloured foliage was a conspicuous ornament of the tent. The *Caladiums* exhibited were *Chantini*, *pictum*, *plutarium*, *bicolor*, *bicolor major*, *pocelle*, *rubicula*, *marioratum*, *Wighiti*, *Bellemey*, *Madame Houlet*, and *Verona*. Among the plants shown above the canvas, Mr. Ramsden also sent three bunches of White grapes, grown on a Vine taken from the Redan by himself in the Crimean War of 1855. Mr. Chard, gen. to Sir F. H. Bathurst, evidenced his skill as a grower of Ferns and other plants by a fine specimen of *Latania palmifolia*, *Seasthria elegans*, *Calamus dealbata*, and *Calamus asperus*, among the Palms, and *Adiantum farleyense* among the Ferns. On the eastern side of the marquee Mr. Charles Noble, of Bagshot, had arranged a large group of blue-flowered Clematis, conspicuous in the group, among which were Mrs. Lister, Albert Victor, Lady Lonsborough, and Miss Bateman. All the plants in the group were of great beauty, and they attracted much notice from H.R.H. the Prince of Wales. As these and similar varieties of Clematis are thoroughly hardy, and at the same time, free bloomers, they will be probably soon be found climbing over the porch of

many an English cottage, as well as over the lattice-work of mansions. Mr. Noble exhibited some fine *Rhododendrons*, two specimens, one of The Queen, the other of Lady Cathcart, being remarkably fine. Messrs. Standish & Co., of Ascot, sent a few novelties. *Stratiolites orientalis*, a fine red Fern; *Antichloranthus*, a fine variety of yellow leaves; *Hydrangea*, a fine variety, with stripes running through the centre; *Coprosma Baueriana*, of nearly the same habit, having dark olive-green leaves with golden margin and occasionally a golden splash in the centre of the leaf; and *Hydrangea stellata* proflera, peculiar in that its flowers, instead of uniting to form a ball like the *Gaultheria* Rose, each form a perfect double star of delicate pink. The same firm sent some fine bunches of *Rhododendrons*. Two Cucumbers were exhibited by Messrs. Sutton—the Marquis of Lorne and Soer. The Queen of Sooty, a measure, but not a fruit, almost 13 inches; and was in its greatest girth almost 1 inch length; the fruit of this plant is in itself at once a Cucumber and a Vegetable Marrow, being eaten in China raw, boiled, pickled, &c. Mr. Burd, gen. to—Hulse, Esq., added another novelty to the Cucumbers, a fruit with a skin so fine and delicate that the rind may be eaten with impunity. A small basket of the *Mespilus japonica*, or Loquat, exhibited by J. J. Blyth, Esq., Woolhampton, Berks, was a source of wonder to many, who mistook its yellow fruit for a hybrid Orange. The exhibitor explained whence these particulars are gleaned, pathetically winds up a lengthened account of the show in the following words:—"A novel feature of the show were five unknown plants sent by the Earl of Lovelace—to be named by the great public, and the show was so successful, that of going to press, no one can name them all; and it is even rumoured that Dr. Hooker cannot give a name to one."!!

Florists' Flowers.

FLORISTS are generally agreed that the year 1870 and the spring of 1871 have been singularly fertile in fine and improved forms of that welcome and useful winter-blooming plant, the *CYCLAMEN PERSICUM*. The great work of perfecting any one particular flower is almost left in the hands of some one or two individuals; the rest is usually carried on by several cultivators, either collaterally or successively. The history of the gradual development of many popular flowers shows that it has often been given to one individual to carry on the work to a certain stage, then others take up the result at that point and do their share, to be succeeded by another set of workers as time rolls on. There is no monopoly of improvement in the realms of floriculture.

The Cyclamen has been taken in hand by many of recent years, and in each instance some quota of gain has augmented the general result, and now a new actor in matters floricultural has entered on the scene, in the person of Mr. Henry Little, Cambridge Park, Twickenham, who, smitten with the charms of this lovely flower, is gradually gathering together a collection of the finest and most advanced types on which he can lay his hands. Mr. Little makes no secret of the fact that his best flowers are not seedlings of his own raising, but obtained from other collections. With this it is his intention to be content, and he is already making a most distinct type, with a view to gain certain results, on the attainment of which he has set his mind. He is an enthusiastic amateur cultivator, tenderly loving the flowers he has taken in hand; and bent on improving the types he possesses, because of the great pleasure the work will afford him. The "pains-taking amateur florist" of the past is, happily for floriculture, not yet numbered with the "extinct species."

Mr. Little's collection of Cyclamens occupies a long low span-roofed house, in two equal divisions: the space on the north side of this house (about 3 feet in width) was, during February and March, completely filled with something like 400 plants having variously coloured and tinted flowers, scarcely any two varieties being alike. It was a charming sight, and many of the plants had been in bloom since the middle of October. Incidentally, it may be mentioned, that, even with a somewhat small collection of Cyclamens, there is no reason why they should not be had in flower from the middle of October to the end of March, with the help of a little judicious management. The collection at Cambridge Park gave flowers of the purest white; and then going on to blush, continued with deepening shades till they culminated in a rich deep crimson-carmine. It was seen that good purple tints are gradually being obtained, and in some cases could be noticed the presence of blue; also charming shades of lavender. From such a collection as this in the possession of Mr. Little, many new shades and improved types of flowers may be confidently expected.

To the production of early and late blooming varieties attention will be turned, so that a succession of flowers may be had for seven or eight months in the year, commencing with the end of September or beginning of October. Form is also an important point in the articles of Mr. Little's ideal floricultural creed. He aims at the attainment of stout, broad, well-rounded petals (segments), as far as possible in the case of that "twist" so many of them possess. Nature lends material aid in this direction, and it is in the case of one plant having a number of clear-coloured flowers of different form, there

could be seen among them two of a very superior build; these had been fertilised with the pollen of some deeper coloured flowers of fine shape, and as the plant will only be allowed to mature the pods so crossed, the result is very hopeful. Of high-coloured flowers, having form to a large extent, several fine examples could be seen; but one thing seemed certain, that with fine colour and high-class shape, there comes, at the present time at least, a sensible diminution of the quantity of bloom usually borne. Another prime consideration with Mr. Little is habit, and his ideal is that of a slightly convex mass of leaves, regularly laid on the surface, with a canopy of flowers above them of nearly equal height, the centre of the floral mass slightly raised; the flowers should be from 1½ to 3 inches above the leaves; the foot-stalks should be stout, strong, and erect; the leaves thick, and well-marked. Some leaves are already handsomely marked, almost like those of *Sonchella margaritacea*. The collection contained some very beautiful types of flowers, as, for instance, one was of a beautiful pink hue, with a carmine-purple base to the petals; this had been derived from a high coloured crossed with a white flower. The base was seen to be in several instances very clearly defined, in the form of a regular band, and without the high colour running into and staining the white. In the matter of white flowers some were found to be much purer than others. One had the segments of a flower so small, that it was almost with a tendency to twist. Another had them stouter, and it did appear that with stoutness came less of the twist. As far as it can be attained, the removal of this twist is one of the aims Mr. Little has set himself to accomplish. Another flower had deep rose-coloured segments, and a rich blood-crimson base. This was particularly striking, and had been fixed on as an acceptable seed parent. High coloured flowers are kept by themselves, so that they may be seen in their own colours. Such types require special precaution as Mr. Little considers to be imperatively necessary. The production of *bond* fide striped flowers, in which the flakes of colour shall not be the production of the mere accident of a moist atmosphere, but a normal characteristic of the flowers, is being persistently attempted, as well as the attainment of white stripes on coloured petals! The last will perhaps be realised first. I saw on a rose-coloured variety two or three flowers having two or three stripes of rose along them, and these later had been fertilised with a white variety. Mr. Little hopes that he has also made a decided advance towards *bond* fide edged flowers, and expects to reach something quite distinct in character. One variety, bearing suffused pink flowers, had the florets distinctly edged with pink, and the remainder quite white as the flowers increased in age, and so giving it quite a pink edging. Striped and edged flowers, therefore, appear to be not far distant.

Some specimens of large size were noticeable, because they served to show that bulbs after the second or third year of blooming need not be discarded, as some have taught. These specimens were from bulbs five years of age, and were growing in 24-pots. One of these was a model in point of what the habit of a Cyclamen should be, and when shown later at the Regent's Park attracted much attention. None of these plants were allowed to carry any seed, and all the decayed flowers were picked off as they came away. The principle of non-seeding Mr. Little impresses on the minds of those wishing to grow large plants for exhibition. When potted the bulbs are half buried, the soil is both stiff and good; in fact, Mr. Little holds that the Cyclamen cannot be treated too generously; and if so treated, bulbs at 14 or 15 months old will require a 32-pot. From the sides of many of the bulbs young rootlets could be seen protruding, and these thrust themselves down into the soil as additional means of obtaining a further supply of organic food.

In selecting flowers from which to seed, with a view of producing a large flowered type, Mr. Little pays great attention to the dimensions of the base of the flower; and he pointed out some that had bases singularly broad, and long though somewhat narrow petals, and these he fertilises to get increased size. There is also another thing about the Cyclamen—that many of the flowers have a tendency to decay, and as a colour appears to die out of them almost suddenly, as soon as the season of their prime beauty has passed. These are rejected; and so Mr. Little hopes, by-and-by, to reach a strain that will retain the brightness of their peculiar hues almost to the last. Every bit of seed saved has its parentage duly chronicled, in order that Mr. Little may see how far he has been able to approach a desired object, and only two or three pods are allowed to be placed. As soon as the seed is ripe enough, it is immediately sown, and allowed to take its own way; any attempt at unduly forcing it into growth is discouraged, but so much encouragement is given to it, that it speedily germinates. It is sown in pans, and placed on the cool shelf of a greenhouse, or in a cold pit, and when the plants are large enough to handle, pricked off into store pots, and finally potted singly when strong enough. Don't see heavily, is the urgent advice tendered to all improvers of the Cyclamen by Mr. Little; and in that he gives one of the points in his own cultural process that he would on no consideration think of disregarding, *A. D.*

THE WEATHER.

TEMPERATURE OF THE AIR AND FALL OF RAIN AT DIFFERENT STATIONS.

DURING THE WEEK ENDING SATURDAY, JUNE 10, 1871.

NAMES OF STATIONS.	TEMPERATURE OF THE AIR.										FALL OF RAIN.
	Highest.	Lowest.	Range of Week.	Mean of all Highest.	Mean of all Lowest.	Mean of all Mean Range.	Mean Daily Range.	Mean.	Mean.	Mean.	
Portsmouth	78.4	35.2	43.2	74.1	43.2	34.3	30.9	59.0	0.10	0.00	
Blackheath	78.4	35.2	43.2	74.1	43.2	34.3	30.9	59.0	0.10	0.00	
Bristol	77.4	34.2	43.2	73.1	42.2	34.3	30.9	59.0	0.10	0.00	
Birmingham	77.4	34.2	43.2	73.1	42.2	34.3	30.9	59.0	0.10	0.00	
Wolverhampton	77.4	34.2	43.2	73.1	42.2	34.3	30.9	59.0	0.10	0.00	
Leicester	77.4	34.2	43.2	73.1	42.2	34.3	30.9	59.0	0.10	0.00	
Nottingham	77.4	34.2	43.2	73.1	42.2	34.3	30.9	59.0	0.10	0.00	
Sheffield	77.4	34.2	43.2	73.1	42.2	34.3	30.9	59.0	0.10	0.00	
Liverpool	77.4	34.2	43.2	73.1	42.2	34.3	30.9	59.0	0.10	0.00	
Manchester	77.4	34.2	43.2	73.1	42.2	34.3	30.9	59.0	0.10	0.00	
Salisbury	77.4	34.2	43.2	73.1	42.2	34.3	30.9	59.0	0.10	0.00	
Bradford	77.4	34.2	43.2	73.1	42.2	34.3	30.9	59.0	0.10	0.00	
Leeds	77.4	34.2	43.2	73.1	42.2	34.3	30.9	59.0	0.10	0.00	
Hull	77.4	34.2	43.2	73.1	42.2	34.3	30.9	59.0	0.10	0.00	
Newcastle	77.4	34.2	43.2	73.1	42.2	34.3	30.9	59.0	0.10	0.00	
Edinburgh	76.4	33.2	43.2	72.1	41.2	34.3	30.9	59.0	0.10	0.00	
Glasgow	76.4	33.2	43.2	72.1	41.2	34.3	30.9	59.0	0.10	0.00	
Aberdeen	76.4	33.2	43.2	72.1	41.2	34.3	30.9	59.0	0.10	0.00	
Paisley	76.4	33.2	43.2	72.1	41.2	34.3	30.9	59.0	0.10	0.00	
Greenock	76.4	33.2	43.2	72.1	41.2	34.3	30.9	59.0	0.10	0.00	
Leith	76.4	33.2	43.2	72.1	41.2	34.3	30.9	59.0	0.10	0.00	
Ferri	76.4	33.2	43.2	72.1	41.2	34.3	30.9	59.0	0.10	0.00	
Dublin	75.4	32.2	43.2	71.1	40.2	34.3	30.9	59.0	0.10	0.00	

STATE OF THE WEATHER AT BLACKHEATH, LONDON, FOR THE WEEK ENDING WEDNESDAY, JUNE 7, 1871.

1871. MONTH AND DAY.		At 4 P.M.										RAIN.
		Reading of				Hygrometrical Deduction from Glaisher's Tables, 3d edition						
June.		Barometer reduced to 32° Fahr.	Dry Bulb thermometer.	Wet Bulb thermometer.	Dew Point.	Degree of Humidity.	Weight of Vapour in a Cubic Foot of Air.					
		Inches.	Deg.	Deg.	Deg.		Gr.					
1. Thurs.	29.88	61.1	59.9	53.1	85.7	Gr.	4.5					
2. Friday.	29.88	61.1	59.9	53.1	85.7	Gr.	4.5					
3. Satur.	29.88	61.6	66.6	41.5	69	Gr.	3.0					
4. Sunday.	29.82	61.8	63.1	41.5	65	Gr.	3.0					
5. Monday.	29.82	61.8	63.1	41.5	65	Gr.	3.0					
6. Tues.	29.91	62.7	59.3	45.2	85	Gr.	3.4					
7. Wednes.	29.78	60.7	59.3	45.2	85	Gr.	3.4					
TEMPERATURE OF THE AIR.												
		TEMPERATURE OF THE AIR.					WIND.		RAIN.			
June.		Highest.	Lowest.	Range in Day.	Mean.	Difference of Average of Years.	Direction.	Horizontal Movement.	In Inches.			
1. Thurs.	72.0	42.8	66.8	24.0	59.8	variable	N	300	0.0			
2. Friday.	68.8	41.6	68.8	27.2	55.8	N	NE	300	0.0			
3. Satur.	57.4	41.2	65.9	24.7	53.2	N	NE	240	0.03			
4. Sunday.	57.3	41.0	65.9	24.9	53.4	N	NE	240	0.03			
5. Monday	57.6	38.7	59.9	21.2	49.2	N	NE	370	0.00			
6. Tues.	57.3	40.3	65.9	25.6	53.1	N	NE	370	0.00			
7. Wednesday	54.8	45.3	62.7	17.4	54.0	7	N	400	0.00			

1871. MONTH AND DAY.	TEMPERATURE OF THE AIR.										WIND.	RAIN.
	Highest.	Lowest.	Range of Week.	Mean of all Highest.	Mean of all Lowest.	Mean of all Mean Range.	Mean Daily Range.	Mean.	Mean.	Mean.		
June.	78.4	35.2	43.2	74.1	43.2	34.3	30.9	59.0	0.10	0.00		
1. Thurs.	78.4	35.2	43.2	74.1	43.2	34.3	30.9	59.0	0.10	0.00		
2. Friday.	78.4	35.2	43.2	74.1	43.2	34.3	30.9	59.0	0.10	0.00		
3. Satur.	78.4	35.2	43.2	74.1	43.2	34.3	30.9	59.0	0.10	0.00		
4. Sunday.	78.4	35.2	43.2	74.1	43.2	34.3	30.9	59.0	0.10	0.00		
5. Monday.	78.4	35.2	43.2	74.1	43.2	34.3	30.9	59.0	0.10	0.00		
6. Tues.	78.4	35.2	43.2	74.1	43.2	34.3	30.9	59.0	0.10	0.00		
7. Wednes.	78.4	35.2	43.2	74.1	43.2	34.3	30.9	59.0	0.10	0.00		

June 1.—Generally overcast and gloomy till afternoon. Variable at night.

2.—Large amounts of cloud prevalent till night. A little rain fell occasionally. Fine at night.

3.—Very variable throughout the day. Frequent heavy showers in the morning.

4.—Overcast till night, then variable. Rain fell occasionally.

5.—Fine, but generally cloudy. Very cold.

6.—Generally overcast till the evening, then very fine.

7.—Overcast throughout. A dull cold day. Brisk wind.

JAMES GLAISHER.

Miscellaneous.

PEANUTS.—We learn from the *Scientific American* that the demand for "Peanuts" (*Arachis hypogaea*) is on the increase. "There is hardly an article of American production that has grown so rapidly in importance as the Peanut. There are fully 550,000 bushels sold annually in the city of New York alone. Treas to 1860 the total production of the United States did not amount to more than 150,000 bushels, and of this total, nearly five-sixths were from North Carolina. Now North Carolina produces 125,000 bushels; Virginia, 300,000 bushels; Tennessee, 50,000 bushels; Georgia and South Carolina, each, 25,000 bushels; while from Africa come about 100,000 bushels a-year. In one week of the month of January, 1871, there were received at the port of New York 2,751 bushels."

THE NAUCLA, or UNCARIA GAMBIR, is a plant well known in the Malayan islands, on account of its yielding a valuable article of export under the name of Gambir or Terra japonica. The plant, which belongs to the Cinchonaceae, is also well known to botanists both by reason of the generic name, Uncaria, having been first given to it, and then transferred to a plant of South Africa belonging to the Pedaliaceae, as well as from the fact of the lower flower-spikes being barren and transformed into curved or hooked spines. In its native or wild state it is an irregular climbing plant, but under cultivation it becomes a bush or shrub, and grows to a height of 7 or 8 feet. It is largely cultivated, both for home use as well as for exportation, and appears to thrive best in a sandy soil. The Terra japonica, so

largely imported into this country for the use of dyers and tanners, is an astringent extract prepared by boiling down the leaves and young shoots of the plant; for this purpose the bushes are frequently cut off just above the ground, when they are about two or three years old, and from 4 to 5 feet high. With good management the plants recover in about six months. The leaves are placed in water and boiled for several hours; the liquid is then fermented and made to evaporate, after which it is poured into moulds or tubes made of Bamboo; when cool, these tubes are split off, and the solidified substance is cut into slices. In some parts the process of extraction is somewhat differently conducted, the leaves being piled one upon another, moistened, and when fermentation commences, being covered with cloths and boiled. The article is exported to China for tanning purposes, but amongst the Malays its chief use is as a masticatory, used with Betel leaf and Areca nut.

Garden Operations.

(FOR THE ENSUING WEEK.)

PLANT HOUSES.

Climbing Plants, whether grown in stoves or greenhouses, will now want frequent attention, especially such quick-growing subjects as *Passifloras*, *Mandevilla suaveolens*, *Tecomanas*, *Tecomas*, *Ipomoeas*, *Dipladenias*, &c. Endeavour to encourage as natural a growth as possible, keeping the shoots apart in such a manner as to prevent them from becoming entangled. Attend particularly now to the maturing of all New Holland plants (*Ericas*, and the like), as to permit them to become too dry, the risk is to injure them very materially. If, indeed, it does not conduce at no very distant date to kill them outright. The young stock of these plants should be best placed in cold pits with the lights off, or in any similar position where the lights can be put on again should the condition of the weather be such as to make this desirable. Any plant of the showy *Kalanchoes* now showing flower should receive occasional waterings with liquid manure, and have the necessary attention in regard to the fresh staking and tying out of the branches. Many kinds of greenhouses plants may now be removed, with perfect immunity from risk of injury, into the open air. Always select a sheltered position for them, where violent wind storms cannot fully reach them. It may be needless to state that they should always be placed upon slates, or some other kind of worm-proof bottom, where perfect drainage is also assured. Continue the necessary stopping of all young specimen plants of the soft-wooded sections, and remove all the flower buds which form upon such as are now being grown on exclusively for a future display. Sprinkle over the paths, borders, and other surfaces upon dry hot days. Be very particular not unduly to crowd plants at this particular season, when growth is being made. Though they may be overcrowded from necessity during the winter months, there can be no excuse for such treatment now. Those who have not thinned their *Camelias* in the advent of the foregoing period, may, nevertheless, do so now, that actual growth is complete in so far as quickly formed branches are concerned. Use, as I have before urged, crude turfy soil, and pot them moderately firm. Continue the use of the syringe both in regard to these and *Oranges*, &c., many of which will now be actively engaged in growth. The beautiful "Cape Jasmines," *Gardenias*, having in many instances ceased flowering, should also receive a moderate shift. Employ for them a compost of nice rich peat, silver sand, and a little nicely decomposed and pulverised cowdung. Such a do not require potting may be greatly benefited by occasionally receiving a watering with liquid manure of moderate strength. Give to most choice specimens a little shading during all very bright periods, more especially in instances where the modern system of glazing with large squares of glass is carried out.

FORCING HOUSES.

Continue thinning Grapes until all are finished off. Stop lateral and sub-lateral growth frequently, and thin the sap into those channels which lead to the development of the fruit. As I have frequently suggested, give all *Vines* that have their roots in indoor borders a copious watering at the time the fruit commences to swell freely, and also immediately before the stoning process; but do not root-water too freely after the final swelling has made a good amount of progress. Where Grapes are ripening off freely give air with moderate freedom at the apex of the structures on all mild nights. Shut up *Fineries* when the direct rays of the sun commence to decline about 3.30 or 4 P.M., and ply the syringe vigorously, well damping the walks and the surface of the tan-beds, &c. During the finest weather the thermometer may range as high as from 90° to 93°, keeping during such periods all cool internal surfaces thoroughly saturated with water. Give air freely to *Peach* and *Nectarine trees*, which are ripening off their fruit, not only by day, but also during the night, when the weather is favourable. Attend to the borders of such as are now stoning, and give if needful a good soaking of nice soft water, and in connection therewith syringe the trees

copiously. In regard to *Figs*, immediately the first crop is nearly all gathered, give to the roots a thorough soaking with tepid water, to induce a return to activity in the matter of growth, for the production of a subsequent successional crop. Continue to stop the young growths upon *Melon plants*, and encourage the fruit already set and swelling by keeping up a nice bottom-heat, and occasionally applying clear manure-water. *Cherries* and other similar kinds of hardy fruit, which have already produced a crop in orchard-houses, should be turned out into the open air as soon as the crop is gathered. Plunge the pots into the ground and mulch their surfaces over in such a manner as to obviate excessive evaporation and its attendant labour of watering.

HARDY FLOWER GARDEN.

Dahlias should be well mulched all around their base with short decomposed manure, and care should be given thus early to protect the young plants from the many kinds of insects which infest them. Many subjects will now need frequent attention in mixed herbaceous and similar borders in regard to their proper staking and tying up, &c. *Roses* should also be gone over frequently, with the object of destroying insect pests. It is only by very close scrutiny that the cause of much injury is detected. The Rose-maggot has been justly referred to as "the worm 't' the bud," frequently it is to be found in the very heart of young buds, having eaten its way unobserved in this position before detection. *Panicle* may still be propagated by means of the young growing side shoots. *Hardy Annuals*, sown where intended to flower, should be thinned out. In thinning them out do so with some idea that this class of plants but seldom get sufficient room to grow as they would do if thinned out rather more. Hoe over the flower-beds amongst all newly planted bedding stuff, not only to destroy seedling weeds but also to loosen the ground. Many kinds of *Pelargoniums* will lose some of their leaves after being turned out; these should be removed carefully, and everything possible done to induce a neat tidy appearance.

HARDY FRUIT GARDEN.

Strawberry plants, now setting their fruit and swelling, will be very much benefited by having a thorough root-watering, if no very heavy rains set in. If we do have such an amount of rain as we think necessary, much assistance can be afforded by giving a watering with good strong liquid manure between the showers. Lay the runners of any kinds required for forcing on to the surface of small pots filled with rich mould, and by frequent waterings induce them to root freely and quickly. Remove suckers from all kinds of hardy fruits, and neatly dig around the base of all sorts requiring such attention. Much good may be done to *Peaches* and *Apricots* by syringing them nightly during very hot dry weather.

KITCHEN GARDEN.

Here very little can be added to past directions, and the ordinary routine which generally suggests itself; keep the hoe going constantly while the weather, being dry and fine, is favourable. During showery periods dig the plants, this at least will destroy the worms at such a size as to require this. Mulch spring *Cauliflowers*, and give to them a good soaking with liquid manure. Make a main sowing of *Endive*, finish earthing up all late *Potatoes*, make a successional sowing of *Lettuce* seed, sowing it in drill rows, or where it is to stand. Continue to plant successional rows of *Celery* in trenches, keeping them well watered subsequently. Cut away all flowering branches upon stools of *Seakale*, these go to impoverish the ground greatly and unnecessarily. *W. E.*

TOWN GARDENING.

FINISH planting out all tender *Annuals* which do well in town, if planted with care and kept watered. Attend well to the watering of newly planted trees and shrubs, without which they make but a feeble start, and many die. Nail in the leading growths of the *Ley* and *Virginian Creeper*, and take out all straggling shoots. Keep the Dutch hoe frequently at work between the plants, this at least will destroy the worms, but greatly benefits the plants, letting in the rain and sun to the roots. Towards the end of the month propagate *Pinks* by pipings. This is performed in the following manner:—Take the young shoots of this season's growth, and cut them off at the third or fourth joint, and at the same time remove the lower leaves and shorten them at the apex. They will then be ready for putting in the ground, and the seed should have been prepared the day before, by sifting some fine soil and well soaking it. The cuttings should be covered close with a glass, and shaded from the mid-day sun. They will require nothing more till struck, which will be in about five weeks, and they should have the glass lifted a few days before planting out. Shift the large-flowering *Chrysanthemums* into their blooming pots, removing all lateral growths which have been prepared, and the seed should have been prepared the day before, by sifting some fine soil and well soaking it. The cuttings should be covered close with a glass, and shaded from the mid-day sun. They will require nothing more till struck, which will be in about five weeks, and they should have the glass lifted a few days before planting out. Shift the large-flowering *Chrysanthemums* into their blooming pots, removing all lateral growths which have been prepared, and the seed should have been prepared the day before, by sifting some fine soil and well soaking it. 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The cuttings should be covered close with a glass, and shaded from the mid-day sun. They will require nothing more till struck, which will be in about five weeks, and they should have

one would like to compass and attain, but it is rather by the cultivation of independent thought-

fulness and self-reliance that a good result is possible; and this is rather checked than fostered by the direct offer of rewards through a society.

It is, satisfactory, therefore, to find that the list of such prizes is gradually dwindling at the meetings of our local agricultural and benefit societies—and that they are being altogether abandoned at others. It is by the offer of premiums for skill that such societies best perform their duty, and it is thus that the interest of the labourers in them can be best maintained. Prizes for skill in sheep-shearing, in ploughing, in hedging and ditching, in thatching, in draining—prizes for success in vegetable growing—all these fall most perfectly within the scope of the local agricultural society, and it is thus that even the moral end is the best attained. What a capital trial, for example, was that inaugurated, we believe—at any rate, illustrated—by the Faversham Agricultural Association at their last meeting, when 14 engine drivers competed for the Society's prizes offered to those who could get most power out of a given quantity of fuel. We take the following report from a county paper of the day:—

"The engine used for these trials was an 8-horse power portable, to which was attached a friction brake, carrying a lead equal to a duty of 800 revolutions per minute; those used by the Royal Agricultural Association, only, instead of being driven by a belt, a coupling-rod, with universal joints, was used in the same way as an engine is attached to a steam-cultivating windlass. The brake was fitted with a self-acting counter, to indicate the number of revolutions obtained by each man. Messrs. EDWIN NEAME and ARTHUR CURLING officiated as judges, and their decisions and close attention to all the details of the trials gave general satisfaction. Mr. AVELING, of Rochester (who originated this useful competition), acted as consulting engineer. Each of the 14 drivers was provided with 84 lb. of coal, and 8 lb. of wood, and 4 oz. of oil, and any oil left was afterwards accurately measured. The difference of water level in the boiler at the commencement and conclusion of the trial was calculated, and the rate of 500 revolutions per minute. The following were the rules:—1st, Before starting, the firebox of engine is to be cleared out, and the oil cups filled by the driver who has just concluded his trial. 2d, 60 lb. of steam is the highest pressure allowed. 3d, The trial is to attend to all bellows, 4th, The trial is to terminate so soon as the pressure of steam falls below 45 lb. 5th, No person is permitted to speak to engine driver. The following were the results of the trials:—

Name of Driver.	Oil used.	Revolutions obtained
	ounces.	
Thomas Turner	1½	7257
William Easdown	1½	7243
William Turk	1½	8734
Edward Pantowny	2	6917
W. Wilson	2	6712
Thomas Hadow	2	7533
A. Sampson	2½	7018
James Payne	2½	7075
William Black	3	7349
George Dutton	3½	7449
James Philpott	3½	7314
Charles Stone	3½	7314
Richard Stickle	3½	7717

1st prize, a silver medal and £3, was awarded to CHARLES STONE; 2d, silver medal and £2, WILLIAM TURK; 3d, the medal to WILLIAM EASDOWN; 4th, and THOMAS TURNER, 5s.; this prize was divided in consequence of the excess of oil used by EASDOWN. A lad, named WILLIAM ILLMAN, in the employ of the consulting engineer (Mr. AVELING), obtained 8885 revolutions, using 13 oz. of oil, for which performance he was presented the judges with £1. From the Table given above, the advantages derived from these trials are evident; they show that the best result obtained was 8885 revolutions, equivalent to a consumption of 82½ tons of coals in a year, calculated at 250 working days; the worst result obtained was 6721 revolutions, equivalent to a consumption of 104 tons of coal, showing a difference of 21½ tons. The smallest quantity of oil used was 1 oz., or 17 galls. per annum; the greatest was 3½ oz., or 65 galls. per annum, a difference of 48 galls. used in the same time.

Saving of coal—24 tons, at 20s.	£48 10 0
Saving of oil, 48 galls., at 5s. 6d.	13 4 0

Showing a saving per annum of £64 14 0

Besides this, it must be noted that in ordinary work the worst driver would show a much worse result in comparison with the best. The medals and prizes were presented at the dinner by the noble chairman, Lord SONDES, and the winners left the room wearing their medals, doubtless as much prized as if won in a more sanguinary contest.

It is by skill thus encouraged—by the constant habit of effort towards improvement which such trials foster—that any labourer can best hope to maintain or benefit himself. Encouragements to this end are felt by the labourers themselves as a strength—whereas prizes for long servitude and good behaviour really assume a weakness, and rather help to maintain it. A labourer is in the one case treated as a man, in the other he is petted and rewarded as a child.

If in addition to habits of constant effort thus stimulated, a young man could acquire a habit

of carefulness and foresight with reference to possible periods of illness and helplessness, the result perhaps of accident or even of old age, his condition as an agricultural labourer would be vastly improved, and we should find country and village occupation maintaining its hold upon our working men, who are at present leaving us more rapidly than any other class for towns. We are glad, therefore, to direct the attention of our readers to a recent speech of Sir E. KERRISON, Bart., which will next week be laid before them, on just this aspect of the working man's condition, in which an earnest philanthropic man anxiously endeavours to bring right and useful motive to bear on the agricultural labourer whom he addresses. It will be seen that Sir EDWARD KERRISON has afforded full proof of the benevolence he expresses by the noble gift with which he proposes to lay the foundation of the benefit society which he advocates.

— AT Mark Lane, on Monday, there was a short supply of English Wheat, and the sales were at the extreme prices of last week. Business on Wednesday was restricted, but prices scarcely altered. A good demand at the Metropolitan Cattle Market on Monday sent up prices for all descriptions. Thursday's trade in beasts was at Monday's rates, but there was a little business in calves and lambs. Little doing in the Seed Market; Hops are advancing, with a short supply; the Wool Market remains firm, and a rise in prices is expected.

The fate of Friday evening's debate in the House of Commons, when the conduct of Government in reference to the FOREIGN CATTLE TRADE was under discussion, was a curious illustration of the indifference of members to a subject in which, if the Agricultural Chambers of the country are any index, the agricultural interest is almost indignantly aroused. Anyhow, the subject is one in which great interest ought to have been taken; and yet the House, after having with difficulty been made, was actually cut out before the discussion was concluded. Mr. CLARE S. READ'S speech, and the reply of Mr. FORSTER, will be found in another page.

At the meeting on Tuesday of the CENTRAL CHAMBER OF AGRICULTURE, the Chairman read the report of the Local Taxation Committee, which briefly discussed the position of affairs in regard to local taxation matters, and on the motion of Mr. T. DUCKHAM, seconded by Mr. JABEZ TURNER, the following resolution was carried unanimously:—

"Accepting the withdrawal of the Government Bills as an acknowledgment of their failure to meet the requirements of ratepayers, this meeting greatly regrets that the Government have found it impossible to fulfil the promise made by the late Mr. St. John's speech in regard to gross injustice to occupiers and owners of land and houses under the present system of assessment to local rates."

A long conversational discussion followed upon the subject of Bills and proposals before Parliament involving any increase of charge upon local rates, and Mr. HENEAGE moved the following resolution:—

"That those clauses in the following Bills now before Parliament—namely, the Army Regulation Bill, the Elections (Parliamentary and Municipal) Bill, the Further Education of the People Bill, the Pauper Lunatic Discharge and Regulation Bill, the Prisons Ministers Bill, the Registration of Voters Bill, the Protection against Dogs Bill, and the Corrupt Practices Amendment Bill—which propose to increase the burdens on local rates should be firmly opposed until the question of local taxation has been equitably adjusted."

Mr. CALDECOTT seconded this, and it was also carried unanimously. Some communications were then received regarding the importation of foreign cattle, and the views of the meeting were evidenced in the following resolution, which was agreed to recently:

"That this Council views with alarm the recent Order of Council by which cattle direct from Russia are taken to the Metropolitan Market, and by which also cattle from Holland, where pleuro-pneumonia now extensively exists, are permitted free access to any part of the United Kingdom after undergoing a detention of only 12 hours."

It was also resolved that the secretary, Mr. J. ALGERNON CLARKE, should be requested to send a copy of the resolution to Mr. FORSTER.—The subject of Poor-law medical relief was then gone into on a paper read by Dr. ROGERS, who entered into a concise history of Poor-law relief in England and Scotland as compared with Ireland, and he maintained that most attention to the medical relief of the poor would result in lessening the general evidence of pauperism in England and Scotland. Mr. F. S. CORRANCE, M.P., spoke on the same subject, and supported Dr. ROGERS' views. Votes of thanks were passed to Dr. ROGERS for his paper, and the Chamber passed the following resolution:—

"That the present system of medical poor relief is inadequate to the wants of the poorer classes, is unsatisfactory, and requires amendment. To this end it is expedient that the provisions of the Irish Medical Charities Act and the Irish Dispensary system should be generally adopted throughout England, with such modifications as may render it applicable to the English system of Poor-law administration."

— In a very well packed paper on CATTLE DISEASES, recently read by Mr. W. W. GOOD, before the Newcastle Chamber of Agriculture, we are informed, on the authority of statistics collected by Mr. KILBY, that, taking the total number of cattle in England at 3,779,691, and the average value per head at £13 11s. 4d. (the total value of the cattle in England being, therefore, £56,948,073), the losses during the last 30 years by lung disease have been £44,054,459, and by foot-and-mouth disease £39,502,395; total, £83,016,834—equivalent to a loss of 5,549,780 cattle, amounting to 146.831 per cent., or nearly one and a half the whole stock in England. In Scotland, again, the number of cattle is 1,000,917, the average value per head is £14 5s. 2d., giving a total value of £14,518,140. The loss by lung disease in the same time has been £9,542,739, and by foot-and-mouth disease, £8,286,824. The total losses by both diseases have been £12,369,563, equal to 867,269 cattle, or 12,525 per cent. on the whole stock of Scotland. The grand total of the losses by rinderpest, lung disease, and foot-and-mouth disease, amounts over the whole of Great Britain to 100,633,795, or £13,132,000, during 30 years, lost on every £100 annually invested in cattle during the course of these diseases in Great Britain. Enormous as these losses are, it is, after all, not the only loss to the country. A scarcity of meat has arisen not only from the death of many cattle, but also from the diminution of meat on those slain, before they have come to maturity. Neither do they represent the total loss to the farmer, because no consideration is made for the waste of pasture, for the derangement of the whole system of farming, nor for the expense of treatment, attendance, &c. Moreover, the foot-and-mouth disease causes cows to cast their calves, and also brings death to young calves, which strikes at the root of future production. Again, our farms would have been in a much better state had there not been so much capital lost. Mr. GOOD adds: I do not hesitate to say that during every year of the last 30 years this country has lost more in live stock and animal food from these important diseases than the value of the whole of the stock imported.

The annual meeting of the MANCHESTER and LIVERPOOL AGRICULTURAL SOCIETY is this year to be held at Liverpool, on the 5th, 6th, and 7th Sept. next. A large prize list has been issued, amounting in the aggregate to £1000. The most prominent prizes are £100 for the fewest of the most prominent prizes are £100 for the best hunter, £80 for the best bull; extra silver cups for sheep and pigs; a very liberal prize list for dogs and poultry; and, from the exertions made by the local executive committee, the show promises to be one of the most successful ever held in the North.

— A PROLONGED DROUGHT will soon become seriously injurious. No rain, they say, is wanted for the Wheat crop after the ear is shot; but grass is suffering, and the growth of all seedlings is being checked, and even the Wheat plant, when the spring-time finds it injured by the severity of winter, wants all the aid of a growing season to help make good its losses. On the dry soils of Cornwall, whence we are now writing, there are already all the signs of a season which is severely trying all succulent growth.

— A SHOW OF ROOTS, to be held in December by Messrs. CARTER, on their Holborn premises—corresponding to that of Messrs. SUTTON, at Reading—is announced, in which upwards of £100 is offered in prizes for roots, and it is stated that the number of competitors are so great that all specimens must be grown from seed obtained direct from J. CARTER & Co.; all roots to be forwarded, carriage paid, in the same state as when taken from the land; no exhibitor to take more than one prize in one class. They vary in amount from ten guineas to half a guinea. Such shows, established for trade purposes, are nevertheless of great public utility, and we are, therefore, glad to make them known.

— We gave some weeks ago the CARCASE WEIGHT of several of the FAT CATTLE exhibited at the Agricultural Hall, Islington, last December. Although so long after date, we may place one more fact on the list of our somewhat scanty record. Mr. NEWBY, butcher, of Eastcheap, purchased Mr. W. TAYLOR'S Devon steer, No. 3 in Class I. Its dead weight was 105 stones; it carried 17½ stones of loose fat; and it is described as the "thickest fleshed, of the best quality." Mr. BENNETT ever saw in so young a steer. He also purchased a prize Shorthorn and a prize runt, but neither of these was to be compared with the Devon.

— A letter in the Mark Lane Express refers to the history of the DOUBLE FURROW PLOUGH, dating its origin back for 200 years. Mr. H. S. HARKLAND says:—

"I have in my possession an old book on farming by WALTER BLITH, and dedicated to OLIVER CROMWELL, containing a sketch, and full description of one after showing how to make such an implement, the writer concludes by saying, 'which plough, thus marshalled, you may well plough upon ordinary arable land that is in good tillage a double proportion, and also upon fair clean lay turf; and this you may manage with two men and horses, but not either upon strong land or rough land.

The description and discourse whereof I give not in as of my great advantage above the other plain plough, but for variety sake, and to provoke others to the amendment and perfecting of this discovery; yet I for present see not, but it may be of excellent use and expedition upon many lands in England."

Hence it appears that in those days they found two men and four horses necessary to work it. The plough shown in sketch is simply a combination of two ordinary ploughs (the leading plough having a beam about twice the length of the other) braced together with cramps, leaving a space between equal to the breadth of a furrow. Only two handles or "tails" are shown, attached to the hindmost plough, so that one man of the two mentioned was evidently employed in leading the four horses.

"WALTER BLITH also refers to a plough with a harrow attached, and also proposes to make 'a plough, harrow, and man (a drill, or drill, all shown, attached to the same at one time;' so that he was evidently a most ingenious man, and in advance of the age in which he lived."

OUR LIVE STOCK.

At the Palmer's Green sale, near Southgate, on the 31st ult., 28 Shorthorns, the property of Mr. W. Derham, were disposed of by Mr. Thornton. The very fair average of £43 4s. was shown, giving the entire number; 18 cows made £45 19s. 4d., and 10 bulls averaged £38 5s. 6d. Among the principal sales we may mention that of *Lady Braybrooke* by ENGLISHMAN (19,701), and of the "Crocus tribe," purchased for 40 gs. by Mr. J. B. Elliott; *Acacia* by KNIGHT ERRANT (18,154), a descendant of *Dimitry* by ZENITH (5702), sold for 40 gs. to Mr. Williamson; *Lady Lucy Thornale*, a splendid cow, by 3D DUKES OF WINDSORE (17,749), and of the "Crocus tribe," sold for 83 gs. to Mr. Williamson; *Colleen Bawn*, also a fine cow and good milker, by LORD RED ROSE (22,205), and from *Carolina* by VALASCO (15,443), sold for 82 gs. to Mr. Hugh Aylmer; *Bloomer*, a very good cow, by LORD RED EYES, and of the "Certainty" tribe, 39 gs., to Mr. H. Carr; *Katie Thornale* by COSTA (21,487), a beautiful heifer, and a daughter of *Lady Lucy Thornale* (let 4), 110 gs., to Mr. E. K. Cox; *Lady Florence* by BISMARCK (25,637), and of the "Acacia" tribe, 41 gs., to Mr. E. A. Fawcett; *Lady Eleanor*, similarly bred, to the last, was cheaply bought, at 34 gs., by Mr. J. V. Longbourne; *Roan Empress* by BISMARCK, and of the "Crocus" tribe, was sold for 40 gs. to Capt. J. J. Robinson; and *Rosadale*, similarly bred, was sold, for 65 gs., to Mr. Williamson. In the bull sale BISMARCK, a magnificent bull, but very fat, was sold cheap for 30 gs. to Mr. E. K. Cox; *THE DOCTOR*, a splendid yearling out of *Colleen Bawn*, by LORD RED EYES (22,205), dam *Carolina* by VALASCO, was sold to Mr. E. K. Cox, of Australia, for 50 gs.; *THE DOCTOR*, a splendid yearling out of *Colleen Bawn*, was secured by Mr. Williamson for 71 gs.; and other bulls made from 30 to 37 gs. each.

—Mr. T. H. Hutchinson, of the Manor House, Catterick, Yorkshire, has sold a very nice cow to Messrs. L. Hampton & Co., of America, for a considerable price. She is by VAIN HOPE (23,102), from a cow by GRANDMASTER (24,078), tracing back, through *White Rose* by YOUNG REMUS, to good old Colling stock.

POULTRY.

I INSPECT the fowls at night, and if any are found roosting on the shelves or boxes in the egg room, I put them gently on the floor, and they are allowed to do just about as you wish them to do, provided you are kind and careful with them. Allow no stranger to go into the house alone, or anything that will frighten them in any way, as quiet is also one of the things productive of eggs. Should any appear feeble, or sick, or droopy, which is rarely the case, I take them out and let them range at will around the premises; they in a few days recover their vigour; if not, and they appear sick, refusing to eat, I produce them to the guillotine, and their headless bodies are soon buried beneath the compost heap. By this management I count on 150 eggs per year, exclusive of chickens, to each fowl. The eggs are packed in Oats, put in a cool place, and will remain good for many weeks, enabling me to take advantage of the market, and get the best prices. I think 1 dol. per year will keep a fowl in high condition, and the gross income from each fowl is about 3 dols. per year. In the account I charge them 12½ per cent. on cost for rent and repairs yearly; in about eight years they have paid for the building. I can now point to one, 1000 miles away, I put up 15 or more years since, that contained over 100 fowls, and it is good to-day. The manure pays for the trouble. *Massopag Cincinnati*, in "Albany County Gentleman."

THE WEIGHT AND VALUE OF LIVE STOCK.

FOR the benefit of young beginners in agriculture, I make the following observations:—If you are wrong in the buying, selling, and management of live stock, you may bid adieu to comfortable profits. How to buy and how to sell, well as to manage, are the three of importance to successful farming, and if you cannot trust your own judgment, get if you can the unbiased opinion of some competent friend. It is worth even paying for if you have it not. But in the

absence of both, let me commend to you the weighing machine, which will put you on a par with some of the best judges, and give you confidence in your selling, and reprove you, if in buying you pay too dear. The weighing machine clears up many doubts. You should remember that in selling to the buyers (butchers or dealers) you have to do with practised hands, who, as a rule, thoroughly understand their business, and can judge closely of animal weights, so that the odds are sadly against you, unless you know the weight, and can therefore insist on a fair market price, which you are sure always to get, either from one or another. I have known of many a rare "picking" got out of farmers who do not know what proper price to ask; and that reminds me that it is very false economy not to have a knowledge of the state of the metropolitan and other markets. The penny, or even halfpenny, daily papers convey this information, so do the ordinary farm periodicals. I quote the following extract from the late Mr. Horsfall's most valuable paper on cattle feeding and dairy management, *Royal Agricultural Society's Journal*, volume 17, and I hope to see the time when these two papers shall be made available to the general farmer in the form of a cheap pamphlet, for I know of no other treatise so valuable and comprehensive as that on the subject of cattle management and dairying.

"I have weighed my fattening cattle for a number of years, and my milch cows for more than two years; this practice enables me at once to detect any deficiency in the performance of the animals, it gives also a stimulus to the feeders, who attend at the vantage, and who advise, so that the cattle entrusted to their care should bear a comparison with their rivals. Another obvious advantage is in avoiding all cavils respecting the weight by my purchasers, who, having satisfied themselves as to the quality of the animal, now can obtain the most certain weighing. The usual computation for a well-fed, but not over fat, beast is, live to dead weight as 21 to 12, or 100 to 59 1/2 lb., with such modifications as suggest themselves by appearances."

I recommend also in this matter a reference to those valuable and laborious investigations and Tables by Messrs. Lawes and Gilbert, in the *Royal Agricultural Society's Journal*, vol. 13, p. 193, and in vol. 21, p. 484. They say:—

Well bred and moderately fattened oxen should yield 58 to 60 per cent. carcass in fasted live weight; excessively fat oxen may yield from 65 to 70 per cent. Moderately fattened sheep (shorn) should yield about 58 per cent. carcass in fasted live weight; excessively fat sheep may yield 64 per cent., or more. Moderately fat pigs, killed for fresh pork, should yield (including head and feet) about 80 to 82 per cent. carcass in fasted live weight; large, well fattened pigs, fed for curing, will yield a considerably higher proportion. In each of the three descriptions of animal the proportion will, however, vary much, according to breed, age, and condition."

In conclusion, when you wish to invest capital profitably in agriculture let me advise you to purchase the volumes of the *Royal Agricultural Society*, and study them carefully to the end that you may be able to give the wisest for knowing why his practice was successful. It is a painful truth that an agricultural library rarely forms a part of a farmer's investment; but the schoolmaster is abroad now, so that we may reasonably hope for better things; and I never met with a farmer who was educated at our *Royal Agricultural College* at Cirencester who did not show the good effects of the reforms combined with practice—the why and the wherefore.

Out of a million of farmers, great and small, in the United Kingdom, there are not 20,000 who belong to the three great agricultural societies of England, Ireland, and Scotland, and who benefit by their publications. This is sad evidence of the lack of literature in agriculture. I hope the time will come when no British farmer can be found who would say: "None of your theory and book farming for me, I am a practical man!" for, as that great man, Baron Liebig, truly says, "Theory is not opposed to successful practice, but is an explanation of the cause of its being successful." *Y. F. Mochi, Yuma.*

P.S. Since writing the foregoing I have a striking instance of the necessity for the weighing-machine. Two practical farmers, previously unacquainted with each other, met at my farm last week. My bailiff asked their opinions of the value of some bullocks; one said £27, the other, £18 to £20. The latter was nearly correct, 20 having been sold at £22 each, of which the remaining 12 were the youngest and lightest. We bought the 20 on July 20, 1870, at £6 10s. each.

ON CLEANING FOUL LAND.

I AM a constant reader of your paper, and I frequently see in it queries relative to the best way of restoring the fertility of run-out land. I have been engaged for the past 12 or 14 years in similar work, and

having succeeded in doubling and trebling the value of the land I operated upon—besides having paid dearly for mistakes—I have no objection to those seeking advice on the subject. I observe that you invariably advise hand-picking and removing to the compost heap the Scotch-grass and weeds that overrun worn-out tillage lands. I have tried this more than once or twice, and found it laborious, tedious, almost impossible to be done so completely as to leave none of the broken bits of Scotch behind to grow again in greater luxuriance than ever, and impoverishing in exact proportion to the completeness with which it is done; I allude more particularly to Turnip soils, which are rendered nearly effete by excessive working.

On such soils, and without farmyard manure, I have invariably completely failed in growing even a moderately decent crop of Swedes whenever I adopted the hand-picking and removing of Scotch. I then, though grievously against my inclination, tried paring and burning: I was well aware of the theoretical objections to this process on light lands, but feeling that it was absolutely indispensable to get a crop of Turnips, and arguing that it must be in the disposal of the crop, and not in the production of it, that injury or the reverse could be done to the land, I took the following course.

If the lea was some years old, and composed of coarse, bent grass, that neither cattle nor sheep would touch, I ploughed it 6 or 8 inches deep in autumn, giving it a good harrowing to completely shut out the light from the edges of the slices. Then on the return of dry weather, in spring, I cross-ploughed the sods to the same depth, cross-cutting and turning up the sods, which were much rotted; and being suddenly exposed in their bleached and moist state to parching winds and hot sun, withered and died still more. Two or three good harrowings removed most of the soil adhering, and I then gathered the sods with rakes and forks, also by little boys and girls, into heaps, and burned them. I scattered the heaps of ashes, and grubbed the field, bringing up more sods, which I treated in the same way. The ashes were then scattered, the land was drilled, and a mixture of 5 cwt. superphosphate and 3 cwt. Peruvian guano per acre sowed by the hand while the drill was forming; 8 lb. of seed per acre drilled in the evening of each day's work. I always got a braird strong and plenty enough to withstand the attacks of the fly, and the crop ultimately made about 20 tons to the Irish acre. This was all folded off with sheep—hoggets and mixed ewes, the Turnips being pulped with a Bental's pulper, and mixed with half straw and half hay chaff; palm-nut meal and cotton-seed meal mixed, or bruised Oats or Indian meal was added, when I was in funds, beginning with about ½ lb. per head and ending with 1 lb.

The sheep threw well, the losses averaging about 3 per cent., and those principally from an accumulation of fine sand in the stomach. I always killed the sheep the moment I saw them discontinuing feeding, and the mutton being perfectly good, I was at little loss. I often thought of washing the roots, but as yet I have not done so. About 20 sheep consumed each acre, and paid about 15s. per head, including their manure. The hoggets reached from 18 lb. to 25 lb. per quarter, and the mixed ewes up to 30 lb., and occasionally more. I have sold hoggets, 23 months old, at 67s. 6d. each, and in considerable lots at a time.

About the end of March or early in April the land was grubbed about 3 inches deep, not ploughed, and grass seeds for two or three or more years sowed with 7 lb. Rape per acre.

The new grass was begun to be fed in June or July, and there was abundance of stuff in the field. I put sheep on the new layer, and found that, if not allowed to eat too close, they did no harm to the Clovers. At first I used to put them in for a few hours each day, but found that some got hoven; I then left them in altogether, and no more suffered from that complaint. I have fields that were so treated by me lying in pasture for the past seven or eight years, and they give very little sign of deterioration. I could get from 40s. to 50s. per acre for land which was not let at more than 18s. when I took it up.

In conclusion, I say that on lands too strong for folding, burning will not do any harm to speak of. On gravels and light, sandy land it is admissible, if you consume the crop that it enables you to grow on the land that grew it.

Pray excuse this lengthened letter, which I am vain enough to think may be useful to those who, like myself, are anxious to improve worn-out lands. I have derived great instruction from your Journal, and hope you will not take umbrage at my venturing to disagree with so eminent and practical an authority as yourself. What I have written is the sum of what I have gained by a dear bought experience, which has convinced me that light, gravelly lands can be doubled in value by the use of portable manures alone (by portable I mean bone dust, mineral superphosphate, guano, salts of potash, &c.), provided the soil be freed from the ground that grows it, and is tilled, if oil-cake, or palm-nut meal be added to the rations. My maxim is to carry nothing but what is desiccated. Dragging tons of roots home and tons of farmyard ash is not, to my mind, the way to make money by

farming on light land. *E. H. Perry, Belleek Castle, Ballina; communicated to the "Dublin Farmers' Gazette."*

INTERNATIONAL EXHIBITION.

Brick and Tile Machines, &c.—Henry Clayton, Son & Hewlett, of the Atlas Works, London, W., exhibit their three-process brick power machine, also a hand-power tile, pipe, and brick machine, and Large's patent combined brick moulding and pressing machine for semi-dry material, generally designated "the dry process manufacture."

Fig. 156 represents H. Clayton, Son & Hewlett's "A. 1" 16-horse power machine, capable of making from 20,000 to 30,000 bricks per day, and also their "A. 2" machine, effectually worked by a steam-engine of 12-horse power, turning out from 15,000 to 18,000 bricks per day, according to the quality of the clay and the size of brick. The machines are shown in motion, but there is no provision or accommodation for making bricks. The illustration shows the machine at work in the brickfield.

The clay is wheeled into the hopper of the machine as shown in the engraving, or it may be tipped from a railway wagon or pitched in with a spade or fork. The clay is crushed between two large rollers, the position of which will readily be understood, and centrally above the rollers is what is technically termed "the crammer" (a rotating axis furnished with knives

ing apparatus on the central shaft into two portions, one to each pair of expressing rollers, very ingeniously driven by the central spur-wheel, which gears in the spur-wheel of the upper roller on the left hand and in the spur-wheel of the lower on the right, so as to make them draw in the clay into the forming chambers of the dies. The pugging process here terminates, and the third, or moulding process begins. The expressing rollers perform a twofold function. As they draw in

of the common one (fig. 156). The clay is expressed from the die on to the rollers, in the usual way, and when of sufficient length for the desired number of bricks (the engraving shows 10 cut bricks), the length is cut off by the single wire, and brought forward on to the cutting-table during the time another length is expressed from the die, and, coming forward, the attendant with the handle turns two pinions, which gearing in racks on the under-side of the reciprocating

frame, forces it transversely across, with standards and cutting wires—the table-plate passing under the moulded clay being cut, and also under the back-plate on the fixed frame. As the bricks are cut they come out between the wires on to a movable platten board or palette-table, and when the wires come up to the back-plate the 10 bricks are outside, as shown in the engraving. The attendant then brings back the handle, which by means of the pinions and racks places table as shown, ready for another length. The loaded board with the bricks is placed upon the barrow, an empty one being substituted for

another cut, and so on the work proceeds without interruption. The last roller works in an oil-trough supplied from an oilcan shown on the further side of the machine. The reciprocating table is adapted for any length, breadth, and depth of brick by removing the two strain-bars and substituting others with fewer or more wires, as the case may be. The wires may also be set for cutting arch bricks, angular bricks, &c.

The advantages of this table over any other now in

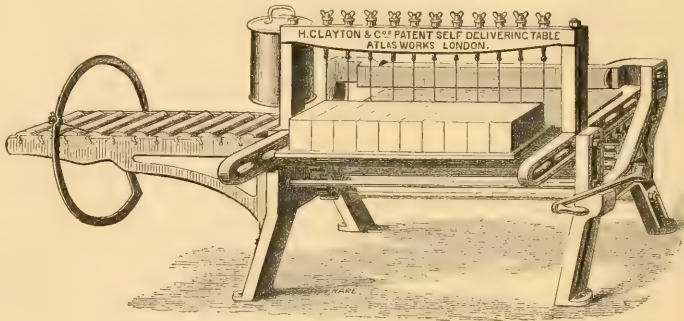


FIG. 155.—H. CLAYTON & CO.'S PATENT SELF-DELIVERING CUTTING TABLE.

the clay they have a pugging crushing action, but when the forming chamber becomes full they have, each pair, an expressing action—forcing the clay through the die, of uniform density and velocity, the force being rectilinear. The dies are rotary, i.e., the clay passes out between two vertical rotating cylinders covered with cloth and driven by means of bevel gear, from a cross shaft actuated by a belt shown at the side. The die rollers are lubricated from a water cistern above,

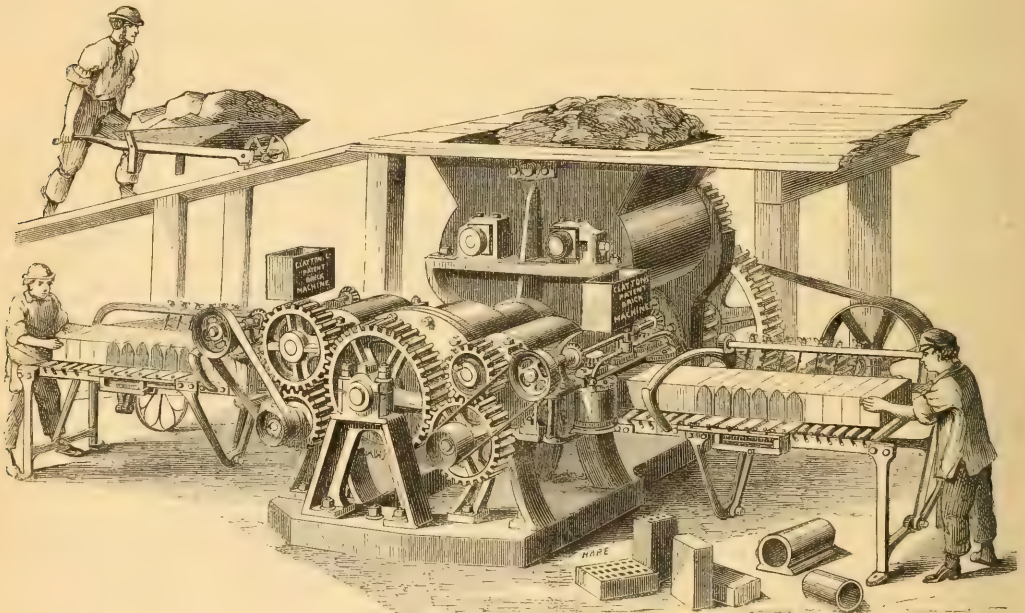


FIG. 156.—H. CLAYTON & CO.'S PATENT BRICK-MAKING MACHINE.

like the shaft of a pug mill) which cuts up the clay fine, thus feeding it in between the rollers uniformly and continuously. This constitutes the first, or crushing process; the second process consists in pugging. As the clay comes from the crushing rollers it falls into a horizontal pug-mill, the axis of which carries the large central spur-wheel, seen outside. The knives of the pug-mill form portions of a screw, so that whilst they thoroughly incorporate the dust of crushed stones with the clay they at the same time work it forward into the feeding chamber of the expressing rollers. In this chamber the clay is divided right and left by feed-

and from the cloth being kept uniformly moist the stream of clay comes out uniform in density, smooth and clean, and the angles well formed. The framing of the machine is bolted to a cast-iron foundation-plate, which secures the truthful action of the working parts without the necessity of expensive mason-work, which would not otherwise be done. The cutting tables shown in the engraving are of the common kind.

H. Clayton & Co.'s Patent Self-delivering Cutting Table.—This table (fig. 155) is fixed to the machine in place

the brickfield may be summed up as follows:—(1), Any obliquity which the moulded volume of clay may take in passing over the rollers from the die, is corrected by being pressed firmly against the smooth metallic back-plate, before the wires begin to cut; (2), the cutting action of the wires is rectilinear (and not angular, as in other machines), so that the velocity is equal throughout, and hence the cutting power; (3), the cut being rectilinear, the upper angle of the brick is not bevelled off, nor the lower one ragged, as in the angular cutting-tables, and as the farther ends of the bricks are held firm against the back or resist-

ance-plate, they are also free from ragging, the end and side angles being thus perfect; (3) the bricks are placed in the drying shed or kiln with greater expedition, and without any handling taking them from the table and placing them on the barrow, thus saving time and obviating much labour to the bricks.

Specimens of bricks, tiles, &c., made by the above and other machines of H. Clayton, Son & Hewlett, are shown in the building material department; but there being no convenience for making bricks, &c., in the Exhibition, readers practically interested should visit Atas Works, which is well worth the seeing, being the largest manufactory of the kind in the kingdom, driving a large foreign as well as home business; or a catalogue can be had, and an introduction obtained to some brickfield, where any machine selected can be seen at work. H. Clayton & Co. maintain the position they occupied in the Exhibition of 1862, when the jurors awarded them the first prize.

THE CONTAGIOUS DISEASES (ANIMALS) ACT.

[On Friday evening last the following discussion on the administration of this Act took place in the House of Commons.]

MR. CLARE S. READ rose to call attention to the operation of this Act, and to the recent orders relating to foreign stock and to move for a Select Committee to inquire into the cost, constitution, and working of the Veterinary Department of the Privy Council. Since he had given notice of his motion he had slightly altered its terms in consequence of the evidence given before the Sanitary Commissioners, and also in consequence of the returns moved for in February last by the hon. member for North Staffordshire not having been presented to the House. He begged in the first place to offer his apologies to the hon. member for having spoken of him as the secretary instead of the director of a defunct company, and to state his belief that he was a well educated gentleman, who was well fitted to hold his present post, although he had received no special training for it.

In August, 1865, the present Veterinary Department of the Privy Council was established under the name of the Cattle Plague Department, and Dr. Williams was appointed secretary. For the next few days that department was renowned for its expensiveness and for its injustice in attempting to kill the cattle of the farmers without awarding them any compensation. In the same year Dr. Williams was replaced by Colonel Harness, and the business that the department had to get through then was very heavy, there being 5000 or 6000 cases of cattle plague weekly at that time. At the end of the year 1866, Colonel Harness was replaced by Mr. Forster, and Dr. Williams again became the secretary of the department. For the next two or three years the office had very little to do, and of the 1500 letters a-day, which Mr. H. Forster stated were received then, nearly 1000 contained "nil" returns from inspectors. The Cattle Plague Report, which he knew had been nearly completed in 1867, was not presented to that House until 1870, by which time it had lost all interest, people having then almost forgotten the existence of the cattle plague. During that period but few cases of compensation had to be determined by the department, but an immense amount of trouble was occasioned by the difficulty of forcing a small modicum of justice from it. A certain number of statistical papers had been prepared by the department at his suggestion for the use of the Metropolitan Cattle Markets Committee which sat in 1868, and since then the Cattle Diseases (Animals) Act had been passed, and it might now be taken that the department was a permanent Government office. Although it had been stated that the department was not to be regarded as a permanent one, it appeared that within the last few months the secretary and three or four of the clerks in it had been placed upon the permanent civil list, with, he supposed, a claim to pension and to compensation in the event of their office being abolished.

Now, he asked, what had a single suggestion for the kingdom? It had not made a single suggestion for getting rid of the cattle plague, except the rule of isolation and slaughter. It had certainly prepared one report in three years, but it had not even solved the problem of inoculation as a remedy. The maximum inconvenience was inflicted upon the owners of stock with the minimum of good results. They had to collect the statistics of the metropolitan markets, but that was only already done by the clerks in the market, and appeared weekly in the *Foreign*. They had also to record the landing of foreign stock, but that was already done by the Customs, to whom, and not to this department of the Privy Council, was due the credit of keeping out the rinderpest, if it had been kept out. They had certainly sent out to the local authorities forms to be filled up where any cases of pleuro-pneumonia, foot-and-mouth disease, or scab had occurred; but if he might judge by his own experience last year, when he moved for a return of these cases, it did not appear to be tabulated by the department, though they occasioned the country great expense. Now he had heard, and he hoped it was not true, that the law officer of the Crown received £1000 a year for drawing up these orders. If that were so the duties must be pretty well a sinecure. [Mr. Forster was understood to intimate that no such payment was made.] Last evening they voted in

Committee £12,000 towards the expenses of this department, which, exclusive of law, stationery, and printing, had cost something like £75,000, or about £100,000 in all. The secretary was stated in the Estimates to receive £800 a-year, but a foot-note would show that he really received £1000, £200 additional being given him for "personal allowance." The chief clerk, who a short time since had been in receipt of £200, rising by £20 a-year, had made a sudden jump to £600. Of this he did not complain, for the money, as he knew, was a very good fellow, and one who, having married a relative of his, was glad to be able to congratulate upon the possession of a good berth. But he maintained that Professor Symonds at the head of the office, and with a staff of ten clerks under him, would have done the work much better, and have commanded the confidence of the public. His right hon. friend had, no doubt, made the best he could with the establishment, but he was astonished that the Chancellor of the Exchequer of an economical Government had not laid his hand upon it, and saved £5000 or £6000 a-year out of the sum voted for the expenses—a thing he might easily have done without impairing its efficacy.

It was, he contended, utterly absurd to have included the foot-and-mouth disease in the Contagious Diseases (Animals) Act. Such a course would never, he felt sure, be followed by the Government, and he was glad that it could only have been done by the department, for had it not been included their occupation would have been gone. After the cessation of the cattle plague the Veterinary Department sent out complex forms to the different inspectors, accompanied by books full of instructions, but they did not take the trouble, and they had not the courtesy to tell the local authorities what they had done. For some four weeks the veterinary surgeons worked away, and incurred expense in searching for cases of foot-and-mouth disease, but this day they had never been paid, for the first act of the quarter sessions was to cancel their appointments and to send them for their remuneration to the department that had sent the instructions. The veterinary surgeons, however, had never received anything for what they had done. There could be no doubt that the foot-and-mouth disease had been a costly thing to the nation and ruinous to the farmer. For two or three years after the appearance of the cattle plague was the cost of it, and he began to hope that we should manage to keep free, but in 1869 sheep in the foreign cattle market known to be afflicted with foot-and-mouth disease were allowed to be dispersed throughout the country, and the effects became very soon apparent. The cost of foot-and-mouth disease could not be put at less than £1 per head, and it must have amounted to £100,000 in the case of the Norfolk farmers alone. It was not, he might say, Mr. Mill and another who held that farmers would be recompensed by the increased price; farmers would rather have moderate prices if they could only retain their stock. His right hon. friend would tell him that when the Contagious Diseases (Animals) Bill was under discussion he advocated stringent home restrictions. So he did, but that was on condition that foreign cattle should be killed at the port of landing.

He would not bring up the case of pleuro-pneumonia occurred in a herd of 40 cattle. Six were attacked within a fortnight, and were entirely separated from the rest. All recovered except one, which had a chronic attack lasting to the end of May. But the unfortunate farmer would not be permitted to remove his stock because the farm was said to be an infected spot. Let his right hon. friend calculate how much that bullock which would not die and would not recover, and which its owner would not kill, cost the county of Norfolk. But foreign stock might and did mix with diseased animals on the other side. He said so because in May there were two cases of pleuro-pneumonia in different ships, and so advanced was the disease that the authorities had the carcasses of the animals destroyed. A recent order said the stock from Holland might come over here, and, after 12 hours' quarantine, might go over the whole country. His right hon. friend might say that since the relaxation of the orders for the export of the loss stock during the last 30 years, and had also applied to some gentlemen in Wales and Scotland. He found that in some of the northern districts of Scotland and the remote counties of Wales, they had no case whatever of foot-and-mouth disease, or of pleuro-pneumonia. Did not that show most distinctly that these were foreign diseases,

because there was the same atmosphere in one part of the country as in another, and the cattle received, if anything, more severe treatment in the remote districts? In the breeding counties, Mr. Kilby found that the losses were 25 per cent. from lung disease, and 33 per cent. from foot-and-mouth disease; while in the grazing counties the losses were—from lung disease, 90, and from foot-and-mouth disease, 78 per cent., or 108 per cent. in all, showing it was by the transit and import of cattle these dangerous diseases were propagated. In 1868 we had 3,769,000 cattle, worth about £56,000,000. Well, the losses in 30 years amounted to £83,000,000, or nearly once and a-half the worth of the whole stock in 1868. So that a man in England during the last 30 years who had 20 head of stock lost the value of one every 12 months. As regards Norfolk, that was considerably under the mark, and his own losses had been very much more. Now, for the sake of £84,000 head of stock, which was the average importation of the last four years, we exposed 9,000,000 of cattle in this country to foreign diseases; and for 560,000 head of sheep, the average importation of the last four years, we exposed 34,000,000 of our sheep to foreign disorders. The consequence was, that the price of meat to the consumers had been greatly increased. Whatever might be the case with corn, the consumers of meat in this country had to look to the same supplies. According to the official returns of the Board of Agriculture, the total number of cattle for the towns for the years 1867, 1868, 1869, and 1870 were 4,856,000 tons, or on an average per year 1,214,000 tons. The foreign supplies for the same period were—of live stock 59,000 tons, and of dead meat almost exactly the same amount, or 56,724 tons. The percentage of the home supply therefore was 91½ as against 44 of live stock and 44 of dead meat from foreign countries. He could not understand why legislation, where so diseased, was scheduled, and why the right hon. gentleman, and the others here, allowed the direct importation of cattle from Russia. The other day a cargo of beasts came direct from a Russian port whence the disease was imported in 1865. It came to the Victoria Docks, and after 12 hours the beasts were sent to the Metropolitan Cattle Market. They mixed with foreign sheep, both at the railway station and in the market, and although he might be sure the latter were not allowed to leave the market alive, he was sure that the more accommodation for a cargo of beasts came from Hamburg, but they were imported from Russia through Germany. They arrived with some sheep at Brown's wharf, and those very sheep went into the provinces.

The Vice-President of the Council had extemporised a temporary water-side market, and Mr. Odams, who spent £12,000 in fitting it up, had not been very well liked by the authorities. He provided a very good and sufficient place, and he had been asked whether he wanted he was asked whether he would provide it. Mr. Odams thereupon spent £1200 more in making sheds, &c., but in a fortnight the order was rescinded, and the whole of the stock for which this accommodation had been provided was allowed to go to the Metropolitan Cattle Market. The state of the foreign cattle market which was to arise at Dead Man's Wharf would, he trusted, receive the attention of his right hon. friend. The Corporation of London, who had a little or nothing hitherto had now built a wall to separate 20 acres of land from the Victualling Yard, Deptford. If, however, the new market were not ready by January 1, 1872, the Corporation would lose the monopoly of the market, and he hoped the Vice-President would insist on the Corporation keeping to their part of the bargain. He wished the right hon. gentleman had kept to the temporary market, and withdrawn the coroner, so that the inhabitants of Brighton and other places might have the advantage of coming to London and buying their stock. The House ought to encourage the carriage of dead meat, for the sake not only of economy but of humanity. A sheep might be sent into Staffordshire for 10d., and from London to Manchester for 1s. a head, including the skin and offal. Even lamb, that most perishable meat, he had himself been sending in large quantities to the London market. He believed that, instead of a member of that House, the Government should be in the country, and calling for economy, it was far better to put his finger in that House upon some item of uneconomical expenditure with which he might be acquainted. He trusted that the House would grant the inquiry for which he asked. It need only be a short one. Three or four sittings of the committee would be sufficient either to prove or disprove his case. The hon. member concluded by moving, That a Select Committee be appointed to inquire into the cost, constitution, and working of the Veterinary Department of the Privy Council."

[Colonel CORBETT, in seconding the amendment, said he could endorse two statements made by his hon. friend. The first was that a veterinary surgeon ought to be at the head of this department of the Privy Council, and the next was that the foot-and-mouth disease ought not to have been included in the Act. The question of cattle plague contagion was one of equal importance to the consumer and producer. He believed that if the losses sustained by the diseases of imported cattle were ascertained, it would be found that the price of meat had been raised in consequence 1d. per lb. to the consumer. He knew that as a

Breeder of cattle he would rather sell at 2½ per lb. less than receive the present high prices. It was exceedingly small stock of cattle in the country which kept up the price, and nothing but getting rid of the diseased would bring down the price of meat to its normal state. For the cattle should be killed at water-side markets, and store cattle should be kept out altogether. As to the 12 hours' quarantine it was of no use at all. He could confirm what his hon. friend had said as to the cattle in Wales being free from disease. If no disease were imported he believed our cattle would be entirely free from disease.

After some further discussion, during which an attempt was made to count out the House, Mr. Forster said, that although the hon. member for Norfolk had made a severe attack on the department with which he was connected, he did not regret that the subject had been brought before the House, although he could not admit that his hon. friend had made out a case for a committee of inquiry, the appointment of which would imply some degree of censure. Complaint had been made that the department was unnecessarily expensive, and that it had very little to do. When he became responsible for the working of the department, Mr. Williams said, he had been the permanent head of the branch to which this amendment related, and if any blame was due it should rather rest on him, who was the Parliamentary head of the department, than on an official whose industry and judgment he had found to be of the greatest service. With respect to the supposition that there was nothing to do, he must point out that shortly after he became Vice-President the Contagious Diseases (Animals) Act was passed with two objects, one to prevent the importation of diseased animals, the other to take steps against the spread of infection at home. The first object was attempted to be fulfilled to some extent by the previous Government, but no attempt was made to check the home disease. Any interference with the trade concerning a main part of the food of the people was a serious matter, and no one in his position would be able to hold office for a single day without having a responsible and intelligent staff capable of advising and giving information as to the spread of the disease at home and abroad. Their attempt to prevent the spread of the home disease was a new duty, and by the agency of 1180 inspectors in England and Wales alone the central office was brought into daily communication with the local authorities. Day after day pressing cases were brought before him, on which more information was requested, and though the office did not attempt to interpret the law, it was an erroneous notion to suppose that it did not answer general inquiries. Cases were brought under its notice from day to day; the correspondence, independent of returns, was enormous, and the number of letters that came into Colonel Harness's department was more than 30,000. However, he did not think that the objection of his hon. friend was that the office had nothing to do, but that it had better not have done what it had done. It was the duty of a person in his position to consider what was intended to be done when the Act was passed, and what was the best use of carrying out that intention out. As regards foreign importation he understood the principle of the Act was that there should be only such restrictions on the import of foreign cattle as was necessary to prevent the spread of the disease; and that for this purpose cattle coming from a country considered dangerous should be slaughtered at the ports of landing. Consequently, all Germany, Holland, Russia, and the Eastern Provinces were scheduled, not so much because the import of cattle reared in those countries was dangerous, but because it was apprehended that through them the disease might be brought from the Steppes. The late war on the Continent necessitated an increase of restriction, as France and Germany, in consequence of the march of the armies, became violently infected. It was then determined to put France in the same position as Germany had stood in, and it was also ordered that German cattle should be slaughtered at the water-side; and afterwards in an order was issued entirely prohibiting the import from France and Belgium, which order had not yet been entirely relaxed.

These orders could not have been issued unless the office had had a responsible department to give information as to the facts of the case; and as the orders necessarily raised the price of food, nothing but a feeling of necessity induced the office to issue them. The war, as far as Germany was concerned, was now entirely over, and that circumstance had enabled the office to put Germany back again into the position in which it stood before the war. In the next place it was thought—and this he believed was the real cause of offence to his hon. friend—that the time had arrived when Dutch cattle might be safely introduced. Last year the import of Dutch cattle was somewhere about 70,000 or 80,000, and of German cattle somewhere about 50,000 or 60,000, and for some time past there had been no cattle plague in Holland, the restrictions to prevent its spreading in this country being wisely devised; but as there was a danger that Steppian cattle might come through Rotterdam, the Dutch Government were told, when they asked that the restrictions on the import of Dutch cattle into this country might be taken off, that there was risk in allowing cattle to be imported from Rotterdam, and the result was, that the Dutch passed a law

prohibiting the import of sheep and cattle into Holland, and promising to give notice before the law was changed. He did not deny that pleuro-pneumonia was a very fatal and infectious disease, but it was nothing like so fatal or infectious as cattle plague; still, it was a very fatal disease. But pleuro-pneumonia was a known disease, and no restrictions would stop Dutch cattle would prevent its existence in this country. It was a matter of dispute whether pleuro-pneumonia was or was not introduced from abroad; he only knew it was found here; and he thought it was too much to require that Dutch cattle should be excluded, because in Holland, as in England, pleuro-pneumonia was to be found. No doubt there should be stringent regulations with regard to inspection, and that no animals should be allowed to be introduced into this country which came with pleuro-pneumonia. And what were the regulations? The regulations with regard to pleuro-pneumonia were, that if in any ship coming from Holland, or any foreign country, there was any animal affected with the disease, not merely the animal should be killed, but the whole cargo should be slaughtered at once, and not allowed to go to the metropolitan market, or into the interior. For cattle, therefore, were liable to even more stringent regulations than home cattle. That was going on as he thought they were justified in going. It was rather remarkable that, soon after this order, three cases of pleuro-pneumonia had occurred in two cargoes from Holland. The Dutch Government were immediately communicated with on the subject, and told they should take the greatest precautions to prevent the recurrence of such cases. They had taken the greatest precautions, and he believed they had been effective. The regulations enforced were of the most stringent character. No cattle were allowed to be shipped without previous examination by veterinary surgeons—to be conducted between sunrise and sunset. The General Steam Navigation Company had also taken up the subject, and it was their interest to see that the regulations were strictly enforced, for the trade in cattle between Holland and this country was a most important one. Still, he did not think they were going to make any more drastic regulations on the account of Holland being in the same position in this country with regard to pleuro-pneumonia, while the regulations in force did practically prevent pleuro-pneumonia being introduced by Dutch animals. Then, on the other hand, he was urged by his hon. friend the member for Manchester to let in the German cattle for the benefit of the large towns, as we did the Dutch, under certain regulations. But it would be exceedingly difficult to draw a cordon round those large towns to give the same security as existed in London. Nevertheless, he thought the representations made by the deputation to which his hon. friend had alluded deserved the most careful consideration of the Government, and he acknowledged he had postponed a final decision on that subject, expecting the arrival of Lord de Grey within two or three days, when he should be glad to have his counsel and assistance in the matter. In the meantime, he was glad to find that the representations of his hon. friend appeared to have found favour with his hon. friend the member for Norfolk. "—No, no." At all events, the hon. gentleman did not seem to think any great danger would result from the adoption of the suggestion. Now, with reference to home diseases, the hon. gentleman seemed to think that all their efforts to check them had been useless. But there had not yet been time fully to test the value of their regulations. He did not think that in a couple of years they could gain statistics that could be of very great service with regard to the disease, as far as the spread of disease among the cattle of this country. It had taken some weeks or months before the local authorities could thoroughly work the Act. In some places there had been a strenuous endeavour to carry it out; in others there had been apathy and opposition. So far as they could get any information, it was very much in favour of the working of the Act. There had been in 1867 ending March 6, 1870, 775 outbreaks of pleuro-pneumonia, and in the corresponding weeks of 1868 ending March 14, only 14 outbreaks. In 1869 in England and Wales there were 16, in which during six months of 1869-70 the outbreaks had been 603, and in the corresponding period of 1870-1 the outbreaks were only 379. In 15 others there was a diminution and a considerable diminution. There was only one county in which there had been an increase—from 104 to 112, and that was the county of Norfolk, where there had been more opposition to the carrying out of the Act than in any other county. In Norfolk, till November, 1869, that any inspector had been appointed there. Nine were then appointed for the county and two for the boroughs. Suffolk had 42 inspectors, selected from the police; the decrease of the disease there had been greater than in Norfolk, and the expense of working had been less—£253, as compared with £841, the cost of working Norfolk. It was found that inspectors taken from the police, assisted by one or two veterinary inspectors, answered better than a large staff of veterinary inspectors. The case of Mr. Odams had been referred to, but Mr. Odams perfectly well understood that he set up his market as a temporary affair, and that the occasion for it would cease at any moment. He did not think any case had been made out against the department; the regulations now seemed to meet with general approval, and 30 out of

the 47 counties had adopted more stringent regulations than the Act required.

Mr. BENTINCK was remarking upon the fact that the thin attendance of the House showed what little interest members took in a matter which so nearly concerned their constituents, when

An Hon. MEMBER noticed that there were not 40 members present.

THE SPEAKER counted, and finding there were only 21, declared the House adjourned at 20 minutes to 11 o'clock.

Home Correspondence.

State of the Crops.—*Berwickshire.*—Had I been able to send you a report when you asked for it, I should have had to send a very gloomy one. But after a long course of cold ungenial weather, a most grateful change took place on May 20. From that date to the end of the month the crop made as rapid progress as I have almost ever observed in the same number of days. The first three days of June were again cold and boisterous; but upon the whole the agricultural prospect is now bright and encouraging. Some pieces of Wheat have lost plant from maggot, otherwise this crop looks well, as do Barley, Oats, and Beans. Swedes were sown in good time and have braided well. Turnip-sowing draws rapidly to a close. Pastures have freshened greatly, and now afford a good bite to stock. *John Wilson, Edington Mains, Chirnside, June 5.*

Shropshire.—It has seldom, if ever, been my province to report upon the Wheat crop under more unfavourable circumstances. A large breadth of the autumn-sown has been ploughed up (and the land planted with Barley and other spring crops); a considerable portion of what has been allowed to remain has a miserable appearance, and I have no hesitation in saying that that crop on the whole breadth sown cannot exceed half an average. The effect of the season has been most capricious, for while some few are rejoicing in a full plant, others have had the greatest portion of their crop destroyed. Of two fields adjoining this farm, with only the turnpike road separating them, the surface soil the same, the cultivation equally good, and the substrata alike, the one field, sown in October, was completely destroyed; and the other, sown in November, has a full plant, and the present appearance bids fair for a first-class crop. It is well being able to report that the appearance of all descriptions of spring corn is most cheering, and we have every reason to hope for a full crop of Barley, Oats, and Peas. The Turnips are going on admirably, and the appearance of the meadows is far more satisfactory than they were this time last year, so that we have every reason to expect that there will not be the difficulty in carrying off the stock through the winter, as was experienced in a high degree through the past. *Evan Davies, Patton, June 2.*

The Cost of an Acre of Turnips.—Allow me space for a very few remarks on Mr. Arras's paper on the Cost of an Acre of Turnips. I have no objection to offer to Mr. Arras's items of outlay, or to his estimations of the cost of the various manures, and I have no wish to care, by one thoroughly competent to the task, and to accept them as substantially accurate. But the principle on which the estimate is framed appears to me to be entirely fallacious. For obviously the cost of thoroughly cleaning, pulverising, and manuring the soil, although incurred in connection with the Turnip crop, is not exclusively for its benefit, but for that of the whole crop of the rotation. Nay, this does not express the whole truth, for often it appears that these cleaning operations, although highly beneficial to the after crops, are particularly hurtful to the Turnips. Mr. Arras ought to have distributed the cost of the following and manuring over the whole rotation, just as he has ascertained the proportion of rent, public burdens, and tenant's profits accruing to his acre of Turnips, by dividing the gross amount of these charges by the whole acres of the farm. Before the introduction of Turnips substantially the same outlay had to be incurred upon the dead fallow, and the same outlay, thought of charging the whole cost of the dead fallow upon the immediately succeeding Wheat crop. I regret that so able and interesting a paper should be marred by this fallacy. *J. W.*

How to Make a Cheap Manure.—The gentleman with the unpronounceable name who, at p. 359, asks the above question, has induced me to send you a few words on a system of making manure that obtains in several large cities in India where water is scarce. Each house, or cluster of houses, has a closet, opening inside, but with a small door on the outside, that the sweeper can open and remove the nightsoil, which is taken to a cart. The carts are filled from a small door in the top. They are kept in out-of-the-way places about the city. The dirt is deposited by being regulated by the denser of the population, so that they are full at the period of the hour every day, when bullocks are yoked, and the carts taken outside the city to a place where large pits have been prepared. On reaching the pits, the carts are backed close to the edge, the screw on the top of the barrel, which is connected with the large valve in the bottom, is opened,

Parkin, Jno., Goldthorpe, Workson, Notts.
 Parr, Capt. R. W., 78, High Street, Birmmgham, Salop.
 Parkes, James, Midway, Potters, Notts.
 Perry, Graddon, Aston Pigott, Conover, Salop.
 Pickering, William, Poulton Pulford, Wrexham, Denbigh.

Podmore, Robert, Sealand, Queen's Ferry, Flint.
 Powis, Charles, Millwall Pier, and 60, Gracechurch Street, E.C.

Pugh, David, Manarovan, Llandel, Carmarthen.
 Quelch, J. Bewick, Bournbourn House, Ferry Hill, Durham.
 Roberts, Frederick L., Queen's Ferry, Flint.
 Robinson, Isaac, 1, Victoria Road, Wichebech, Cambridge.
 Robinson, Stephen, Tynhale's, Kingston, Hereford.
 Rogers, William Henry, J. P., Wolverhampton, Stafford.
 Saxton, Dr. W. W., Market Drayton, Salop.
 Scott, Thomas Robert, Portchester Farm, Portchester, Hants.

Shashaft, Thomas, Ravenstone, Newport-Pagnell, Bucks.

Sharpley, Charles, Fultone Hall, South Lincoln.

Sharpley, Isaac, Boswell House, South Lincoln.

Shaw, Heller, Thomas Bradney, The Woodhouse, Wombourne, Stafford.

Sladden, Capt. J. B., Donington, Newport, Salop.

Smith, George, Ailston, Stafford-on-Avon, Warwick.

Smitheth, Richard Hudson, Hengrove House, Margate.

Stubbs, Samuel, Bridgford, Stafford.

Summer, Richard, Cranmer House, Bridgford, Salop.

Swain, George, Hamerton, Newcastle, Stafford.

Taylor, Henry, Pittingham, Wolverhampton.

Thompson, William, Moresdale Hall, Kendal, West-morland.

Twentyman, Alfred Charles, Castlecroft, Wolverhampton.

Walker, Samuel, Chapel Farm, Tynhale, Stafford.

Wardle, Henry, Burton-on-Trent, Stafford.

Watling, Robert S., Scraby Hall, Yarmouth, Norfolk.

Watson, Joshua R., Le Bocage, Guernsey.

Webster, Frederick Taylor, Bishon Hall, Shifnal, Salop.

Wells, Henry John, Leston, Leicestershire, Bridgford, Salop.

Wilson, John, Aston Hall, Claverley, Bridgford, Salop.

Wolton, Horace, Newbourn Hall, Newbourn, Woodbridge.

Wood, Edmund Burke, Moreton Hall, Chirk, Ruabon, Salop.

Woodfin, John, Aston, Wem, Salop.

Wright, Charles, Strettham, Ely, Cambridge.

Wright, George Thomas, Stoke Farm, Wokingham, Berks.

Wright, Richard Mary, Coppenthal, Stafford.

FINANCES.—Mr. Davies presented the report, from which it appeared that the secretary's receipts during the past month had been duly examined by the committee, and by Messrs. Quilter, Ball & Co., the Society's accountants, and found correct. The balance at the bankers' on May 31 was £384 14s. 11d., while £200 remained in deposit.

It was reported that, by a letter received from the Society's secretaries, the action of Bradburn *versus* the Society's stands for trial on Tuesday next, at 10 A.M., at the Court of Exchequer, Westminster Hall.

Mr. Thompson (chairman) reported that, after considering a letter referred to them by the Council, in which Mr. Sidney advocated an agricultural survey of England by the Society, the committee were of opinion that the information which Mr. Sidney thinks it desirable to collect by means of a general and very expensive survey, has been to a great extent obtained in a more interesting and useful shape by means of the reports which have been published in the Journal within the last few years, viz., in—

1867. Reports on steam cultivation, giving the details of management of 176 farms cultivated by steam, and situated in 29 different English counties.

1869. Reports of a few eminent farms selected for the known excellence of the results obtained by the skill of the farmers.

1870. Reports on the farms which competed for the prizes offered at the time of the Oxford Show.

These reports have been drawn up by very able writers at a considerable cost to the Society, and will, with the consent of the Council, be continued from time to time; and the committee submit that an exact account of a limited number of noted farms in different districts is more likely to be useful than the indiscriminate collection of all sorts of good and bad alike, and which, if faithfully collected, would be too bulky to be fit for general perusal.—This report was adopted.

CHEMICAL.—Mr. J. Dent Dent, M.P., reported that a letter having been read from the secretary of the Oswestry District Agricultural Society, applying for information as to how far members of the Royal Agricultural Society, being also members of the committee of a local agricultural society, may apply to Professor Voelcker for analyses of manures, and may make such use of these reports as they think proper at the meetings of the local society—the committee were of opinion that reports of analyses by Professor Voelcker, being made for the *bona fide* use of members of the Society, such reports ought not to be used as public property by the committees of local agricultural societies.

In presenting Professor Voelcker's quarterly report, the committee regret that they have to call the attention of the Council to the great number of inferior and adulterated manures and feeding stuffs sold to agriculturists; but they hope that the determination of the Council to publish these reports will eventually do much to check such fraudulent transactions. The number of applications for advice received by the Professor is continually increasing, and members of the Society seem fully alive to the advantage and necessity of chemical inquiry. In many of the cases presented

there is a difficulty in obtaining the names of the vendors of manures or cakes, and the committee find that very frequently vendors make compensation, and compromise the matter to avoid exposure.

The following is the report of the Consulting Chemist:—

1. Last March I reported the following analysis of an artificial manure, which was sent to me by Mr. Catchpool, Feering Bury, Kelvedon, Essex:—

Moisture	9.65
*Organic matter	13.54
Phosphate of lime	4.99
Carbonate and sulphate of lime	48.77
Alkaline salts and magnesia (chiefly common salt)	3.22
Insoluble siliceous matter (sand)	19.83
	100.00

*Containing nitrogen	1.12
Equal to ammonia	3.36

In comparison with the price at which Peruvian guano is sold, this manure would be dear at 2s. a ton.

Mr. Catchpool has since informed me that he bought this artificial manure from Messrs. H. Marshall & Co., Quays, Wivenhoe, Essex, as fish and bone manure, at 5s. 5d. per ton, and sent me the accompanying letter and copies of analyses, which he received from Messrs. H. Marshall & Co.

Quays, Wivenhoe, February 27, 1870.

Dear Sir,—In accordance with your request, enclosed you have copies of analyses of our fish and bone manure. You are exceedingly busy with it, and sending out from 20 to 30 tons per day. Sir John Tyrrell, of Bircham House, had a ton of our fish and bone manure, and tested it for Barley and Oats in the Chelmsford Market on Friday that the fish and bone manure beat all the others, and the only thing near it was Peruvian guano.

Your order shall have our best attention.—Yours, faithfully,

H. MARSHALL & CO.

COPY.
Result of Analysis of Fish and Bone Manure by Professor Voelcker, Analytical Professor to the Royal Agricultural Society.

Laboratory, 11, Salisbury Square, Fleet Street, London, October 21, 1870.

Moisture	14.74
*Organic matter and salts of ammonia	21.29
Phosphates of lime and magnesia	10.07
Sulphates and carbonates of lime	35.39
Alkaline salts	10.64
Insoluble matters	7.97
	100.00

*Containing nitrogen	3.62
Equal to ammonia	10.86
Fee received, 2s. 5d.	(Signed) AUGUSTUS VOELCKER.

COPY.
Result of Analysis of Soluble Fish and Bone Manure by Professor Sibson, F.C.S., Professor of Chemistry in the Royal Agricultural College.

Laboratory, 11, Eaton Terrace, St. John's Wood, October 20, 1871.

Moisture	15.13
*Nitrogenous organic matter and salts of ammonia	22.33
Precipitated phosphates	14.02
Insoluble phosphates	27.03
Carbonate of lime	2.64
Alkaline salts and magnesia	6.44
Insoluble siliceous matters	7.17
	100.00

*Containing nitrogen	3.99
Equal to ammonia	11.97
(Signed) ALFRED SIBSON, F.C.S.	

Feering Bury, Kelvedon, March 16, 1871.

My dear Sir,—Thank you for your letter, received this morning, also for the trouble you have taken. This same post also brought a letter from Marshall & Co., in which they write, "There is no necessity for you to correspond with Dr. Voelcker, as we are in communication with him." It is this statement, correct as I do not gather from your letter that you have heard from them. I shall be glad to hear.—Believe me to remain, yours, faithfully,

EDWARD CATCHPOOL.

Dr. Augustus Voelcker.

2. A sample of boiled bones, sent by Mr. Barbour, of Bolesworth Castle, Chester, on analysis, was found to have the following composition:—

Moisture	5.76
*Organic matter	11.64
Phosphate of lime	40.41
Carbonate of lime, magnesia, and alkaline salts	15.53
Insoluble siliceous matter (sand)	26.60
	100.00

*Containing nitrogen	2.14
Equal to ammonia	6.42

This sample, it will be seen, was largely adulterated with sand. I have not been able to learn whether it was sold as pure boiled bone dust, and at what price per ton.

3. In another sample, sold as pure and unadulterated bone dust to Mr. Henry Straker, Riding Mill on Tyne, I found 28.66 per cent. of sand. This sample was taken out of the middle of one bag. Having reported the bone dust to be adulterated, Mr. H. Straker sent me a fresh sample taken from several bags, and then asked me to take a full quantitative analysis, which yielded the following results:—

Bone Dust sent by Mr. H. Straker, Riding Mill on Tyne, March 8.

Moisture	7.20
*Organic matter	19.17
Phosphates	41.50
Carbonate of lime	31.66
Alkaline salts and magnesia	5.01
Sand	15.99
	100.00

*Containing nitrogen	2.47
Equal to ammonia	7.59

Like the preceding sample, it was not pure, and genuine bone dust, although it was bought at £8 7s. 6d. a ton, as will be seen by the invoice of Messrs. Oliver

& Snowden, seed and cake merchants, and dealers in Peruvian Government guano, nitrate of soda, tar, grease, and oils, Hallowell.

H. Straker, Esq., Riding Mill, Hallowell.

Bought of Oliver & Snowden, Seed and Cake Merchants, &c.

Feb. 25, 1871.—67 bags bone dust, 5 c. 2 q. 0 lb. 0 oz.

£8 7s. 6d. £42 14 9

76 bags bone dust £19 1

Stock-fish.—Carriage not paid. £44 13 4

Mr. Straker sent me a copy of a letter, in which occurs the following passage:

"You will probably remember having also had a sample of bone dust which I had bought as 'pure and unadulterated,' and which, on getting your analysis, I sent back. I heard in the train to-day that it was afterwards sent to a neighbour of mine (he told it to me himself), who also had it analysed, not liking the look of it, and the report was worse than yours; he, too, refused it, and they actually sent him a copy of your analysis to me, which I had given them in justification of my refusing it—tho' they sent to my friend to show how wrong his chemistry was. They offered to deduct 1s. a ton if he could keep it."

4. *German Potash Salts: Kainite.*—Mr. H. Straker also sent me a sample of kainite, which he had bought from Messrs. Keighley & Maxsted, of Hull, on a guarantee that the kainite should not contain less than 23 per cent. of sulphate of potash. I find, however, only 18 per cent. of sulphate of potash in the sample sent to me by Mr. Straker on February 22, 1871.

The sample was taken from a burst bag, and as it might not have fairly represented the percentage of potash in the whole delivery, Mr. Straker sent me another sample, which was a mixture taken from the middle of ten bags. The second sample of kainite, received March 8, yielded—

Potash	10.35
Equal to sulphate of potash	19.13

Both the bone dust and the kainite were returned by Mr. Straker, as not being according to the guarantee.

5. *British Economical Manure.*—A sample of so-called artificial manure was sent to me by Mr. W. Levett, Glassburn, Cranbrook, who informed me that the manure is called the British Economical Manure; that it is manufactured by Mr. B. Coveny, 17, Devonshire Square, Bishopsgate Street, London, and sold at £12 per ton. Its composition was as follows:—

Moisture	12.89
*Organic matter and water of combination	8.69
Sulphate of iron	14.09
Sulphate of lime	10.78
Alkaline salts (sulphate of soda chiefly)	44.10
Sand	9.36
	100.00

*Containing nitrogen	1.1
Equal to ammonia	3.3

This economical compound contains a mere trace of ammonia, no phosphates whatever, and is a worthless mixture of green vitriol, crude sulphate of soda (salts), gypsum, and sand. It has already been mentioned in the quarterly reports, and its utter worthlessness pointed out to farmers. Mr. Levett states that he bought 1 ton, and some of his neighbours more than this quantity.

6. I would also direct attention to the composition of a sample of British guano sent for examination by Mr. Joseph Masters, Bengeworth, Evesham.

Moisture	10.26
*Organic matter	26.61
Phosphates	12.83
Sulphate of lime	11.62
Manganese and alkalies	20.74
Sand	16.94
	100.00

*Containing nitrogen	1.59
Equal to ammonia	4.82

This British guano contained not quite 2 per cent. of ammonia and 13 per cent. of phosphates, and on the other hand a good deal of sand and gypsum. It is scarcely worth £4 a ton.

I have received no particulars of the price at which this manure was supplied, or the parties from whom it was received.

There have been several cases of inferior guano, and also, I regret to say, some that have been also adulterated.

7. *Adulterated Guano.*—A sample of Peruvian guano, sent by Mr. W. Lamin, Bestwood Park, Nottingham, was found to contain 100 parts:—

Moisture	15.22
Carbonate and sulphate of lime	5.54
*Organic matter and ammonia salts	26.43
Phosphates	18.89
Alkaline salts, &c.	8.84
Sand	20.35
	100.00

*Containing nitrogen	5.79
Equal to ammonia	17.32

It will be seen that this guano was adulterated with a large proportion of sand and earthy matters, which yielded only 7 per cent. of ammonia. It was sold at £12 10s. per ton.

Bestwood Park, May 1, 1871.

Dear Sir,—You wished me to inform you how I bought the guano I sent you for analysis. I enclose you the invoice. Mr. Bado, a friend of mine, assures me that he only gets 5s. per ton for selling it, calls it Peruvian guano, and he believed it to be good. He bought it from Mr. Shaw & Co., 15, Tithes Barn Street, Liverpool.—Yours, faithfully,

W. LAMIN.

Dr. Augustus Voelcker.

P.S.—Mr. W. Lamin told me the guano as best Peruvian, but said it was cheap at the price he sold it.

W. LAMIN.

A case of adulterated guano, supplied by the same firm at Liverpool, was mentioned in the last quarterly report.

8. Another sample of adulterated guano was sent for analysis by Mr. N. Basket, Braines Hall, Wetheringale, Stomham, which was paid for it £12 15s., cash. It had the following composition:—

Moisture	17.84
*Organic matter and ammonia salts	23.97
Phosphate	18.07
Carbonate and sulphate of lime	12.02
Alkaline salts, &c.	5.35
Sand	17.75
100.00	

*Containing nitrogen	4.94
Equal to ammonia	5.99

9. *Fish and Bone Manure*.—One of the most worthless artificial manures examined by me during the last quarter was a sample of so-called fish and bone manure, sold at £5 per ton, delivered free, sent by Mr. N. Buxton. This compound, as will be seen from the subjoined analysis, yielded only one-third of a per cent. of ammonia (in round numbers), and only 31 per cent. of phosphate of lime, and the remainder was worth the cartage to any distance. Such a manure would scarcely be worth 10s. a ton, delivered free of cost on the farm.

Composition of a sample of Fish and Bone Manure sent by Mr. Nathaniel Buxton, Braines Hall, Wetheringall, Stokenham Suffolk—

Moisture	11.68
*Organic matter	8.88
Phosphate of lime	3.43
Sulphate and carbonate of lime	51.66
Magnesia and alkaline salts	9.79
Insoluble silicious matter (sand)	21.95
100.00	

*Containing nitrogen	3.1
Equal to ammonia	3.77

10. *Concentrated Fish Manure*.—A manure, received from Mr. W. Gascoyne, The Law, Sittingbourne, was offered to me as concentrated fish manure, at £4 10s. per ton, but, according to the subjoined analysis, it was worth only £2 per ton.

Composition of a Manure sent by Mr. W. W. Gascoyne, The Law, Sittingbourne, called Concentrated Fish Manure, April 21, 1871.

Moisture	17.48
*Organic matter	21.37
Phosphate (equal to bone earth 2.06)	1.31
Insoluble phosphate	5.99
Sulphate of lime	26.64
Alkalies	1.14
Sand	32.14
100.00	

*Containing nitrogen .....	.63
Equal to ammonia .....	.89

Mr. Gascoyne writes:—

The Law, Sittingbourne, May 9, 1871.
Dear Sir,—The manure merchants are much distressed with the result of your report, and will seek an analysis on their own account. The price they ask me for this manure is 6s. per ton; they say it consists exclusively of acid, fish, and scum; that they cannot understand the 37.14 insoluble silicious matter, or 26.64 "sulphate of lime," but these must come with the scum from the tannery—Yours faithfully, W. W. GASCOYNE.

The names of the dealers have not been furnished.

11. Another very inferior manure was received from Mr. Edw. Wadham, Milwood, Dalton-in-Furness. Its analysis had the following composition:—

Moisture	26.74
*Organic matter	29.99
Phosphate of lime	5.30
Oxide of iron and alumina	1.86
Carbonate and sulphate of lime	4.61
Alkalies and magnesia	11.52
Sand	17.05
100.00	

*Containing nitrogen	1.37
Equal to ammonia .....	.66
*Containing nitrate of soda .....	.72

Estimated its value at about £2 a ton. In the reply to my inquiries, Mr. E. Wadham writes as follows:—

Milwood, Dalton-in-Furness, May 15, 1871.
Sir,—Absence from home must be my apology for not having sooner attended to your favour of the 6th inst. Your analysis entirely confirms my suspicion. The article was purchased from one William Gradwell, of Barrow-in-Furness, and he charged me 48s. per ton for it. I shall, of course, only pay him according to your valuation, and if he makes any difficulty about it, he must stand the consequences.—Yours obliged, EDW. WADHAM.

12. *Composition of a Sample of Patent Blood Manure, sent by Mr. J. Moisset.*

Moisture	19.24
Water of combination and	15.60
*Organic matter	
Ephosphate of lime (monobasic phosphate of lime)	11.10
Equal to bone-phosphate (tribasic phosphate of lime) rendered soluble by acid	(17.40)
Insoluble phosphate	8.14
Sulphate of lime	40.64
Sulphate of lime	2.01
Alkaline salts and magnesia	3.27
Insoluble silicious matter	
100.00	

*Containing nitrogen	1.82
Equal to ammonia	2.21

Slowley Hall, Arley, near Coventry, April 13, 1871.
Dear Sir,—I have sent you a sample of Patent Blood Manure for £1. The price of the manure at my station is £10 per ton; it is bought from a very respectable firm, and I should like to know whether I have value for my money. Waiting your analysis, I remain, yours truly, J. MOISSET.

A. Voelcker, Esq.

Slowley Hall, Arley, Coventry, May 26, 1871.
Dear Sir,—On receipt of your analysis, I forwarded a copy of it and your letter to the firm the manure was purchased from, and enclose a copy of their reply, which I do not consider at all satisfactory. They enclose a receipt for 2s. 6d. per ton of the No. 2 and No. 3 manure. If I had not had an analysis, I should not have known their mistake (as they put it). I have not

given the name of the firm, but will do so if you require it.—I am, dear sir, yours truly, JUNIUS MINNET.

P.S. On looking at the bags I find they are marked No. 3. They have three prices for their Patent Blood Manure: No. 1, 46s; No. 2, 48s; No. 3, 46s. No. 3 I ordered.

Copy of Reply.

May 17, 1871.
Dear Sir,—Immediately upon receipt of your sample we tested it, and find that it is No. 2 blood manure, and not No. 3. We exceedingly regret that such a mistake should be made, and for the future we shall brand the bags with red instead of black, so that no such mistake can occur. With forwarding towards 300 tons of blood manure, such as this cannot be wondered at by workmen, as the only distinction on the bags is the letter 2 and 3. The price Dr. Voelcker puts upon it is simply absurd. The amount worth is—cwt., the soluble phosphate, 6s. per cwt., which shows at once:—

17.40 soluble at 6s.	£5 4 0
3.21 ammonia, at 2s.	2 4 0
Insoluble, all from Peru guano, 8.14 at 2s. 6d.	2 4 0
Organic matter and sulphate lime	1 10 0

£9 18 0
The standard price is Nesbitt's, and the price of ammonia is the market price. We guarantee the No. 3, so per cent. soluble phosphate, 4 per cent. ammonia—that is 2 per cent. more than the No. 2.—We are, dear sir, yours truly,

The committee have requested Professor Voelcker to write at once for the name of the firm who supplied this manure.

13. *Adulterated Rice Meal*.—In the next place I have to report a case of adulterated rice meal, sent to me for examination by Mr. W. Stubbs, Bickerside, near Stafford. This meal had the following composition:—

Moisture	8.36
Oil	4.72
*Protein compounds	8.87
Starch, &c., &c.	41.72
Woody Fibre	11.14
Mineral matter	24.16
100.00	

*Containing nitrogen

Analysis of Ash.

Phosphate of lime	1.26
Magnesia and alkalies	2.89
Sulphate of lime	17.73
Silica and sand	6.16

It will be noticed that this meal was mixed with gypsum; and as it contained 24 per cent. of mineral matter, and 11 per cent. of indigestible woody fibre, it is no wonder that it did not agree with Mr. Stubbs's stock. In answer to my inquiries respecting the name of the vendor of the meal, price, &c., I received the following note:—

Dunston Farm, Penkridge, March 25, 1871.
Sir,—Mr. W. Stubbs, of Bickerside, has laid before me your analysis of a sample of rice meal from a lot purchased by him, also your letter requesting him to give the name and address of the vendor, and as he had some doubts as to how far this would render him liable, it was published. I have prevailed upon him to place in my hands the invoice and correspondence relating to it, to forward to you if I thought fit. I do so, because I believe it is only a matter of time, which the shameful imposture to which we are every day made victims. Mr. Stubbs wishes you to send the paper back to him at once, as he consumed 7 sacks of it before he had any suspicion of its contents, and which he has not yet paid for.—I am, yours truly, DR. AUGUSTUS VOELCKER.

Copy of Invoice.

Corn Exchange, Oldwindsor, Stourbridge.

1870. Terms cash. Charles Harrison.

Dec. 31—25 Sacks No. 1 rice meal, 14s. £18 2 6

25 Sacks not returned, 12s. each 1 5 0

Mr. W. Stubbs. £19 7 6

14. *Linseed cake, containing Castor-oil Beans*.—The following letter was received from Professor Varnell:—

Beech House, Belton, Suffolk, April 23, 1871.
My dear Doctor,—I send you two pieces of cake taken from a parcel I am feeding some bullocks with. If it has made them ill, and I will thank you to examine it, and inform me what it contains that is injurious to health. Some part of the lot has been damaged, I suppose from having been heated in the sun, but I observe that a fine crop of Fungi has sprung up on the surface of some of them, which I have thought may have something to do with it. I am sure of the waste, but of the I am not sure. It may contain in its composition seeds and other matter which has done the mischief, but of this you will, I have no doubt, be able to analyse. It is a kind of rice meal from some farmer besides myself have had reason to complain. A reply as early as convenient will oblige yours truly, DR. AUGUSTUS VOELCKER.

Member of the Royal Agricultural Society.

Dr. A. Voelcker.
Beech House, Belton, Yarmouth, April 29, 1871.
Dear Dr. Voelcker,—I beg to thank you very much for your kind letter respecting the cake. With regard to the conditions under which it was bought and sold, I am quite ignorant. All I know about it is, that a merchant in Yarmouth imported a cargo of the cake, and sold it to some farmers, who very soon afterwards complained that it made their bullocks ill. The merchant requested me to try some of this cake with some of my cattle. I therefore had a sack of it taken to my farm, and on the following day I gave three bullocks about 4 lb. each of it, which they readily ate, and on the following day they were all decidedly ill. The symptoms were indicative of considerable irritation of the mucous membrane of the stomach and intestines. They refused all kinds of food for nearly two days afterwards. As the symptoms came on, and I was not at home, I did not think it necessary to test the cake any further, being satisfied in my mind that it was unfit for food for cattle. I dare say I shall be able to find out whether it was sold as pure linseed, and also at what price.

Beech House, Belton, near Great Yarmouth, May 5, 1871.
My dear Sir,—About the end of this week a gentleman will send to you, by my advice, three samples of cake for you to analyse. It is a kind of rice meal from some farmer besides myself have had reason to complain. A reply as early as convenient will oblige yours truly, DR. AUGUSTUS VOELCKER.

It was sold at 1" I have learned that the price was £10 per ton, but, finding it produced disease in many cattle that were fed with it, he sold the rest of it by auction.—Belton, May 10, 1871.

Dr. A. Voelcker. GEORGE VARNELL.
A careful microscopic examination showed not merely the presence of Fungi, but also that of the husks of castor-oil beans. The cake, I need hardly say, is totally unfit for feeding purposes.

I have reason to believe that the same cake has done much mischief in Suffolk and Norfolk, inasmuch as I had samples of cake very similar to that sent by Prof. Varnell, sent to me for examination by non-members of the Society, who complained of the mischief done by the cake to their stock.

15. Another cake was sent to me by a gentleman residing in Essex, not a member of the Society, sold at £11 10s., or, as best English Linseed, which was composed chiefly of the screenings from pure seed, and which had caused considerable loss amongst sheep. This gentleman, not being a member of the Society, the names of the parties concerned cannot be given.

16. The next case on which I have to report is that of a sample of linseed cake, which was sold at £12 5s. to Mr. E. H. Davies, Palton, Wenlock, Shropshire, as best cake. Its composition was as follows:—

Moisture	11.34
Oil	11.60
*Protein compounds	11.65
Gum, mucilage, starch, &c.	30.33
Woody fibre	9.52
*Mineral matters	7.99
100.00	

*Containing nitrogen .....	.468
*Containing sand	1.40

Although this cake was not a bad feeding cake, it was nevertheless adulterated with pollard, or similar starchy mill refuse materials, and certainly not best linseed cake, nor worth £12 5s. a ton.

Mr. Davies writes to me as follows:—

Palton, Wenlock, April 18, 1871.
Dear Sir,—The linseed cake which I sent to you for analysis, and which I have received, was bought from Mr. Burnett, of Broseley (agent). It is a cake made at Hull, but the maker's name I do not know. It was sold as a genuine linseed cake, and is stamped (Best). It has had three different lots from the same mill—one lot stamped (Pure), the other (Genuine), and this which I sent you (Best). It cost me £12 5s. per ton. I have fancied it was a good cake, my cattle eating it well; but a labour of mine having bought some more of the same person, with which he was not satisfied, I thought I would have it analysed, to satisfy myself if there was anything in it except linseed. Although you state that the cake in question is adulterated with bran, &c., still the composition is very good, at all events compares favourably with that of a cake sold by Mr. Firminstone, Stourbridge, and which you state is a pure linseed cake, of first-rate quality. To express what I mean, I enclose your analyses of the two cakes, which, if it is not giving you too much trouble, I shall be glad to have returned.—Yours faithfully, EYAN H. DAVIES.

17. Another sample, sold as best English linseed cake, was found adulterated with nut cake, and made from dirty Linseed. It contained in 100 parts—

Moisture	11.92
Oil	10.60
*Protein compounds	27.06
Gum, mucilage, &c.	29.20
Fibre (woody)	15.66
*Mineral matters	5.95
100.00	

*Containing nitrogen .....	.431
*Containing sand .....	.98

Mr. Leggett, of Bromwich, Titchfield, Hants, says in his letter to me: "I have reason to believe the cake contains some ingredient highly injurious to stock, as I have within the last five weeks lost 90 lambs which have been fed on it." (Signed) AUGUSTUS VOELCKER, F.R.S.

These reports were adopted.

JOINT JOURNAL AND CHEMICAL.—Mr. J. Dent Dent, M.P., reported that the joint committee recommended that they be authorised to engage a consulting botanist to the Society at a salary of £100 per annum, the engagement to be an annual one. It was then the order of the day to read the report of the principal work performed from time to time for its members, and to undertake the work at fixed rates, to be arranged before his appointment, and to furnish papers to the Journal on special subjects of botanical interest. They also recommended that the question of the appointment of an entomologist be postponed for the present.—This report was adopted.

GENERAL VOLUNTEERS.—Mr. J. Stevenson reported the following recommendations of the committee. (1.) That it is desirable that a charge of 1s. each person be made for admission to the trial fields at Barnhurst, near Wolverhampton, except to members of the Society. (2.) That the local committee be bound to provide sufficient police to prevent any impediments to such trials. (3.) That a sufficient staff of police be provided at the cost of the Society, to keep the trial grounds at Stafford clear of trespassers to the public during the progress of such trials. (4.) That the police at the trial fields be obtained from the Staffordshire county police, that they consist of four mounted and six dismounted men, and that more be granted if required by the stewards. (5.) That application be made to the Secretary of State for the services of some members of the A. Division of the Metropolitan Police. (6.) That the advertising of the show be at the same scale as last year. (7.) That the arrangements for Divine service in the showyard be left to the Vicar of the parish. (8.) That the arrangements for the issue of combination tickets by the Great Western and London and North-Western Railways and the

† The Professor has not received the names of the vendors of these manures, but has applied for them.

Society, as proposed by the companies, be adopted. On the motion "That this report be adopted," the following amendment was moved by Mr. Randall, seconded by Mr. Milward, and carried by 19 votes against 7:—"That while appreciating the assistance which Mr. Bantock has given to the secretary in endeavouring to effect arrangements with the railway companies for the issue of combined tickets, it does not appear to the Council that the terms on which alone the railway companies propose to issue such tickets would make the acceptance of them desirable." Subject to this amendment the report of the committee was then received and adopted.

IMPLEMENT.—Mr. Milward reported that Mr. Randall and Mr. Masfen had engaged additional land, required for the trial of implements, in the occupation of Mr. John Darlington, near Stafford, viz., 53 acres, at a cost to the Society of £150, with not more than £10 additional for men to keep the ground. The committee therefore recommended that the prizes offered in Classes 1, 2, and 3, and the silver cup given by the President, shall not be awarded without submitting the competing implements to trial upon this land after they have been tested upon the comparatively lighter land at Wolverhampton.—This report was adopted.

VETERINARY.—Mr. Thompson stated that a deputation of the members of this committee had had a conference with a deputation of the governors of the Royal Veterinary College, in accordance with the resolution passed at the last monthly Council. The interview was maintained by the governors that the College authorities could not undertake to send a veterinary inspector into the country at the request of the Society or of any of its members, as such an engagement would interfere seriously with the delivery of lectures at the College, and would also bring the professors into competition with their own pupils at the reduced fees claimed in the statement of veterinary privileges of members of the Society; they also could not undertake that professors of the College should collect for publication the Society's Journal information on the treatment of diseases of stock; but they considered that the grant made by the Society was given as an aid to the education of veterinary surgeons in the pathology of cattle, sheep, and pigs. Mr. Thompson, however, expressed his belief that the deputation with whom the Veterinary Committee had conferred, probably did not represent the opinions of the governors as a body, and he therefore moved the following resolution:—"That the Council be requested to take further to consider the existing relations between the Society and the Royal Veterinary College, and to report to the Council, whether, in their opinion, any improvements could be effected therein." This resolution, having been seconded by Mr. Milward, was carried unanimously.

SHOWYARD CONTRACTS.—Mr. Randall (chairman) reported that the showyard at Wolverhampton was nearly completed, and that the contractor was bound to the sum of £150. The committee recommended that the seal of the Society be affixed to the agreement with Mr. Penny. For the purpose of preparing the agreement with the local committee of Cardiff, the surveyor had been directed to make a preliminary plan, which had been approved by the committee, subject to such modifications as the honorary director may find desirable, and the Secretary had been instructed to embody in the agreement the requirements pointed out.—This report was adopted.

Mr. Torr, in moving the resolution of which he had given notice, viz., "That when the trials of implements at the country meetings of the Society are not held in the showyard, one half the expense of providing trial-fields shall in future be borne by the Society," pointed out that the magnitude of the Society's requirements made their visit a heavy tax on the selected locality, and that the town itself did not in any way benefit by the trial-fields.—Mr. Jacob Wilson, seconding the resolution, expressed his belief that the Society could not spend money in a better way than that proposed by Mr. Torr.—Mr. Amos considered that the Council ought to know in each case what the Society has to pay, and Mr. Thompson suggested the insertion of the word "years" into the resolution after "in future."—Mr. Torr having adopted this suggestion, and the resolution having been further supported by Mr. Randall and Mr. Masfen, it was, as was decided, put from the chair, and carried unanimously.

The death of Mr. Samuel Jonas, of Chirshall Grange, a trustee of the Society, was reported.

Mr. Thompson gave notice that at the next monthly Council he would move "That in future the list of questions to be answered by towns competing for the country meetings shall include one calling for a statement of the maximum cost of the land required for the trial of implements, the acreage wanted for farming, and the Society."

Letters were read from Mr. James Easton, Senr., resigning the office of consulting engineer, and from Messrs. Eastons, Amos & Anderson, accepting the office of consulting engineers to the Society, and were ordered to be entered on the minutes.

On the motion of Mr. Jacob Wilson, seconded by Mr. Torr, the judges of stock and implements, who had been selected by the judges' selection committee, and accepted the office, were duly elected by the Council.

Permission was given to the committee of the South Staffordshire General Hospital to attach two boxes for the receipt of donations to the Society's buildings in the showyard at Wolverhampton.

A letter from the Secretary of the Austro-Hungarian Embassy, communicating the rules of the Agricultural Trial Station at Ungarash-Altenburg (Hungary) was referred to the Journal Committee.

A letter was read from Mr. Joseph Meadows, the breeder of "Bolivar," and the Secretary was instructed to inform him that the Council could not depart from their usual practice in reference to prizes for stock.

RATH AND WEST OF ENGLAND AND SOUTHERN COUNTIES.

THE following report of the Council was presented to the annual meeting, May 30, 1871:—

The Council, on the occasion of the ninety-fourth anniversary meeting of the Society, have the satisfaction of reporting a considerable increase in the number of new members, and they express a hope that the extension of the operations of the Society to the enlarged area of the southern counties, may hereafter be attended by an accession of subscribers. There are at present on the books of the Society, 139 governors, 73 life members, and 864 annual members.

The funded stock of the Society has during the last year been augmented by the purchase of £1700 stock, and amounting to £50,000.

The entries of stock, poultry, implements, &c., for the present meeting justifying the hope expressed in a recent report, that the effect of cementing the union contracted between the western and southern counties may tend to the development of the agricultural and commercial resources of the two great districts.

The entries of stock surpass in number those of any former year. There are in the cattle classes 31 Devons, 45 Shorthorns, 30 Herefords, 52 Sussex, and 31 Channel Islands. Total, 180. In the sheep classes there are 100 Leicester, 120 Cotswolds, 12 Kewstons, 59 Southdowns, 33 Hampshire Downs, 18 Shropshires, 23 Oxfordshire Downs, 26 Somerset and Dorset Horns, and 4 Exmoor and other mountain sheep; whilst the prizes offered by the local committee have brought together 15 pairs of Game Societas, represented by 120 animals, and the prizes liberally presented by the Right Hon. the Earl of Portsmouth and Mr. Morrison, for the encouragement of Hampshire Down ram lambs, have brought together 11 entries.

The horse show, though an attractive feature of the exhibition, and in the year received the amount of support to which it was entitled by virtue of the increased amount of prizes offered for competition. It cannot be too strongly impressed on the minds of those interested in the Society's proceedings, that the date of entry for animals in every class is final and conclusive, and that in accordance with the rules of the Society no animals can be admitted for exhibition as extra stock. More than 50 horses have had this year to be excluded from the exhibition, owing to non-compliance with prescribed rules.

The pigs of the last year were bred, 39 of the small breed, 45 Berkshires; making a total of 92 animals. For the local prizes there are, for Wheat 22, and for Hops 11 competitors; whilst for the special prizes given by Mr. Miles, of Dixfield, Exeter, for the encouragement of proficiency in horse-shoeing, there are 26 competitors.

In the implement department there are not less than 59 steam-engines propelling machinery in motion, and great improvement is observable in the mechanism and finish of many of the more important machines. A great number of trivial articles, not strictly connected with the agricultural progress of the country, have on the occasion been rigidly excluded from the exhibition; but notwithstanding this regulation there are 184 exhibitors, and not less than 3372 articles enumerated in the Society's catalogue.

The department is unusually rich in the exhibition of pictures of merit by rising artists; so much so that it has been found necessary to provide space for part of them in the building ordinarily appropriated to manufactures and works of industrial art.

The publication of the Journal has during the last year been continued, except as related to a special appendix, containing reports of the Taunton meeting. The third volume of the third series, containing reports of the Guildford show, will be published as soon as possible after the meeting has terminated.

The various reports occurring in the Council since the last annual meeting by the retirement of Mr. William Wippell, of Cutton, Poltmore, has been supplied by the election of Mr. Robert Neville, of Butleigh Court, Glastonbury.

It has been arranged with the local authorities of Dorchester that the Society's meeting for 1872 shall take place in the municipal borough of that ancient and interesting borough, and it is hoped that the Society's second visit to that town may be attended with results as satisfactory as those which marked the very successful meeting of the Society at Taunton last year.

The Council, having regard to the usage of the Society, that the President for any year shall be non-resident in the county wherein the annual meeting is held, recommend that his Grace the Duke of Marlborough be requested to occupy the office of President for the year ending with the Dorchester meeting.

Farmers' Clubs.

ROTFLEY.

The Four-course System.—MR. HUGHES lately read a paper on this subject here, from which we extract a passage or two:—

It is a common mistake to suppose that the business of agriculture possesses the elasticity, or is capable of the developments and unlimited combinations that

pertain to manufacture or to trade. The farmer's factory is the immovable land; and though the soil is grateful for help, and yielding to skilful management, Nature, who presides over all his works, will not be forced.

The object attempted in the re-arrangement of the old four-field system has been to suppress those crops that are declining in value, and, if possible, extend those that still yield a profit. Let us consider the case of the Bean crop. The question is, whether Beans have been a remunerative crop of late years, or whether we go on growing them as favourable in the prescribed rotation to ensure a successful Wheat crop. I do not believe that Beans have paid for growing for some years past, on land adapted for feeding sheep. They are not grown of necessity, nor for feeding our horses and cattle, for foreign feeding stuffs are cheaper and better adapted to the purpose. Indian Corn, to a great extent, supplants the use of Beans; moreover, sufficient Oats may be grown on a portion of the stubble to supply horse corn, and clover is better suited to our soils, and as a fertiliser. I do not suppose anybody will make a stand for Beans. In addition to the question of price, the frequent blight in both Peas and Beans suggests the prudence of growing them less frequently, even if it is no way connected with the cause of blight. The manner in which blight attacks these crops indicates an unhealthy condition of the plant, which, if it does not produce the blight, immediately precedes and induces it. Beans and Peas in 1860 grown on the stonier soils, those naturally adapted to grow, did not succumb to the blight as those did on the sharper soils, and it is remarkable that Bean land Wheat suffered far the worst. My own conviction is, that we have grown Beans long enough, and that we should grow Wheat less frequently upon the description of soil called Turnip and Barley land.

In my diagram (Barley first, then roots and seed, Beans and Barley, roots, Barley, seed and roots, Wheat and Barley, roots), I have cut out the Bean and Pea crop altogether, and the Kohl Rabi is prominent, viz. Beans and Peas. The next step is to substitute Barley for half the Wheat course, making such an interchange with the Kohl Rabi and seeds as shall cause the seeds to be repeated once in eight years on the same land; and the Wheat, always following on the Clover lea, will share the same advantage, and be planted under conditions that experience has proved most suitable for the source of seed, and the course over eight years, in order that the interchange for the benefit of the Wheat and seeds might be more apparent. It will be asked, Why not lay down part of the land? and I am not sure that ultimately this would not prove to have been the wisest course; but, I will also ask, Who is to do it? If it were done without compensation from some quarter, we should sacrifice this generation for the next. Profitable pastures upon old worn-out land are a matter of course, and no doubt the best land would be reserved under cultivation. There is also the objection that this would be a landlord's question, and in many cases would entail a considerable outlay upon him. The alteration I propose is one, no doubt, on which the landlord must be consulted, but it does not really affect him, except beneficially, by the improvement of the land. It is higher farming, and it is cleaner farming, than the other system.

Another objection is, that Barley and roots are repeated on one-eighth of the occupation, twice in three years. As a matter of fact founded on experience, Barley will bear repeating more frequently than any other cereal, and, considering the improved condition of the soil, resulting from the substitution of the fed-off root crop in the place of an exhausting Bean crop, I have no reason to doubt its success. Moreover, as that portion of the land upon which the repetition of wheat occurs is a portion of the Barley course, it will have the young straw under it, this bulky crop of straw will not be disadvantageous. I look for a pecuniary gain in the mere substitution of the Barley for the one-eighth of Wheat. For I hold it is more probable that we should grow 6 qr. of Barley after the roots fed off with cake and corn, than 4 qr. of Wheat after a failing and foul Bean crop, and they are as sure to be foul as they are failing! Putting the Barley at 4s. 6d. per bushel, and Wheat at 6s., there would be a balance in favour of the Barley of 24s. per acre.

With regard to the second and most important change proposed, namely, the substitution of roots for Beans, a considerable advantage presents itself in favour of the roots. Of course, no fixed amount of profit can be determined upon it, must depend on the bulk of the root crop; the cost of the sheep at buying in, and the value of mutton and wool at selling out. Last year my sheep paid me scarcely £2 per acre, but this year more than £2. The roots are large, but anyhow produce results under favourable circumstances, to the best corn crop; and when the crop and the price are both good, runs up an amount per acre more than equal to all the corn crops put together. As to the repetition of the roots alluded to before, I do not propose to increase the breadth of Turnips, I would rather allow Mangels to encroach somewhat on the Turnips, and let Kohl Rabi occupy the vacant place; it is almost proof against the fly, for it will rally and make good plants if they are eaten to the ground,

Liquid Manure is capable of being carried out profitably to a far greater extent than is generally calculated; numerous examples may be quoted in proof of this. Thus, in the United States of America where root crops are with difficulty grown, owing to the warm, dry summer, the liquid-manure cart is yoked as soon as the young plants break the ground, the liquid being applied to two rows of Mangels, or Cabbages, &c., at a time, by means of the high-pressure hose, and the man behind guiding the hose so as to where it should be applied, one mile or a mile and a half to the liquid-manure tank at the homestead, or the supply of river or pond water, a man with an active horse will do 2 acres per day, and if only half a mile 4 acres per day, and so on. A proper application not only secures an abundance of plants in the rows, but also prevents the ravages of fly. All drill crops, including Wheat and other cereals,

Beans and other leguminous crops, may be watered in the same way, either with or without manure dissolved in the water. A water-drill, made with four discharge pipes, for watering as many drills or stripes, was patronised by the Highland Society of Scotland about the commencement of the present century. A water-cart made on the same plan was exhibited at the Leicester meeting of the Royal Agricultural Society, 1868, by J. James, of Cheltenham, who, at the recent horse show in the Agricultural Hall, exhibited an improvement upon his Leicester water-drill, viz., perforated hose, equally adapted for broadcast watering; so that the practice of applying water or liquid manure to drilled crops has been gaining ground. Success mainly depends upon timing the velocity of the discharge pipes, so to speak, in the opposite direction of the pace of the horse (i. e., the head-pressure of water in the water-cart), so that the water shall fall upon the ground with no more force than that due to gravitation. If the pipes are, therefore, allowed to trail on the ground, or nearly so, the force of the discharge will be so neutralised as to fall upon the ground without doing any harm, as in the corresponding case of irrigation by gravitation. The object sought is to prevent the pores of the surface being closed, and thus secure the free ingress of air, which follows the water in all examples of successful irrigation—the air being essential to success. The proposition is doubtless a nice one, but not beyond a practical solution.

Hoing and Weeding Corn Crops finish with the least possible delay. The current season has had its own peculiarities, the experience of the provinces being unusually diversified. Fields should be gone over with a searching eye, and Docks, Coltsfoot, and everything that should not be there removed; and in pulling up such any plants of corn that have been loosened should be put to rights by the foot.

Beans, Peas, Potatoes, Carrots, and Parsnips go over. If too far advanced for the hoe pull out weeds by hand. Earthing-up is the finishing operation, and is preceded by the horse-hoe, the double-mouldboard plough will work all the better. To get this done with the land in good working condition is essential to success.

Flax hand-weed as soon as the crop is fairly above ground. Weeds are easier seen and pulled when the crop is short. The old rule of "an inch above ground" is out of date. In weeding, stand evenly on your feet, and avoid twisting and turning, or pitting, and comparatively no harm will be done by trampling. The common mistake is to take on too great a breadth, and to stretch too far forward, both of which produce a twisting and pitting action of the feet. Lazy hands go to their knees, "all fours," as it is sometimes termed in field phrase, and thus do harm both with their knees and toes. Long arms and short legs are an advantage; but, whether long or short, take on no more breadth at a time than you can weed without any twisting and turning on the tread, and, as you advance, lift and set down heel and toe together, thus putting the sole of the foot evenly on the Flax, and footprints will soon disappear.

Hemp grown in drills, as it always should be, hoe as soon as the young plants will bear it. The crop, when once it covers the ground, is a smothering one, and will keep itself clean.

Mangel Wurzels horse and hand hoe. In a few early places the crop will be ready for the second hoeing. The practice of growing roots close in the rows is gaining ground, as heavier crops per acre are obtained than when grown wide asunder. The quality also is better.

Sugar-Beet horse and hand hoe, singling out the plants 5 or 6 inches apart; the frequent use of the horse hoe is in favour of all root crops. As Sugar-Beet should be grown below-ground, so to speak, draw the earth well up to the roots in hand-hoeing.

HOING TABLE FOR MANGELS, KOHL RADI, SWEDES, AND TURNIPS.

Distance between Rows.	Distance between Plants.	Number of Plants per Acre.	Weight of each Root.	Weight per Acre.
Inches.	Inches.		Lb.	Tons, cwt.
27	6	38,720	8	138 8
27	8	29,840	8	103 14
27	10	23,232	8	82 16
27	12	19,104	8	75 8
27	14	16,160	8	69 4
27	16	14,528	8	51 17

HOING TABLE FOR SUGAR-BEET, PARSNIPS, AND CARROTS.

Distance between Rows.	Distance between Plants.	Number of Plants per Acre.	Weight of each Root.	Weight per Acre.
Inches.	Inches.		Lb.	Tons, cwt.
20	5	67,200	4	112 0
20	6	54,720	4	93 6
21	5	57,120	4	91 6
21	6	45,360	4	74 4
21	8	40,400	4	66 4
21	10	37,200	4	69 4

Ground Weeds now begin to play sad havoc amongst Parsnips, Carrots, Cabbages, Beans, Peas, Turnips, and Clover. The cereals, too, are not exempt from their ravages, more especially Potato Oats.

Some, as the Turnip-fly, live on the young leaves; others deposit their ova in the roots, which emerges from thence in the form of a grub. The bleeding root forms a nuisance to another species, which enter in and produce rot. The "club maggot" and the "stinking maggot" of the Cabbage and other plants have long been familiar to most farmers and gardeners. How best to prevent the harm they do is not so easy a task. It has frequently been observed that all such pests are more prevalent when land is in an unhealthy state, so that the counter practice of prevention is deep, thorough cultivation, with plenty of manure, which rots the animal and vegetable matter on which they subsist during certain periods of the year, thereby starving them out of the ground, as it were.

Sheep Folded on Vetches, Clover, &c., attend to. Folding answers well for the land during the summer months, but the scorching mid-day rays of the sun are against the sheep. It is painful to see the panting animals creeping under the shelter of a feeding-trough, hurdle, or netting stake. Whether hurdles or netting is used in folding, it would be easy to erect a half-roof made of Godday's patent straw webs, which can be raised or lowered at will, and fasten upon the ground. The expense of stakes and shifting would not be much, and therefore something this way should be done to afford shelter. The practice of folding is not only profitable on the heavy class of soils adapted for Vetches, but also on light land, which benefits by the trampling. Some farmers allow the sheep to eat the Vetches or Clover off the ground, taking in small breadths at a time; but although a little more labour, the more advanced plan is to mow, and feed in racks, tubs, or trough in the field, or close at home and soil in open yards at the homestead. By taking on a narrow strip, and facing stuffed hurdles or netting to 12 o'clock, sheep would be sheltered in field as at the homestead, and more in accordance with their health and that of the land. On Vetches a fattening sheep will require about a pound of corn daily, and on Clover about half the quantity. It is better to mow and soil at the homestead, or on some dry field, sward, and irrigated meadow grass, seasoned with salt, than mow, Clover, sainfoin, Lucerne, Lupins, or Chicory, if grown, as the mixture not only improves the dietary, but prevents rot, which at this season requires to be guarded against. *W. B.*

Notices to Correspondents.

NAMES OF PLANTS: *H. F. M.* We are unable to recognise the scrap sent. Send a flower.

Markets.

ENGLISH WOOL.

There has been somewhat of a lull in the amount of business transacted during the past week, but this is attributed to the manufacturers having stocked themselves pretty freely of late, and trying to work down prices for the new clip; the position of the market, however, is inherently very strong, and before long a further advance must unquestionably take place.

HOPS.

BOROUGH MARKET, June 6.

The market is daily getting dearer for all descriptions of Hops, and at present there is hardly any stock offering for sale. The accounts from the plantations are worse, and the cold nights with easterly winds are most unfavourable to the proper growth of the bine.

MARK LANE.

MONDAY, June 5.

The supply of English Wheat to this morning's market was small, and higher prices were asked, but as made were at the extreme prices of last week. For foreign there was a fair consumptive demand, on the same terms. There was no change in the value of Barley, Beans, or Peas. Fine dry sweet Oats brought an advance of 15 per cent. but inferior qualities were 6d. cheaper. In the value of Flour there was no change.

PRICE PER IMPERIAL QUARTER.				s.	d.
WHEAT, Essex, Kent, Suffolk, White	47-60	Red	55-60		
— fine selected runs	do.	do.	60-62		
— Talavera	—	Red	—		
— Norfolk	—	Red	—		
— Foreign	—	—	—		
BARLEY, guinea & old	38-40	Maltng	36-41		
— Foreign, grinding and distilling	—	Maltng	35-43		
OATS, Essex and Suffolk	25-28	—	—		
— Scotch and Lincolnshire	25-28	Feed	—		
— Irish	Potato	Feed	25-28		
— Foreign	Poland and Brew	Feed	20-23		
RYE	34-36	Foreign	33-36		
RYE-MEAL, Foreign	—	—	—		
BEANS, Maragan	37-40	Harow	40-50		
— Pigeon	51-52	—	—		
— Foreign	Small	Egyptian	49-50		
PEAS, White, Essex, and Kent	38-40	Suffolk	40-42		
— Maple, 40 to 44	Grey	Foreign	36-40		
MAIZE	—	—	—		
FLOUR, best marks, delivered	per sack	42-50	Country	38-40	
— 2d ditto	—	40-42	—	36-40	
— Foreign	per barrel	36-42	Per sack	38-40	

WEDNESDAY, June 7.

Transactions in the Corn Exchange to-day were restricted, but prices, owing to the cool weather, were without appreciable alteration. There was a small show of English Wheat, and the arrivals from abroad were far from being large. The demand for all descriptions was inactive, but prices were fully sustained. Barley was

quiet, at steady values. Malt changed hands slowly, on former terms. The supplies of Oats were large, and the general condition of the samples inferior. Only a limited quantity prevailed, and prices occasionally were easier. Beans and Peas were purchased slowly, at about late rates. American Flour was more sought after, but other descriptions were dull, and prices were with difficulty supported.

ARRIVALS OF GRAIN, &c., INTO LONDON BY WATER CARRIAGE.

	Wheat.	Barley.	Oats.	Flour.
English & Scotch...	Qrs.	Qrs.	Qrs.	Sacks.
Irish	—	—	—	—
Foreign	5920	3020	34,310	3590 brls.
	5920	3020	34,310	—

LIVERPOOL, June 6.—The market opened quiet, but ultimately a fair business was done, at an advance of 1d. per cental on last Tuesday's rates, the transactions being chiefly in red American. Flour dull, and without change in price. Beans 6d., and Peas 2s. to 3s. per qr. lower. In Oats and Oatmeal hardly anything was done. Indian Corn in fair retail request, at a reduction of 6d. per qr. on the week, mixed American closing at 32s. 6d. to 32s. 9d. per 380 lb.

AVERAGES.

	Wheat.	Barley.	Oats.
April 29	50s 7d	37s 9d	27s 9d
May 6	58 11	36 3	26 10
— 13	58 7	37 10	26 11
— 20	58 10	37 7	27 11
— 27	59 11	36 3	27 7
June 3	60 0	37 1	27 7
Average	59 3	36 1	27 4

METROPOLITAN CATTLE MARKET.

MONDAY, June 5.

The number of English Beasts is larger, but of foreign very much smaller than last week, the total being considerably less; the demand is good, and prices have advanced for all descriptions. The supply of English Sheep is about the same as last week, and there is a great falling off in foreign; trade is consequently better at higher prices. Goodest Lambs and Calves are readily disposed of at rather higher rates, but trade is dull for inferior. Our foreign supply consists of 870 Beasts, 9050 Sheep, and 270 Calves; from Scotland there are 135 Beasts; from Norfolk and Suffolk, 1640; and 440 from the Midland and Home Counties.

Best Scots, Herefords, &c.	5 8 06 0	Best Long-wools	5 8 06 0
Do. Shorn	5 6 0 4	Do. Shorn	5 6 0 4
Best Shorthorns	5 6 0 5	Ewes & ad quality	5 6 0 4
2d quality Beasts	4 0 5 0	Do. Shorn	5 6 0 4
Best Downs and Half-breeds	—	Lambs	5 6 0 4
Do. Shorn	—	Calves	5 6 0 4
Beasts, 3085; Sheep and Lambs, 24,600; Calves, 280; Pigs, 150.			

THURSDAY, June 8.

There are a few more Beasts than Thursday last, but the demand is good, and Monday's quotations are fully maintained. We have a large supply of Sheep, and the quality is good; trade is slow, at lower prices, and a clearance is not effected. Trade is very much worse for Lambs, caused by the cold weather and over-supply. We have a large number of foreign Calves on offer, and these are lower. Our foreign supply consists of 200 Beasts, 3790 Sheep, 575 Calves, and 5 Pigs.

	s. d.	s. d.		s. d.	s. d.
Best Scots, Herefords, &c.	5	8to6 0	Best Long-wools	5	8
Do. Shorn	5	6	Do. Shorn	5	8
Best Shorthorns	5	6	Ewes & 2d quality	5	8
2d quality Beasts	4	0	Do Shorn	4	8
Best Downs and Half-breeds	—	—	Lambs	6	0
Do. Shorn	6	0	Calves	4	0
Beasts, 883; Sheep and Lambs, 15,940; Calves, 670; Pigs, 50.			Pigs	3	4

METROPOLITAN MEAT MARKET, June 8.

Best Fresh Butter 13s. per dozen lb.
Second do. 12s.
Small Pork, 4s. 8d. to 5s. 0d.; Large Pork, 3s. 8d. to 3s. 10d. per 8 lb.

HAY.—Per Load of 36 Trusses.

SMITHELIUM, Thursday, June 8.

PrimeMeadowHay, 130s. to 140s.	Clover, old	.. .. 137s.	145s.
Inferior do. 90	Inferior do. 110	130	
New Hay 60	Prime 2d cut do. .. 130	140	
Inferior do. —	Inferior do. 110	120	
Straw 36		45	

CUMBERLAND MARKET, Thursday, June 8.

Sup. Meadow Hay 140s. to 147s.	Inferior Clover .. 120s. to 130s.
Inferior do. 120 132	Prime 2d cut do. .. — —
New do. 80 100	New do. — —
Inferior do. — —	Straw 44 5
Superior Clover .. 113 148	JOSHUA BAKER.

SEED MARKET.

There is just now nothing doing in the agricultural seed trade, the attention of most of the large houses being given entirely to Hops. Rape and Mustard are quiet, but firm. For Hemp and Canary seed we have a retail demand, at last week's currencies. French Buckwheat is in slow request. Blue Peas have become scarce. **JOHN SHAW & SONS, Seed Merchants, 16, Water Lane, London, E.C.**

WINDOW GLASS, SHEET LEAD, PAINTS, &c.

THOMAS MILLINGTON & Co.,

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THE "AUTOMATON" LAWN MOWERS,

THE BEST, SIMPLEST, AND MOST DURABLE MACHINES.



They leave no ribs in the Grass, and are unsurpassed for keeping a Lawn or Croquet Ground in first-rate order.

They will either Collect the Cut Grass in the box according to the approved English method, or leave it on the lawn, by taking the box off.

They are fitted with the best wheel gearing, the best steel-edged knives, and hardened steel pivots and bearings.

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They are warranted to give satisfaction, and a month's trial is allowed.

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Illustrated Catalogue, containing prices and full information concerning FOUNTAINS and VASES, and with 30 large pages of beautifully Lithographed Designs, post free for 6 stamps to A. HANYSIDE AND CO., Britannia Works, Derby. London Office—34, Walbrook.

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THE above and many other PATTERNS are made in materials of great durability. The plainer sorts are especially suited for KITCHEN GARDENS, as they harbour no Slugs or Insects, take up little room, and, once put down, incur no further labour or expense, as do "grown" Edgings, consequently being much cheaper.

GARDEN VASES, FOUNTAINS, &c., in Artificial Stone, very durable and of superior finish, and in great variety of design. F. AND G. ROSHER, Manufacturers, Upper Ground Street, Blackfriars, S.E.; Queen's Road West, Chelsea, S.W.; Kingland Road, E. Agents for LOOKER'S PATENT "ACME FRAMES," PLANT COVERS and PROPAGATING BOXES; also for FOXLEY'S PATENT BEADED GARDEN WALL BRICKS. Illustrated Price Lists free by post. The Trade supplied.

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WHITE GLAZED TILES, for Lining Walls of Dairies, Larders, Kitchen Ranges, Bath &c. Grooved and other Stable Paving of great durability. Wall Copings, Drain Pipes and Tiles of all kinds, Roofing Tiles in great variety, Slate, Cement.

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2½ inches	£1 9 0
3 " "	1 18 0
3½ " "	2 7 0
4 " "	2 15 6



No. 60½—SWING WATER BARROW. 20 Galls. £2 2 0 13 6 18 0 30 " 2 14 0 50 " 5 14 0

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7 inches in diameter Each—0 71 17 inches in diameter Each—1 0

8 inches in diameter Each—0 81 17 inches in diameter Each—1 0

9 inches in diameter Each—0 91 17 inches in diameter Each—1 0

10 inches in diameter Each—1 01 17 inches in diameter Each—1 0

11 inches in diameter Each—1 11 17 inches in diameter Each—1 0

12 inches in diameter Each—1 21 17 inches in diameter Each—1 0

13 inches in diameter Each—1 31 17 inches in diameter Each—1 0

14 inches in diameter Each—1 41 17 inches in diameter Each—1 0

15 inches in diameter Each—1 51 17 inches in diameter Each—1 0

16 inches in diameter Each—1 61 17 inches in diameter Each—1 0

17 inches in diameter Each—1 71 17 inches in diameter Each—1 0

18 inches in diameter Each—1 81 17 inches in diameter Each—1 0

19 inches in diameter Each—1 91 17 inches in diameter Each—1 0

20 inches in diameter Each—2 01 17 inches in diameter Each—1 0

21 inches in diameter Each—2 11 17 inches in diameter Each—1 0

22 inches in diameter Each—2 21 17 inches in diameter Each—1 0

23 inches in diameter Each—2 31 17 inches in diameter Each—1 0

24 inches in diameter Each—2 41 17 inches in diameter Each—1 0

25 inches in diameter Each—2 51 17 inches in diameter Each—1 0

26 inches in diameter Each—2 61 17 inches in diameter Each—1 0

27 inches in diameter Each—2 71 17 inches in diameter Each—1 0

28 inches in diameter Each—2 81 17 inches in diameter Each—1 0

29 inches in diameter Each—2 91 17 inches in diameter Each—1 0

30 inches in diameter Each—3 01 17 inches in diameter Each—1 0

31 inches in diameter Each—3 11 17 inches in diameter Each—1 0

32 inches in diameter Each—3 21 17 inches in diameter Each—1 0

33 inches in diameter Each—3 31 17 inches in diameter Each—1 0

34 inches in diameter Each—3 41 17 inches in diameter Each—1 0

35 inches in diameter Each—3 51 17 inches in diameter Each—1 0

36 inches in diameter Each—3 61 17 inches in diameter Each—1 0

37 inches in diameter Each—3 71 17 inches in diameter Each—1 0

38 inches in diameter Each—3 81 17 inches in diameter Each—1 0

39 inches in diameter Each—3 91 17 inches in diameter Each—1 0

40 inches in diameter Each—4 01 17 inches in diameter Each—1 0

41 inches in diameter Each—4 11 17 inches in diameter Each—1 0

42 inches in diameter Each—4 21 17 inches in diameter Each—1 0

43 inches in diameter Each—4 31 17 inches in diameter Each—1 0

44 inches in diameter Each—4 41 17 inches in diameter Each—1 0

45 inches in diameter Each—4 51 17 inches in diameter Each—1 0

46 inches in diameter Each—4 61 17 inches in diameter Each—1 0

47 inches in diameter Each—4 71 17 inches in diameter Each—1 0

48 inches in diameter Each—4 81 17 inches in diameter Each—1 0

49 inches in diameter Each—4 91 17 inches in diameter Each—1 0

50 inches in diameter Each—5 01 17 inches in diameter Each—1 0

51 inches in diameter Each—5 11 17 inches in diameter Each—1 0

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70 inches in diameter Each—7 01 17 inches in diameter Each—1 0

71 inches in diameter Each—7 11 17 inches in diameter Each—1 0

72 inches in diameter Each—7 21 17 inches in diameter Each—1 0

73 inches in diameter Each—7 31 17 inches in diameter Each—1 0

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103 inches in diameter Each—10 31 17 inches in diameter Each—1 0

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106 inches in diameter Each—10 61 17 inches in diameter Each—1 0

107 inches in diameter Each—10 71 17 inches in diameter Each—1 0

108 inches in diameter Each—10 81 17 inches in diameter Each—1 0

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125 inches in diameter Each—12 51 17 inches in diameter Each—1 0

126 inches in diameter Each—12 61 17 inches in diameter Each—1 0

127 inches in diameter Each—12 71 17 inches in diameter Each—1 0

128 inches in diameter Each—12 81 17 inches in diameter Each—1 0

129 inches in diameter Each—12 91 17 inches in diameter Each—1 0

130 inches in diameter Each—13 01 17 inches in diameter Each—1 0

131 inches in diameter Each—13 11 17 inches in diameter Each—1 0

132 inches in diameter Each—13 21 17 inches in diameter Each—1 0

133 inches in diameter Each—13 31 17 inches in diameter Each—1 0

134 inches in diameter Each—13 41 17 inches in diameter Each—1 0

135 inches in diameter Each—13 51 17 inches in diameter Each—1 0

136 inches in diameter Each—13 61 17 inches in diameter Each—1 0

137 inches in diameter Each—13 71 17 inches in diameter Each—1 0

138 inches in diameter Each—13 81 17 inches in diameter Each—1 0

139 inches in diameter Each—13 91 17 inches in diameter Each—1 0

140 inches in diameter Each—14 01 17 inches in diameter Each—1 0

141 inches in diameter Each—14 11 17 inches in diameter Each—1 0

142 inches in diameter Each—14 21 17 inches in diameter Each—1 0

143 inches in diameter Each—14 31 17 inches in diameter Each—1 0

144 inches in diameter Each—14 41 17 inches in diameter Each—1 0

145 inches in diameter Each—14 51 17 inches in diameter Each—1 0

146 inches in diameter Each—14 61 17 inches in diameter Each—1 0

147 inches in diameter Each—14 71 17 inches in diameter Each—1 0

148 inches in diameter Each—14 81 17 inches in diameter Each—1 0

149 inches in diameter Each—14 91 17 inches in diameter Each—1 0

150 inches in diameter Each—15 01 17 inches in diameter Each—1 0

151 inches in diameter Each—15 11 17 inches in diameter Each—1 0

152 inches in diameter Each—15 21 17 inches in diameter Each—1 0

153 inches in diameter Each—15 31 17 inches in diameter Each—1 0

154 inches in diameter Each—15 41 17 inches in diameter Each—1 0

155 inches in diameter Each—15 51 17 inches in diameter Each—1 0

156 inches in diameter Each—15 61 17 inches in diameter Each—1 0

157 inches in diameter Each—15 71 17 inches in diameter Each—1 0

158 inches in diameter Each—15 81 17 inches in diameter Each—1 0

159 inches in diameter Each—15 91 17 inches in diameter Each—1 0

160 inches in diameter Each—16 01 17 inches in diameter Each—1 0

161 inches in diameter Each—16 11 17 inches in diameter Each—1 0

162 inches in diameter Each—16 21 17 inches in diameter Each—1 0

163 inches in diameter Each—16 31 17 inches in diameter Each—1 0

164 inches in diameter Each—16 41 17 inches in diameter Each—1 0

165 inches in diameter Each—16 51 17 inches in diameter Each—1 0

166 inches in diameter Each—16 61 17 inches in diameter Each—1 0

167 inches in diameter Each—16 71 17 inches in diameter Each—1 0

168 inches in diameter Each—16 81 17 inches in diameter Each—1 0

169 inches in diameter Each—16 91 17 inches in diameter Each—1 0

170 inches in diameter Each—17 01 17 inches in diameter Each—1 0

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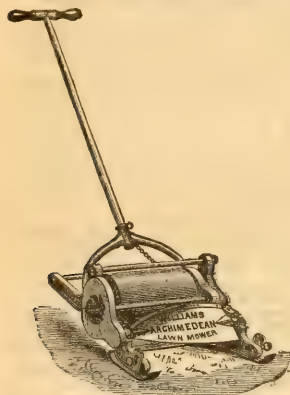
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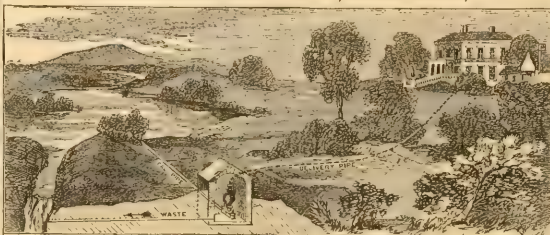
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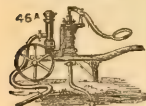
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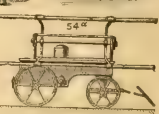
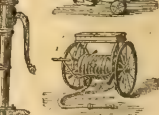
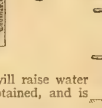
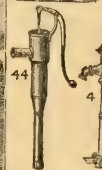


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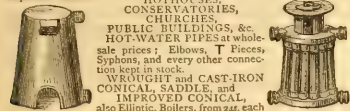
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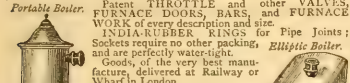
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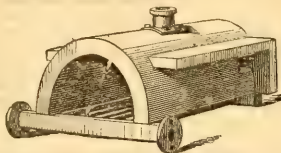


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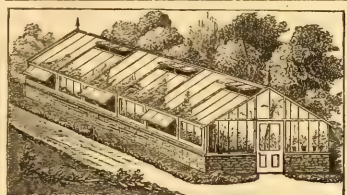


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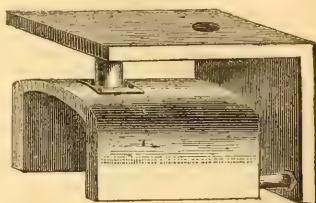
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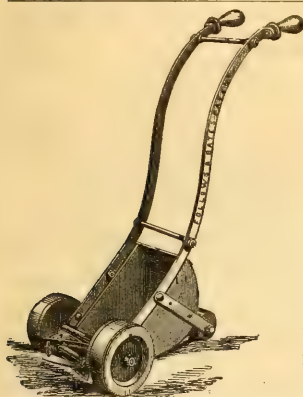
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24 "	24 "	84 "	2,200	28 0 0
24 "	24 "	90 "	2,350	30 0 0
24 "	24 "	96 "	2,500	32 0 0
24 "	24 "	102 "	2,650	34 0 0
24 "	24 "	108 "	2,800	36 0 0
24 "	24 "	114 "	2,950	38 0 0
24 "	24 "	120 "	3,100	40 0 0

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extent encircled by tiers of handsome villa residences, forming one of its most fashionable suburbs, and the look-out from the Exhibition grounds is of a picturesque and striking character. Between the Exhibition tent and the town there is a triangular space of considerable extent, and here will be arranged the glass structures and other incidents to horticulture, besides many other requisites of a very general and miscellaneous character. One of the principal entrances to the show will be through this ground, every part of which is said to be engaged by intending exhibitors.

The local committee, whose exertions are as spirited and untiring as they are successful, have not been unmindful of the creature comforts of their visitors. Near to the exhibition tent, and in relation therewith, which is on such occasions a feature of prime importance, though occasionally imperfectly carried out, will be placed the refreshment-rooms and other offices; and in reference to this matter, we believe the arrangements are such as to enable the local committee to guarantee articles of high quality at reasonable prices. The show ground is also within an easy distance of the Midland and Great Northern Railway Stations, and from the great market place, which is nearly the centre of the town, it is scarcely more than half a mile distant.

That which has heretofore tended materially to lessen the attendance of horticulturists from a distance at these provincial gatherings, namely, the exorbitant prices charged for sleeping accommodation, will not be experienced at Nottingham. There will be ample room at the various hotels and private dwellings, at the usual rates, and the visitors to the Royal Agricultural Society will not, as on former occasions, be present to swell the demand. Mr. W. P. AYRES has made an arrangement with the proprietors of the Ram Hotel, by which a certain number of visitors can be lodged and boarded at a very reasonable cost, if the names of those intending to profit by this arrangement be sent in by June 23.

A long list of distinguished horticulturists and savans, to be invited by the local committee on this occasion, has just been printed, under the title of the "First List of Eminent Scientific Persons." With this has also been issued a circular, signed by the local secretary, which states that:—

"The Royal Horticultural Society for the last four years has held an annual country exhibition with the Royal Agricultural Society. Last year the Council determined to take an independent position, and the invitation to visit Nottingham was accepted. On commencing a new career it has been thought a suitable time to extend the sphere of usefulness to something more than a grand exhibition of horticultural skill; it has, therefore, been determined to have evening meetings, and to read scientific papers bearing more or less on the science of horticulture. Geology, chemistry, meteorology, botany, agriculture, horticulture, &c., are closely connected, and therefore the advance that may be made must be in proportion to the knowledge gained of those sciences that are intimately connected.

"Many gentlemen in the immediate neighbourhood have expressed their desire to entertain strangers, and as the character of the annual country meeting is now changed, and a scientific gathering is aimed at, it is hoped that the scientific committee of the Royal Horticultural Society, and the friends to the spread of science more largely in this country, will favour Nottingham with a visit during the meeting about to be held from June 27 to July 3. Tickets will always be consented to be issued, and tickets from all places where such tickets are usually issued, available for return on any day between June 24 and July 3.

The scientific world need scarcely be told that Nottingham knows how to entertain strangers, having but recently provided for the visitors to the British Association.

The proposed horticultural dinner is said not to be favourably regarded by the Council, and some of the influential members of the local committee are disposed to look askance at it also. A section of the committee, however, seems determined that the dinner shall be held, and under the management of the Rev. S. REYNOLDS HOLE a dinner will certainly be arranged; but it will be incidental to, not a part of the programme of the annual gathering. There is such an overwhelming array of "eminent scientific persons," that the practical worker, to whose patient skill the choicest horticultural treasures are due, seems in danger of being swamped. No doubt this hint will suffice, and we shall see no offensive class distinction paraded, of all places in the world, in Nottingham.

We hear sad accounts of the state of TENDER FRUIT TREES from many quarters, and have seen some very sorry examples of the doings of

the cold among them. The early spring frosts hit the trees hard, thinned their blossoms ruthlessly and without any regard to an abiding crop, and cut deeply into the wood, old and young. Many of the trees were so severely punished by the frost, that they broke into leaf irregularly and weakly, whole branches have in many cases died, and the buds that have pushed have a pinched and starved look. The frost seems to have undermined their vital energy—broken down their growing force. No sooner have they attempted to put forth tender leaves than these have been caught in the grip of shivering north winds, and blistered into useless shell-like masses of gouty tissue. On many trees there is scarcely a proper leaf left. Nothing can well be more gloomy than the prospect of our superior fruits in many gardens. It is not merely that a crop is lost, but that the trees likewise seem on the highway to utter ruin. And while these winds continue to sweep air steeped in ice through and among the branches, either palliatives or remedies are out of the question. We have seen some good cultivators syringing their trees because the branchlets looked parched and withered. Better let them alone while these cutting breezes blow from the stormy north; such thirsty currents drink up the moisture, and leave the shivering branches colder than before.

All this wreck and ruin is the more provoking, as seldom has there been a fairer show of blossom than was seen this spring. The very walls in many gardens were hidden with the ruddy glow of Peach and Nectarine blossoms. The individual flowers were strong and perfect, and promised a full harvest. The frost in many situations reaped it while in embryo; but we have also heard of fair and plentiful sets. And now, instead of the sunny month of June, December seems to have opened its icy doors, and told the frost, the snow, the hail—for we have experienced all three but a few days since—to do their worst on the trees. Between them they threaten their complete destruction in many cases. Time will show how far these gloomy prospects will be realised. Were the weather to change even now, and new growth to be pushed forth and matured throughout the season with all possible skill and care, it is to be hoped that many of the blistered blasted trees might recover.

The recuperative force of vegetable life, helped by general conditions, is well nigh illimitable; but it does seem a pity that this power should have to be so frequently appealed to in the case of our superior fruit trees. Hardly, of late years, are Peach and Nectarine trees fully formed than they are wrecked by the frost, or crippled or destroyed by stress of weather. This spring we have seen many half-formed trees, from four to five years old, utterly ruined; it does seem a sad loss of time, skill, and money. Great care is taken to prepare borders, procure the best varieties, mould the trees into form, induce fruitfulness, and we succeed: when a few cold nights come, or a north wind sets in, in May or June, and all are ruined. And such misadventures seem to increase in frequency. That masterpiece of out-of-door gardening, a perfectly furnished Peach wall, is becoming every year more rare; in fact, it is very seldom seen. Unless the seasons become more propitious—and even if they do—the time seems to have come when Peaches and Nectarines should be generally covered with glass throughout the spring months. In the usual run of seasons the shelter of glass would not only save the crop, but preserve the health of the trees. Portable glass frames from February to the end of May would save the crop, and afford the needful protection of the trees. Surely a perfect crop of Peaches are worth the protection of glass for four months. For general use portable protection would prove cheaper and better than a permanent structure. As soon as the glass was removed the trees would require no more attention than if they had not been covered,—the fruit would swell and ripen as well, or better, without glass, and the dew and rains would nourish and cleanse the leaves, and help to swell the fruit. Besides, the glass shades in most seasons could be dispensed with on the 1st of June, in good time to grow Cucumbers, Melons, Capsicums, Tomatos, &c. Then, again, in October the glass could be called into requisition for a new purpose, that of protecting Cauliflowers, Broccoli, and Lettuces throughout the winter months. How invaluable the portable lights of a Peach wall would have proved last winter, stretched

across beds planted full of Broccoli. With such Peach protectors at command in all good gardens, how many thousands of sweet Broccoli would have been saved that became an easy prey to the first frost!

When February returned, such things could either take care of themselves or be readily protected with litter, and the glass-lights once more be lifted to their place of highest honour and chief duty, that of insuring a crop, and guarding the health of the Peach and Nectarine trees on walls. Apricots, though flowering earlier, are harder and better able to take care of themselves. Under the old modes of protection they escape with much less injury than Peaches. The wood seems less juicy, and is not so easily frozen as that of Peaches. We have also observed that Apricots seem harder when spurred than when pruned and trained as Peaches and Nectarines generally are; still, those who can afford it, may likewise cover their Apricot walls with glass. No fruit thrives better under this treatment, nor yields a better return than the Apricot.

We have often raised in these columns the demand for higher skill, we now raise the cry of more glass, to prevent climate riding rough-shod over skill, to the mortification and defeat of the best cultivators, the ruin of our choicest fruit trees, and the disappointment of all concerned.

— WE are glad to see once more on our table the REVUE HORTICOLE. The dates of the two numbers are sufficient to recall to memory the occurrence of calamities, and we fear we must add also crimes, to which history affords few, or no parallel. No. 15 is dated September 16, 1870, and opens with a reference to the consternation excited by the surrender of Sedan, and with a determination on the part of the Editor, M. CARRIÈRE, not to be turned from his path of duty. How circumstances nullified this resolve is shown in the succeeding number, No. 19, dated April 1, 1871, and which contains an account of the straits to which the unhappy Parisians were subjected during the German siege, and an allusion to the calamities which befell the horticulturists in and around the city. All this is a matter of history, and much of it has been from time to time recorded in our columns. After the first siege came that yet more fearful reign of the Commune, with its awful termination, from the sickening horrors of which we in England have hardly recovered. Let us hope that the next number of the "Revue" will be the first of a series unbroken in the future by such fearful calamities. In the meantime we may hope that the establishment of a similar movement in France will once more open the fountains of our sympathy, and that the subscriptions raised for the aid of our suffering *compatriotes*, checked as they necessarily were by the diabolical deeds of a section of the population, will be resumed, and that by the side of the account of these awful calamities and crimes may be written the record of human sympathy and Christian charity towards the unfortunate, which our own country, no less than Switzerland and Belgium, has manifested.

We have been favoured by Messrs. W. & A. BROWN, of Hendon, with an inspection of a REMARKABLE HYDRANGEA grown among the other notable plants of which presented so marked a peculiarity. Considered as a decorative plant the specimen was remarkable for the large size and brilliant colouring of the bracts similar to those of the plant figured in VAN HOUTTE's "Flore des Serres" t. 1649, as *Hydrangea japonica rosalba*, but much larger. The bracts were a little rough in a florist's sense, but with a little care this fault could probably be amended, and a magnificent flower produced. Botanically the specimen was of no very interesting, and as in these days the origin of species is so much in dispute, it is desirable to place on record the salient points of this particular example. In an ordinary *Hydrangea* there are sterile flowers, in which the beauty is concentrated, and fertile flowers, less attractive but more serviceable to the plant. The sterile flowers consist of three, four, or five more or less ovate sepals, of a pink colour, and perfectly free. The sepals in the fertile flowers are of quite a different character. In Messrs. BROWN's plant there were no fertile flowers of the ordinary construction, but a mass of blossoms resembling the sterile ones but having five bracts, quite leaf-like as to form and even size, the largest measuring over 2 inches in length, and all presenting more or less of the beautiful pink colour which renders the *Hydrangea* so attractive. Within the involucre thus constituted were (in the single specimen we examined) three flowers—the central one with a calyx similar to the involucre already described, then a corolla of five free, oblong, hooded, pink-coloured, and rather fleshy petals; five stamens, hypogynous; and a free ovary of three carpels, united nearly all the way up, but with the three styles divergent. The ovules were perfectly formed. Now, in an ordinary fertile flower of *Hydrangea* we have a calyx inseparable from the ovary below—five to six sepals, five petals, five or more stamens, strictly perigynous, and a more

or less inferior ovary. Here, then, we have a case in which the ordinary dimorphic condition was not observed, and in which all the flowers were fertile, and all possessed an involucre, of which the constituent portions were leaf-like in form, position, and size, but coloured like the sepals, wherein the stamens were strictly hypogynous and the ovary free. The lateral flowers were less perfect than the one described, and seemed to be rather depauperated inflorescences than flowers proper; but the parts were so minute and confused, that in this case, at any rate, it would not be desirable to describe their peculiarities. We do not know whether Messrs. BROWN's plant has been raised from layers in the ordinary way, or from seed, but in any case we strongly recommend that the plant be increased, and its peculiarities fixed and enhanced.

— THE METEOROLOGICAL FEATURES of the WEEK ending June 10 are remarkable on account of the low temperatures which have been experienced. The extreme MAXIMUM TEMPERATURES in England ranged from 70°.2 at Leicester to 58°.1 at Newcastle, the mean for all stations being 64°.3, exactly 1° below the mean for the several stations in Scotland, where 70° at Glasgow, closely followed by 69° at Perth, 68° at Glasgow, and 66° at Greenock (all higher than the second maximum in England) was the highest, and 61° at Aberdeen the lowest. The extreme MINIMUM TEMPERATURES in England were 2° or 3° below the minimum temperatures experienced in Scotland, for whilst 37° (at Paisley) was the lowest in the latter country, 36° at Hull, and 36°.7 at Wolverhampton, were registered in the former, and at several of the other stations less than 40° were recorded; the means for the two countries were, for England, 30°.7, and for Scotland, 42°.2. THE MEAN TEMPERATURES for June have been very low everywhere, and from the beginning of the month they have been continually below the average up to this time, and in some cases to very large amounts; as on the 2d and 3d at Blackheath the mean daily temperatures were about 1° below the average temperature of these days, on the 3d more than 1° below, and on the 4th it was 12° below the average, while the mean for the whole week was in defect to the amount of 7°.6 daily, but these values for the southern country were, as a rule, less than those for the northern, as the means will show, viz., for England, 50°, and for Scotland, 52°.1: the principal temperatures recorded in England were 53° at Manchester, and 51°.6 at Portsmouth, Liverpool and Salford, and in Scotland were 55°.8 at Greenock, 54°.8 at Perth, and 54° at Glasgow. RAINFALL.—But little rain fell at any of the stations; .0.35 inch at Wolverhampton, and .0.31 inch at Blackheath, being by far the largest quantities registered at these stations in England, and .0.27 inch at Leith, and .0.20 inch at Edinburgh, the largest in Scotland, the means for the two countries showing but little difference,—they were, for England .0.09 inch, and for Scotland .0.10 inch. (See Mr. GLAISHER's Tables in our present issue.)

— In the current number of the "Journal of Botany" is a record of some experiments on the production of SUGAR in BEETROOT, by Professor CHURCH, of the Royal Agricultural College, Cirencester, and in which, after casual allusion to the influence of climate, season, soil, and manner of treatment, the sugar produced in the root (stem?) of the Sugar-Beet, the Professor goes on to state the results of some experiments carried on by him, and which have an important bearing, not only on the immediate question at issue—the quantity of sugar produced, and the conditions under which it is developed—but also on general physiological questions connected with the growth of stem and leaf respectively. Referring the reader to the paper itself for the precise details, we may state, in the beginning of August the commencement of the experiments (so far, that is, as the determination of the amount of sugar is concerned), the ratio of root to leaf was as 8.00 : 153; the percentage of sugar at this period, 8.70; the rainfall, 743 inch. The relative proportion of root to leaf gradually diminished till September 20, when we find the ratio stated as 100 : 91, and the percentage of sugar at high as 10.48. At this period the rainfall had been 1,000 inch, and the little or no rain fell, the relation of root to leaf was as 100 : 85, the percentage of sugar mounted to 12. In the succeeding period from October 5 to 18 heavy rain fell, amounting in the aggregate to 2.494; nevertheless, the ratio of root to leaf is still in favour of the former—100 : 65, and the proportion of sugar mounts up to 13.18 per cent. After this the ratio of root to leaf exhibits a slight and progressive advantage for the root, whilst the percentage in the sugar becomes less and less, and ultimately almost nil, so that practically the increment of sugar ceases after October 18, though leaf growth did not exhibit corresponding diminution till after November 1. The rainfall in October and November, then, can hardly have had much effect on the yield of sugar; indeed the maximum development of sugar occurred during the fortnight ending October 18, when no rain fell. The temperatures are unfortunately not given in the Table, but it is stated that the heat declined pretty steadily after August 9. From these and similar experiments it is abundantly clear that the formation and storage of sugar, or indeed any other vegetable product, is a highly complex phenomenon, dependent not only on absolute

numerical variety of conditions, but also on varying combinations of these conditions, varying also in amount and degree of energy at different times. We are still without sufficient data as to the influence of light on plants, and which must be most important in the elaboration of sugar. We trust that in continuing these experiments Prof. CHURCH will give us the comparative analysis of the leaves (qualitative at least) at each period, as well as that of the roots. It would be highly important to have such a series of analyses from the germination of the seed up to the complete development of the root, together with a record of the meteorological conditions throughout.

— THE PINE-APPLE is acknowledged to be the CHOICEST OF OUR IMPORTED FRUITS. What, in our country Singapore and the Straits, must be for an epicure in these delicacies, for we read in the late Dr. MIQUEL's "Introduction to the Prodromus Florae Sumatrae," that in the Straits of Singapore Pine-apples are sold at the rate of eight for one cent (one half-penny). "Two sorts are grown, one with a dark-coloured fruit, of which the component parts are large, the other with a golden-yellow fruit. They grow in such large quantities that they cover the hills up to a height of 300 feet."

A correspondent of an Adelaide newspaper recommends to gardeners and others the following method of DESTROYING the GRASSHOPPERS in various parts of the colony:—"The plan is to sow borders or rows of the common Larkspur in gardens; in vineyards it might be sown between the Vines. The Larkspur has a very pretty flower, and the leaf is so green that it attracts the grasshoppers at once, and, when eaten, is sudden death to them. I have seen them lying dead by thousands under the Larkspur borders in the gardens in Adelaide." The writer adds, that he has adopted this plan for years with much success.

— M. DRECHSLER, to one or two of whose useful inventions we have directed attention on former occasions, has now sent us a new and very handy WINNOWING MACHINE or BLOWER, especially adapted for blowing the dust and light seed out of Lettuce, Cucumber, Beet, Cabbage, Mignonette, Nasturtium, Carrot, and any other seeds. It works very quickly and more completely than by means of a fan or a sieve. The accompanying illustration (fig. 157) will give some idea of the form of the machine, the object of which is to sift the seed, which it does in one operation, collecting the dust within the machine at the same time.

— We learn from the *Grocer* that the island of Barbados is now sending to this country CRISTALLISED SUGAR of a much better quality than has hitherto been received from that colony. It is stated that the Barbados growers are making great efforts and sparing no expense to place the sugar trade of that island on a more satisfactory footing, and that much larger quantities of sugar are being produced. The prices realised in the London market for this sugar have been so good, that it is expected they will prove very remunerative to the importers, and stimulate them to further exertions.

THE NATURAL HISTORY OF A FLOWERING PLANT.

(The first of a series of six lectures, on "The Natural History of a Flowering Plant," was delivered recently in the theatre of the Royal College of Science, London, by Professor Thistlethorn Dyer. The following is an abstract of the discourse, which treated of the leaf of a plant.)

THE best description that we can give of life is that it consists in the power which living things possess of adapting themselves to changes in their surrounding medium. When they lose this power, and are acted upon passively and inertly by external forces, they cease to live. This, in fact, is the meaning of our practical tests of the presence of life. We stir a small animal lying in our path to see if there will be any movement in response, either to avoid the irritation or move bodily away. In the same way we do not condemn a transplanted tree, however lifelike its branches may appear, till we are quite sure that the returning warmth of spring elicits no response in bursting buds. Clearly, then, living things are not acted upon by external Nature as those are acted upon that are lifeless; and in the case of each one the play of action and reaction, between what is outside and what is inside, will necessarily vary. Each one has, in fact, its own separate natural or life history, which must be made a special study. One result is, that amongst living things we rarely find aggregate effects on the grand scale that we see in inanimate Nature. Perhaps the only one is the coincident leafing of the trees in spring; but this is amongst the grandest of all natural effects. A great divine has well called it Nature's annually recurring miracle, and the significance of this great

outburst of vitality following the deathlike torpidity of winter has not seldom been insisted upon. There is no inherent disposition common to all plants to hibernate during the winter; hibernation is forced upon many by deficiency in one of the conditions necessary to their growth—namely, warmth. The absence of another condition—moisture—in hot tropical countries produces the same enforced rest in vegetation, only at the hottest instead of the coldest season. From the same cause tracts of country at the Cape, from which many of our most beautiful bulbous plants have been brought, are brilliant with flowers for a few weeks after the rains, and barren and scorched for the rest of the year.

Where the winter is sufficiently mild vegetation is not arrested; the trees retain their leaves all the year, and many of them keep on growing continuously. All plants, however, even in warm countries, cannot do this; the great effort of flower-producing needs a special season of preparation and rest. Professor Hoffman has tried experimentally to turn deciduous trees into evergreens. He kept a Lilac in leaf all the year round, by placing it in a hothouse in winter; but eventually it died of exhaustion. Indeed, it is well known that many of our fruit trees become evergreen in warm countries, but suffer by becoming more or less barren; the habit of hibernating is too firmly fixed in the constitution of our plants to be easily changed. Still, as I believe it is assumed only in obedience to internal necessities, so I think it would change if the conditions changed. The obvious result gained by the production of leaves is to expose a relatively enormous surface of the plant to the influence of the atmosphere. Hales found that the leaves of a common Sunflower had an aggregate surface of nearly 40 square feet. We are struck with the vast size of large leaved plants, such as Palms. The Manicaria of the Lower Amazons has leaves, used for thatching, 30 feet long and 5 feet wide. The aggregate surface of the innumerable leaves of small-foliated trees is, no doubt, even greater than where they are few and large.

Trees which shed their leaves have their buds protected during the resting season by scales. Very many of our forest trees, though differing in almost every other respect, have these scales formed from appendages at the base of the leaf-stalk, which cover over the rest of the leaf while still immature, but fall off when it expands. Here we have another instance of a similar modification produced in different plants by a similar external cause. The structure of the scales can be seen by the use of the microscope for its complete examination. Roughly, it consists of a fibrous framework, filled up with a succulent material. This may be destroyed by macerating with some alkali, producing a so-called skeleton leaf. The skeleton consists partly of fibres, partly of tubes; the use of these will appear hereafter. The general form of the skeleton determines [?] that of the leaf, though the framework is not always equally filled in. This produces variety in the outlines of the leaves; the veins, as they are called, sometimes even standing out as prickles, as in the Holly. In the Lattice-plant of Madagascar the framework has a continuous margin, but is hardly at all filled in. The Mexican Monstera has leaves complete at first, in which holes gradually appear, which increase as the leaves grow.

The succulent material of the leaf consists of a great number of small bodies called cells. Each form a little house, as the architect's Greek word would say, and another gives the same effect as the little compartments of an India-rubber door-mat. Each compartment is at first filled with a morsel of jelly-like substance called protoplasm. It is on this protoplasm that vitality depends. The wall of each cell is dead material, and only confines and encloses the protoplasm. In some of the more obscure plants the protoplasm escapes under some circumstances, from the cell, and exhibits upon the exterior surface of the cell wall. The leaf can only move in little currents over the cell walls. Portions of protoplasm in the cells of the leaf are partly detached in little granules, and become coloured under the action of light, by the conversion of a part into chlorophyll or leaf-green. A proper supply of warmth, varying in amount in different plants, is necessary for the formation of this substance. The presence of iron has been found to be another necessary condition in this process. The iron is an essential ingredient in the colouring material of blood. Leaf-green is a most important substance in the plant economy.

The interior of the leaf is not quite solid; the cells are more loosely arranged, forming passages communicating with the outside through little mouthlike openings on the under side of the leaf. Air finds its way into these, and with it the carbonic acid, which is taken into the air as it enters the plant, and enters the combustion and decay. In the granules of the chlorophyll-containing cells the carbon is fixed, combined with the elements of water, and the oxygen is returned. The sun's light and heat supplies the force required to tear the carbonic acid asunder. In this way starch is formed. This is insoluble; but in darkness, during the night, it becomes dissolved in the cell, and is then transferred to other parts of the plant, where it is stored in a reserve for the plant's future use, again becoming insoluble. Protoplasm differs from substances like starch, which are quite inert, in containing nitrogen. This is an element very difficult to bring into combination, and very restive when combined. This restiveness seems to have something to do with the proneness to change so characteristic of protoplasm. It is



FIG. 157.—DRECHSLER'S WINNOWING MACHINE.

noticeable that nitrogen is a component in most explosive compounds, and also of many medicinal and poisonous vegetable principles.

THE AMATEUR GARDENER.

Ivy.—When we include all the variegated kinds which have recently been introduced into England, and which are becoming most useful in garden decoration, it may be truly said that no plant, not used for food or as timber, has greater claims on our notice than the Ivy. Its use in aiding the picturesque and the beautiful has long been acknowledged. A host of descriptive poets, besides Gray, have spoken of the "Ivy-mantled tower," and many churches in England owe to this accessory much of their attractiveness, while all over the land it lends a charm to decay, and turns what would be simply an ugly eyesore into a valuable ornament. In the words of a recent horticultural writer, "for clothing dead trees, covering open fences, giving an air of antiquity, security, and warmth and dymess to buildings, and even producing architectural effects, and covering the ground in shady places with a green carpet where scarcely anything else would grow, the Ivy is invaluable."

Botanical works written ten years ago enumerate three sorts of Ivy as greenhouse evergreens, eight as stove evergreen shrubs, and nine as hardy evergreen climbers, and, we believe, other sorts have since been added to the list. The *Hedera Helix*, or common Ivy, and the *Hedera canariensis*, are the varieties in general use, and they are easily cultivated. They strike readily from cuttings inserted in a north border, and kept moist during the autumn. When rooted these shoots can be placed where they are to remain, in deep rich soil. An objection to Ivy is the litter occasioned by its leaves when displaced in spring by the young foliage, and to avoid this it is a common practice to shear off the whole of the leaves of last year in the month of March. By this method the walls covered have a desolate appearance for a month or so, but the new verdant covering makes up for this by its rich beauty. Our own plan, however, is to collect the leaves daily as they fall, and thus to avoid this *interregnum* of apparent baldness and sterility.

There is a vulgar prejudice, widely extended and existing where more good sense might be looked for, that Ivy is injurious to walls and other buildings to

all removed, and the damp part of the wall made good. Fortunately, the former tenant declares that the damp was there ten years ago, before my Ivy had an existence. But independently of that fact, on consulting an experienced builder, he has demonstrated that the wall covered by the Ivy is perfectly dry beneath it, and that the damp has arisen from want of drainage in the interior operating on a bad sort of brick. We shall certainly let this ignorant landlord do his worst should he be determined to burn his own fingers, but we may hope the representations of our builder, and a reference to horticultural authorities, may make him peaceable, and



FIG. 158.—DOUBLE-FLOWERED APPLE.

allow our Ivy to luxuriate without interruption. The only harm done by Ivy is when the brickwork on which it grows has fissures, or when it makes its way under roofs. In such cases as it grows it will have the power of doing mischief. *H. B.*

DEFORMED PEARS.

Few things are better established than the fact that the edible portion of Pears and Apples, popularly termed fruit, is no fruit at all, in a botanical sense, but rather the end of the flower-stalk dilated and rendered

short in its development, and we have a ripe Pear without core or seeds. The illustration, fig. 159, is taken from a Pear forwarded to us by a correspondent last autumn, and it is noteworthy, because it shows that, for a certain distance, only half the flower-stalk is involved, the remaining moiety retaining its relatively small proportions and dry consistence. As a result of this inequality of growth on the one side, as contrasted with that on the other, it will be seen that the Pear in question is bent over, as if dragged downwards by the rigid unyielding portion of the flower-stalk. But the point of greatest novelty and interest about these formations is one for a knowledge of which we are indebted to that excellent gardener, Mr. Parsons, of Danesbury, and which is this, that these peculiar growths are often (certainly not always) the production of flowers formed on the midsummer shoots. Some Pears and Apples, notably the Napoleon Pear, bloom twice in the season, and very often this second crop of flowers is produced on the midsummer shoots. The flowers, instead of being formed on short fruit-spurs, are in these instances developed at the extremity of long shoots, in which the internodes are, comparatively speaking, widely separated. The flowers so formed may be normal, and may be followed by fruit of the ordinary character; but often the flowers are irregular, sometimes double, and more like Roses (fig. 158) than Apple or Pear blossoms, and these double Rose-like flowers are, according to Mr. Parsons, followed by the production of the distorted pseudo-fruits to which we have called attention. The absence of stamens and pistils in some of these double flowers would account for the deficiency of core and of pips.

The normal inflorescence of the Pear and of the Apple is clustered, but in the cases to which we have been alluding it often happens that a single terminal flower of large size is produced.

ALPINE FLOWERS.

(Concluded from p. 745.)

EMERGING from the pleasant shade upon the open Creux des Champs, you fancy you see golden curtains hanging from ridges of brown rock, and festooned among the deep green branches of the Pine forest. What a combination of colour! Scramble up through beds of Oak Fern and groves of that splendid *Spiræa*



FIG. 159.—DEFORMED PEAR.



FIG. 160.—BRANCHED PEAR.

which it clings. An old lady, proprietor of a high wall separating her grounds from those of a friend of ours, coolly demanded that he should denude it of its covering of Ivy, which had been cultivated with great care, as the wall faced a drawing-room window. Explanations were useless, so the lady was left to herself, and has probably learnt wisdom since. A more serious case is furnished by our own experience. Our house is a modern structure, and to build it some old cottages were pulled down, leaving the gable end of our neighbour's dwelling an ugly expanse of plaster and brick. Our first care was to plant Ivy, and the whole of the surface is now covered, and beauty has thus emerged from deformity. But we are not allowed to enjoy this luxury in peace, for the landlord of the house, finding part of the wall damp inside, immediately attributed it to the Ivy, and threatens legal proceedings unless it is

succulent. The true fruit, in these cases, the immediate investment of the seed, is the core—the *caur*, or heart. Many illustrations of this fact have been given in the columns in former years, and some of them we reproduce, in order that by comparing them with evidence more recently obtained, the truth of our assertion may the more readily be demonstrated. In some of these illustrations, as in fig. 160, we have the Pear dividing into numerous subdivisions, swollen and succulent, like the parents. Now, it is far more probable that the flower-stalk should branch, than that the fruit proper, which consists of modified leaves, should do so. It is not customary for leaves to branch; it is a very common property of branches to subdivide. Moreover, in many of these cases the true fruit—the core—is not formed at all, or, if formed, it does not progress to maturity, but stops

which waves its huge white crests before the breeze. Look up presently, and you will find what the golden curtain is made of. It is a magnificent *Laburnum*, the *Cytisus alpinus*, whose roots are buried beneath the rocks above, with a thousand tails of yellow blossoms hang down in clusters before your delighted eyes. Farther on, in openings among the slanting woods, may be found the pure white blossoms of *Anthericum Liliago*, one of the most conspicuously beautiful among the early flowers of the Alps.

In front of the rocky fortresses of the Diablotins is a kind of island, each side of which is swept by the streams that descend in long waterfalls from the mountain. The trees here lie strewn about the ground and torn to pieces in such numbers, that the place must be a very temple of the wintry winds; but among the battered remains may be found many a good example

of a natural fernery. Not far from one of these streams, on a broken, rocky slope, partly covered with bushes, I found no less than fourteen distinct species of Ferns within a few yards of one another. They were all in the most remarkable perfect condition. Among them were many Holly Ferns more than two feet in height. The lower down is a small colony of Lilies of the Valley, and a little higher up, close to the first opening Rhododendrons, we found, among other treasures, the great *Aquilegia alpina*, before which all other Columbines must hide their diminished heads. I know of no flower which may be found in more unexpected places than our old friend the Lily of the Valley. Once upon a time, rather late in the season, as I was coming down the last part of that curious path, the edge of the Wetterhorn, I observed some of the leaves of this plant, and made a mental note to come and look for the flowers at a more convenient season. Seven or eight years afterwards, being at Grindelwald during the first half of July, I went straight to the place, and found thousands of them in the beauty of their early bloom. Only a very few hundred yards from the well-known ruins of the Great Scheideck, the huge unpromising slopes of loose stones and gravel at the foot of the avalanche-shoals were literally covered with beds of these lovely flowers, varied by the lilac tufts of *Globularia nudicaulis* and the tall snow-white blossoms of *Anemone alpina*. A splendid blackcock, rising from some Rhododendron bushes close by, testified to the normal quiescence of a spot which would probably be more visited if the sojourners at Grindelwald had any idea of the treasures in store for them at the foot of the Wetterhorn. The beautiful yellow *Anemone*, *A. sulphurea*, is considered only a variety of the white *A. alpina*, but as far as my observations go, it often inhabits separate localities—a subject on which I should like to have further information. In the Grindelwald valley, for instance, I found that on the southern or shady side the white form was universal, while on the sunnier slopes of the Faulhorn the yellow variety prevailed.

This was exactly the time for setting down into residence at the ever-beautiful Grindelwald. Everything was perfect either for high mountaineering or botanising, or a mixture of the two. The long mid-summer days tempted us to stay out till the latest of late dinners, and then who shall describe the splendour of the scene as we sat in the balcony of the Adler Hotel, and saw the edge of the Eiger and that great wall of the *Fischerhörner* shining like polished silver in the light of a full moon, the great bulk hidden from us by the gloomy rocks of the Mettenberg? The house on the top of the Faulhorn was opened on one of the first days of July. The heat in the valley was tremendous; the upper third of the mountain was still covered with snow, but the middle region was a garden of flowers, dotted here and there with patches of still unmelting snow. A long half-hour's pull up the usual path from Grindelwald lands us on a tolerably level plateau of the mountain, where dark blue beds of *Genetiana acaulis* are close to some luxuriant specimens of a great variety of Ferns. The yellow *Anemones* are as perfect as can be seen, scattered on all sides in little groups and clusters among Oak Ferns and Rhododendrons, and the white clumps of *Maintenium bifidum*. Moist places are gay with tall purple Orchids, and the edges of a little stream are fringed with the delicate hearts of *Primula farinosa*. Up among the rocks on the very summit of the mountain, the *Primula discosa* is rewarded by a good boxful of flowers, conspicuous among which I there found the best specimens of *Antericum Liliago* that I have ever met with. A little higher than this, as the snow patches become more frequent, we came upon abundance of *Primula viscosa* in full bloom. There is hardly a district in the Swiss Alps where, during the full summer and autumn seasons, you will see so many scores of rocky ledges covered with the stout leaves and slender seed-stalks of this plant, and the flowers so closely allied to it. In spring and the early summer these *Primulas* are in all their glory. They are found in all directions fringed with row upon row of their exquisite clusters of lilac and magenta-coloured blossoms, every vestige of which will disappear before the popular Swiss season has begun. The *Primula Auricula*, a lovely flower of the purest yellow, is to be found in very different situations at the same time; but, as a rule, in the most favourable situations, the *Primula discosa* generally frequents the cool clefts of shady rocks; the *P. Auricula* has always seen at its best among grassy slopes, with its face towards the mid-day sun. It is frequently in company with our old English friend, the Oxlip, as for instance, by the foot of the Blumli Alp Glacier, where, near to the chalets, I have seen them both in perfection, and almost touching blue cushions of *Genetiana verna*, about a foot in diameter of solid bloom.

I have lately been talking of flowers which for the most part appear only some time after the melting of the snowy covering which has protected them through the winter. But on the Alps in early summer we have the opportunity of seeing much more impatient and uncontrollable flowers than these. On such Alps as those of the Faulhorn there are acres of blue and white *Crocuses* in full bloom under the snow; and as the fierce midsummer sun daily diminishes the size of the snow patches, thousands of their blossoms emerge and gradually lift up with thankfulness their oppressed heads. If you raise a few handfuls of rather deeper

snow, you will find hundreds more of them lying almost flat upon the ground and anxiously waiting for their share of the great warmth-giver. A few feet from the retiring snow, where the soil is still soaked with its melting, the purple bells and drooping fringe of the *Soldanella alpina* spring as by magic out of the ground which is yet brown from its burial during six months of wintry sleep. Loved indeed this waking from slumber, this melting of death into life. On one of those bright first days of July we ascended the Mannlichen, a grassy mountain about 7500 feet high, which forms the angle between the two Lutschine rivers, and thus commands the valley of Lauterbrunnen on one side, and that of Grindelwald on the other. The collection of flowers grew rapidly as we moved upwards. Pink Rhododendrons and purple Columbines were supplemented by yellow *Anemones* and blue *Gentians*; then came the white crests of *Anemone narcissifolia*, beautiful to behold; then *Crocuses*, blue and white, and beds of the lilac-bellied *Soldanella* on the margin of the snow. In open places upon the top was an abundance of the delicate *Lloydia serotina*, and *Myosotis alpestris*, which far excels all other forms of *Forget-me-not*. I made a large snowball, and bored a hole in the middle of it with my finger; and in this I put the bright cluster of Alpine beauties, and this made a bouquet whose effect could scarcely be surpassed. It was worthy of the scene.

The Riffelberg, which from the second week of August is about as bare as the South Downs, is in July an almost continuous carpet of flowers, and it would be a good summer's work to botanise this district alone. Half way up the path from Zermatt, in addition to the usual *Anemones*, there is an abundance of the purple *Anemone Halleri*; and higher up comes the small but elegant *Anemone baldensis*, and some of the rarer *Ranunculuses*, such as *R. pyreneus* and *R. rutefolius*. But it is impossible here to speak of these floral legions excepting in a general way. One fact is particularly worthy of observation. The higher we get among the alpine flowers the more clearly we see what may perhaps be called the sacredness of Nature. Larger leaves and coarse stems gradually disappear with every upward step we take. The resources being so small, they are made the most of. There is no time for stalks and leaves in the short summer of the High Alps, so the whole energy of the plant is thrown into the flower, and the consequent means of reproduction. The most beautiful *Gentians* are almost entirely blossom; so is the brilliant yellow *Aretia vitaliana*, and the higher Saxifages, and a hundred other inhabitants of such places as the Gümmat. Eminent among them is the true *Myosotis alpestris*, which, instead of wasting itself in straggling stalks, like our English species, forms close tufts of blossoms, massed together like a bunch of turquoises. Still more exquisite as an example of this is the *Eritrichium nanum*, whose dense blue clusters are scarcely raised above the ground, and I ought not to forget the ubiquitous *Myosotis*.

The Engadine is the beginning of that eastern alpine district which presents us with many plants which are seldom, if ever, found in other parts of Switzerland. At Pontresina, in August, every rock and boulder in the woods is covered with the delicate and sweet-scented *Linnaea borealis*. The *Polemonium coeruleum*, our Jacob's Ladder, is very abundant, together with various Lilies; and before reaching the village of St. Moritz, any of the most ordinary observation can scarcely fail to gather the blue *Daphne*, and inhale a perfume which he is never likely to forget. The banks of the stream which rushes under the bridge at Pontresina are festooned with the lilac blossoms of the *Clematis alpina*; and the yellow *Papaver alpinum* may be found in abundance among the *debris* near the two lakes at the top of the Bernina Pass. T. W. Hinchliff, in "Alpine Journal."

Home Correspondence.

The Gardeners' Royal Benevolent Institution.—On June 20, his Serene Highness Prince Teck has consented to preside at the anniversary festival of the Gardeners' Royal Benevolent Institution, and it is particularly desirable that a Prince of so high a rank, and such amiable and courteous manners—who, to use a gardener's expression, is now "acclimatised" amongst us, and who is united to one of the most deservedly popular of England's Princesses—should see what England's gardening skill can produce. There is little doubt that on that occasion Messrs. Lee, Turner, Veitch, Williams, and other supporters, will as usual do their part in the floral decorations of the room and tables, but there is always more difficulty with respect to fruit; and yet with such immense large "acclimatised" among the noblemen and gentlemen of the land, one would think that it would be only requisite to bring to their notice, that the charity required for that one evening (for, like the oyster-grotto boys, we ask "only once a year"), a dish of Grapes, Peaches, or Figs, a Pine-apple or a Melon, for them at once to give directions for these little luxuries to be forwarded. The loss of one dish of fruit would not be an act of great selfishness, but the donors would be a great credit to the night's charitable entertainment. They would be exhibited as a kind mark of the donor's liberality, would be a standing proof of the gardener's skill

before those who would know how to appreciate it, and would win for both employer and employed far higher honours, recognition, and satisfaction than many a medal at a horticultural show could afford. Robert Wrench, Treasurer.

Visitors to Nottingham.—Recurring to the visit of the Royal Horticultural Society to Nottingham, allow me again to state that I have secured first-class accommodation at the Ram Hotel, the house most frequented by the gardeners of the locality, for horticulturists and exhibitors of all classes, who will be provided with bed, attendance, breakfast, dinner and tea supper, at the rate of 10s. 6d. per day, less if all the meals are not taken. It is proposed that dinners should be provided at 1 P.M. and 6 P.M. daily, and visitors can suit themselves at which hour they dine. Already a number of the most influential gardeners and exhibitors have bespoken accommodation, and those who wish to avail themselves of the arrangement must do so by addressing a note to myself, or to the proprietor of the Ram Hotel, Market Place, Nottingham, not later than June 23. With reference to excursions to surrounding places of interest, groups of twelve persons will be carried upon either the Midland or Great Northern Railway the double journey for a single fare. Every information respecting these journeys may be obtained at the hotel, or from myself, or the attendant at my patent imperishable hothouse, in the show grounds. I should suggest that those who wish to visit certain places, say Chatsworth, Newstead Abbey, or the Dukeries, should enter their names at either of the places before mentioned, and then I would make arrangements for the railway trip, and if necessary for conveyances at the other end. A guide to the most important places, with the trains and cost of transit, will appear in the *Nottingham Daily Guardian* of June 26. Further, I have the authority of some of our leading manufacturers of lace and hosiery, and the branches connected therewith, to send parties to inspect their works, and should be glad to prefer that these parties should not be less than six or more than twelve persons. On receiving the names as before indicated, an order for inspection will be given. For those who may require amusement in the evening, concerts will be provided. It must be observed that I have no connection with the executive of the Royal Horticultural Society. What I do will be on my own responsibility, from a desire to provide a place of entertainment for those who, after being victimised, and to enable them to see the lions of the locality with the least possible inconvenience to themselves. W. P. Ayres, June 10.

The Variableness of our Climate has both been seen and felt of late. May came in sparkling salubrious and kind, vegetation being generally forward, kindly looking, healthy and clean. Thunderstorms with hasty rains and hail, which came on the 8th, so chilled the atmosphere, that sharp frosty mornings followed; thunderstorms and frosty mornings continued, with cold cutting north and north-east winds, to the end of the month, very much checking the growth of vegetation of all kinds, and laying the foundation for, and ensuring, a very early and severe winter, with caterpillars, and mildew in variety. In the first week in June biting cold west and east-by-north-east winds continued; it was more like the beginning of March than of June, and vegetation was very much checked, distorted, crippled, and eaten up by varieties of aphid, spider, caterpillar, &c. In my rambles I am sorry to observe that though the Apricots, Peaches, and Nectarines are in general generally set, the Apricot foliage is much curled up, and riddled by caterpillars, and the fruit is in many cases a good deal distorted and misshapen. As to Peaches and Nectarines their foliage is to a great extent blistered, covered with the green aphid, the young shoots being smothered with them, curled up, and becoming naked of foliage. The young wood of the Cherry is smothered with black aphid and honeydew. The Apples, that showed so heavy a crop of five weeks ago, are now have the bunches of blossom stuck together, the young shoots in many places covered with mildew, and having a very seared, scorched appearance, while in others the caterpillars are devouring the foliage. A good many of the Pears are swelled, not grown, outside, by that pest of a maggot at the core, and will fall, I fear, immature previous to St. Swinith's day. I observe that the Gooseberry and Currant bushes, the *Spirea*, *Beauveria*, *Spirea*, *Elm*, *Hazel*, &c., are, to a large extent, devoured by caterpillars and smothered by the various kinds of aphid and honeydew. Thus the early promise of good crops seems to be sadly blighted. James Barnes, late of Bilton.

Pot Grapes at Casewick.—In answer to your correspondent, Mr. Edwards (see p. 743), I beg to inform him that the pot Vines in question are yearlings, all but four, which are cut back. One of the latter had 25 bunches of good marketable Grapes upon it, and the average is 18 with the lot. Mr. Calder cut nine bunches last night, weighing 9 lb. 14 oz. Mr. Cutbush and Mr. Wilson, gardener to Lord Lindsay, have both seen the Vines, and can speak to the truth of my statement. I also forward a bunch from the Vine which had the 25 bunches upon it, and shall leave you to describe its merits. I may add, that Grapes in this locality are

grown to grace the tables of our employers, and not to send to Nottingham for four days to get spoiled. What a wild goose chase to send 25 bunches of Grapes to show merely for the edification of a few sceptics! In conclusion, I beg to say, I have no interest in the matter, and have strictly confined myself to the truth. I have no doubt Mr. Calder would feel a pleasure in giving you the details, should it be thought desirable. R. Gilbert, *to the Marquis of Exeter, Burghley, Stamford.* [We will report on the Grapes in our next. Eds.]

Manure for Conifers.—Will you please say what kind of manure is best for Coniferæ, and if stable manure would injure Wellingtonias? *Comte Wadje.* [Mr. Frost, of Drogheda, has kindly furnished us with the following reply to the above questions:—"I would not use any manure for Conifers; we never have done so here; and there are none in the country more vigorous or doing better. I have prepared the soil taken from the waste places, and use it in a rough state. Each tree has a depth of soil from 3 to 5 or 6 feet, kept 3 feet above the ground level; and now we dress the surface with any waste mould from the potting-shed or elsewhere. I never have used manure, neither do I think it required. If used, it must be on the surface only. I often top-dress with a kind of marl, and find it does the trees much good, avoiding to place it too near the bole, but spreading it off to a distance of 6 inches more from a foot off the bole. *Philip Frost, Drogheda.*"]

Reminiscences of Lilium Wallichianum, L. giganteum, and other Plants.—To the late Colonel Madden we are indebted for the introduction of the above beautiful Lilies. If my memory serves me correctly, about 1841, or 1842, a box of bulbs of the above were sent to the Botanic Gardens of Glasnevin and Belfast. The late Mr. Fergusson, the curator at Belfast, flowered the first bulb of *Lilium Wallichianum* in 1849, or 1850, and sent the flower to Sir W. J. Hooker. Colonel Madden, as well as others, had frequently sent home seed of *L. giganteum*, and as at that time it was not known that the seed lived in the ground one, two, and sometimes three years, it was vegetated, it generally got thrown out before that time. About 1847 a large batch of seed of *L. giganteum* was sent to Glasnevin and Belfast, and my late friend, Mr. Fergusson, was fortunate in raising a large quantity, which he distributed with a liberal hand. In the mean time the late Mr. Cunningham, of Comely Bank, having obtained a quantity of seed from both the gardens, was fortunate in getting one seed to vegetate the same year, and three others early the following spring. In 1851 the first *L. giganteum* flowered at Comely Bank, and was sent to the late Mr. Cunningham. The Comely Bank plants, flowered in 1852 or '53, and the gardens of Trinity College, Dublin. Colonel Madden also sent to the above gardens seeds of many other good plants, among which was a fine collection of Rubus—many of great merit, which I hope are still in existence,—the only one which seems to have been widely distributed being *R. biflorus*, known in nursery catalogues as *R. leucodermis*. To Colonel Madden, I believe, we are indebted for the introduction of *Staurtia*, *Staurtia*, and *capitata*, all of which I have seen in fine condition at Glasnevin; but I fear the two last are now lost to the country. *Ebor.*

Weights and Measures.—I agree with you in thinking that our systems of weights and measures are an ever-sinking maelstrom, with I do not agree with you in thinking that the doing away with the duodecimal element in them, and the adoption of the French system, would be any improvement whatever. The division of a shilling into 12 pence, and of a foot into 12 inches, are by far the most practically useful divisions for common use that we have; and, so long as the divisions of time are essentially duodecimal, the doing away with the duodecimal element in our other systems of calculation is an inconsistent, and, at best, absurd. When the French revolutionists devised the metrical system they were at least consistent, because they divided time decimally also. The units, also, of the French system, as Sir John Herschel has shown, are less scientifically accurate than some of our own, and are founded on a series of blunders. I know, and have used, the French system of weights and measures, and I have also learnt to use a duodecimal notation, and I know, therefore, from my own practice, that it is quite as easy to learn the latter as the former. Every mathematician knows that the use of a duodecimal notation would be a mighty step in advance in facility of calculation, but no one, I suppose, knows this so well as I do, who habitually use it. Knowing this practically, as I do, I look upon the replacing of the duodecimal part of our weights and measures by a decimal one as a step back into barbarism, because the decimal notation is only one of the worst and most inconvenient that could have been invented. Its origin to the stupid ignorance of our savage ancestors, who did not know how to count in any way except upon their ten fingers. A decimal system may be simple, but for that very reason it is ill adapted to the complicated wants of a civilised society. So long as people use only the barbarous decimal notation, which will probably be for some time to come, the English currency is probably as good as possible, combining, as it does, a decimal element correspond-

ing to the barbarous notation, and a duodecimal one adapted to the common use of everyday life. Almost all our weights and measures can be made to correspond with the currency (especially with the duodecimal part of it) by very slight changes, which certainly ought to be made. The same is the case with school notes, taught to count and calculate by dozens and grosses, as well as by tens and hundreds; and as the former is far easier and more convenient of the two, our grandchildren would undoubtedly discard decimals altogether, and sooner or later the whole world would do the same. Any way, to get rid of the duodecimal element is a step in the wrong direction, and to adopt the decimal French units of value is as unscientific as it is inconvenient. *W. S. G. (to the Editor.)* [Our correspondent is safe for the present. The Bill has been withdrawn. Eds.]

Small Birds' Preservation Act.—Although I entirely agree with the object the promoters of this proposed Bill have in view, I cannot help thinking that there are several reasons why it should not be proceeded with at present, and I doubt whether it would receive much support, at least in its present form. My principal reason for recommending delay is founded upon the fact that small birds have benefited more than is generally supposed by the Gun Licence Act. Indeed, I should say that where there were too small birds killed, before it was necessary to obtain a licence to carry a gun, there are not killed now. Formerly, it was almost sufficient protection for the small birds, and if not I would propose increasing it to 200. The only other protection I would suggest is the prohibition of fowling or snaring song-birds for a certain given period of the year. Bird-catchers frequent country places near large towns and trap immense numbers of larks, linnets, bullfinches, goldfinches, &c., to the great annoyance and dissatisfaction of country folks, who love their singing birds, and rarely destroy them or their nests. These people I would prevent from plying their avocations during the breeding season, and if they could take at any other season would be very small in comparison, so that we should soon see an increase. My experience is limited to the environs of Brighton, but, doubtless, we shall hear from other parts what effect the licensing system has had, and I venture to predict that my observations will be borne out. With regard to birds'-nesting by school-boys and collectors—and it would be difficult to define *bona fide* collectors—and those who take birds' eggs make festoons for their parlours, presuming that it would be permissible to take eggs to form a collection—no power in the world could effectually prevent it, though, of course, it might be checked. Many landholders and employers preserve nearly all small birds except sparrows, yet the sparrows are more numerous than any other bird I could mention. Sparrow shoots were frequent until last Christmas at almost every country inn, and it is well known that among goldfinches, yellowhammers, and other small birds besides sparrows, were snared and destroyed by those gatherings. Although I have not sought after them, I have remarked that birds' nests seem more abundant this year than I ever remember seeing, and although I would not take any myself, I think it should not be attempted to prevent farmers and gardeners, who are gradually becoming more alive to the profits as well as the losses conferred upon them by the feathered tribes, from exercising their own discretion. Perhaps, in some cases, districts are not so well stocked with birds as the country of Sussex, and there may be more to be said in favour of the proposed legislation than I anticipate. *H.*

The Coning of Conifers.—That Conifers are a very interesting class of plants I think all will admit, and also that the ornamental grounds attached to any residence cannot be truly said to be complete without them. But they are doubly interesting if they produce cones at all freely. A large *Cedrus Libani*, nearly 40 feet high, growing here, is beautiful to look upon all the year round, though it does not cone. It is very healthy, and has made good use of its time in the autumn. Perovskia, which was apparent to the fact that the old gardener who planted it, and who cared it about in his arms from place to place till the exact spot was fixed upon, is still alive—enjoying a happy old age. At Stutton Rectory, in the adjoining parish, there are some fine specimens of this Cedar, and, looking over this pretty and interesting place last summer, I was particularly struck with the manner in which these trees bear cones. There was a good sprinkling upon them, and the sight was to me truly enjoyable one. In the summer of 1864, a young tree, 10 or 12 feet high, of *Abies nobilis* threw out three cones on the topmost branches, which became very conspicuous objects. They ripened in the autumn and shed their seeds, which appeared to be good. I sowed them the following spring, but not one germinated. Perhaps I should have kept them 12 months before doing so. This tree had a very unhealthy appearance last spring, and we transferred it to

another part of the grounds, being under the impression that the former position was too dry for it; it has, however, now thrown up five more cones, and the branches have also borne a quantity of catkins upon them. The exact place where the cones grew two years ago is still visible, and I am not quite sure whether it did not injure the tree so that it never came to cone when so young, for we have another one of the same species the very picture of health, and well furnished, that does not bear cones. In the autumn of 1865 I went to Knap Hill, and, amongst other things, selected for removal a Wellingtonia 9 feet high; it had several cones upon it, and they were not at all injured in the transit. The cones still hang upon this plant, though it has grown 7 feet higher since it came here, and has not thrown out any new cones. *T. Wynne, Gr., Holbrook Rectory, Suffolk.*

The Python Horticultural Boiler.—I am not sure that Mr. Ayres' Python horticultural boiler (p. 749), which he says he fixed in Kent, is at all like the one of which I sent you the sketch, although the principle is the same. From the sketch, the disposition of pipes in Mr. Ayres', he ought to name it the "Viper Boiler."—My Python boiler being a veritable likeness of that serpent in size when coiled round and incubating her eggs. I was not aware that any one else had conceived or fixed any such shaped boiler before, or I should not have sent you the communication or sketch. *A Gardener.*

Insects and the Crops.—Until very recently—in fact, till the perusal of your last issue—I considered this locality one of the most pest-ridden in the country, but the "blights" enumerated by Messrs. Barnes, Fish, Dean, and "It," seem to have reached an illimitable point. I have been told, to me, during the past few months, that the "blacks" of London, which reach us here, as well as all other places a like distance from the metropolis, might afford to vegetation some immunity from these insect pests. But it is not so. First came the mildew upon old Peach trees, with, to me, an unusual virulence, the fruit even being attacked in a manner I had only once before seen, and that last season in the gardens of the Honorary Secretary of the Herts Horticultural Society. Apple trees here exhibit an inconspicuous exposure of the leaves and dying foliage, intermixed with the *diris*, dead and decayed, caused by the browsing of an insect. No Apple tree so to speak, have withstood this ordeal and the long-continued cold. Plums exhibit, in a great degree, a like feature, the foliage being a crumpled mass. The Bean, Currant, and notably the Elder tree fly are excessive. Whilst cold easterly winds are antagonistic to vegetable growth, they are assuredly not deterrent of insect life. Insects thrive and multiply exceedingly, giving the poor wretched foliage a mass of formation no opportunity to become possessed of vigour sufficient to throw off their obnoxious embraces. It is "the oft told tale." A slow, weakly growth only is possible under the conditions of weather experienced, and this not sufficiently rapid to outgrow the increase of insects. The moral therefore is, that an uninterrupted healthy growth is the best deterrent of insect pests. *William Earley, Valentine.*

Table Decorations.—Permit me, as one who has taken a good deal of interest in the subject of table decoration, to add a few words to those which have already appeared on this subject. In the first place, then, as to baskets. The French say that we white-wash our carpets, and we do not do so, but we wash before our eyes, and spend money on our carpets, which we continually walk upon and cover up with tables, sofas, &c. In the same way I think it is misplaced expense to have expensive glass baskets, which ought always to be so filled with flowers that little of the glass, if any, can be seen; and therefore I think, provided the shape of the basket be good, the materials of which it is composed matters little. I confess that the gipsy-like shape does not appeal to myself to me so much as the plain round or oval with a glass handle. I dissent very much from "W.F.B.'s" ideas on the point of decoration. In the first place, I think the introduction of the white Lily a grand mistake both as to colour and perfume: as to colour, because it forms no contrast with the white cloth, universally left on now; and, secondly, as to perfume, because many cannot stand it, and strong-scented flowers are decidedly objectionable where delicately flavoured wines and dessert dishes are drunk and eaten (I am no Sybarite, but only express what I believe to be facts). I object, too, to the height of his glasses, which are either too high or not high enough, and I quite agree with the present taste of not allowing anything above 18 inches in the centre of the table. As a hint in the direction of what I would find consider good taste, may I say how my own very humble table is arranged every day. I have a large round table, of the common British Maiden-hair, *Adiantum Capillus-Veneris*, and so carefully treated by my wife that its fronds droop down and cover the basket altogether. I then have simply some specimen glasses, with bright coloured flowers in them, at the corners of the table; and in the centre, alongside of the Fern, and tending to throw out in relief its freshness, two very small vases, which I have obtained from the Crystal Palace, quite charming I think; a small vase

of frosted glass, standing on a tripod frame of green leaves edged with gold in these are also put one or two flowers only; and as Roses come in they will receive one fine bloom of Charles LeFebvre, or some such highly coloured Rose. By this arrangement I have the desirable combination of foliage and flowers, and with the least possible expenditure of time. It may be partially, but I see many much more elaborately arranged tables which do not please me half so well. If I could afford to dine *à la Russe*, which I cannot, I should put small glasses opposite each person, but this is impossible when dishes are placed on the table. D., Deal.

The Weather.—According to the calendar, the morning on which I write is the morning of June 7, 1871; according to the weather, it is any time from December to March. The days come forth wrapped in swaddling bands of hoary ice, and, keeping in character with their shivering gown, they are icy throughout. The wind is like a whip from an overhanging icicle, and the sharp driving air is like ice pounded fine in a mortar, and dashed furiously into our faces. It is too cold to rain, and when the attention is made it can but snow, or the angry drops rattle down in hurried hail-stones. Talk of Wheat ears in May, as well look for them in March; of Roses in June, that depends, as the country folks say, upon so many things, leaving you to discover upon what—but in this case there is no mystery, it depends on the weather. And as for early Peas, Strawberries, and other sweet morsels, they are all hidden in the womb of the distant future; and the glory of the flower garden is shivering like thousand sheeted ghosts on the wings of the cruellest wind that ever blew in June. Tender things are sinking exhausted, paralysed, to the earth; huge succulents are being rent to ribbons, drained of their juice, and robbed of the power of growth. Flowers, indeed!—who could expect them while the days dawn under white sheets, stiffly starched with hoar frost, and two or three cold December days combine to make one in June. Vegetation greatly wonders with us at the weather. But the plants bear it more bravely than we do. Most things, excepting the most tender, seem to have put a bold face upon it. True, they can neither grow nor flower, but they can wait; and it is much to be able to wait without going back. Many crops, notably Potatoes, Peas, and Roses, are doing so. They seem patiently holding on till the change comes. It is to be hoped it will come in time to save them from being starved into stuntedness for the season. Possibly such seasons as these may be needed to crop our pride, and keep us in our place. We are only too apt to place ourselves upon our power over Nature, and many of us pitched the whole stock of our patience into the express long ago. Such seasons as these teach us that we have no power at all over Nature unless it be given us from above through the ministry of kindly seasons, and that no work in gardening can be perfected without the exercise of patience. The more haste the less speed is never more strictly verified than in many of our quick marches in these seasons. As we as well as climate go, we must wait an opportunity, and seize it at the foot of the attempt to force them, or to go forward without them, only throws us back. This season is wholly abnormal however, but for that very reason it may serve the better to inculcate lessons of caution, and to teach us, once for all, a truth that many are constantly forgetting—that climate is stronger than skill, and is constantly modifying, frequently baffling it in the art of production. Were this fact more generally acknowledged, perhaps our practice would be better adapted to small variations of climate, and thus, by special adaptation, greater power be ultimately gained over it; or, what would virtually be the same thing, each speciality of climate would be met by a corresponding speciality of skill, and the result could hardly fail to be more satisfactory. Speaking broadly, we are accustomed to sow, plant, and reap, as if our climate was a unity of uniform character, whereas, in fact, it differs almost in every garden. Were these differences fairly discounted in our practice, it is impossible but that the results would prove more successful. D. T. F.

The Cool Treatment of Orchids.—I have carelessly read the articles by your correspondents on this subject, because I think the whole question lies in a nutshell. I will only say that two or three Orchids, which I have seen growing naturally under as great a variety of circumstances as can well be supposed, and which ought to reconcile the statements of your warlike correspondents. On various parts of the mountain ranges of Southern India various Orchids are found, both with and without pseudobulbs; Denckers are found on trees, some of which are moss-covered, others not so. Aerides Linzeyana is found growing on rocks in all sorts of aspects and under various conditions; sometimes water trickles over the rocks for the greater part of the year, in other cases the rocks are comparatively (I may say very) dry at all seasons other than the rainy one. Sometimes these rocks are covered with other vegetation, or are so situated that they receive considerable deposits of decaying vegetable matter for the nourishment of Orchid growth; at other times they are high and dry

above all neighbouring boulders, with only a few coarse grasses near them. Now as a natural consequence the plants found growing under these various conditions present various conditions of luxuriance. But this is not all; the Aerides alluded to is found growing over a range of from 4500 to 8000 feet elevation, with a mean temperature of about 68° to 56°, at the higher elevation, and with a rainfall of from 40 to 60 inches at various places, and in various seasons. What will your cultivators who strain at a gnat say to swallowing this camel? It may interest them to know that this Aerides is most luxuriant at the highest and coldest elevation, where frost frequently occurs during the night. Then as to pseudobulbs and rest, &c., there are several Orchids in these regions growing under precisely the same conditions as the Aerides, but notably one locally called the Snowdrop (a *Coezygne* I think); both one and the other sometimes lose their leaves, and sometimes they do not, and this occurs as much as they are 10° hotter or colder, accordingly as the weather may be cold or otherwise. I imagine any collector could tell a similar story about very many Orchids if he would take the trouble. I append a Table of temperature and rainfall taken by Capt. Auchterlonie at a point (the elevation of which is 7300 feet) in the district where these Orchids grow.

MEAN TEMPERATURE AND RAINFALL.					
Months.	Sunshine.	4 a.m. to 8 p.m.	Sunfall.	Remarks.	
January	42	63	38	Cold N.E. winds.	
February	44	63	38	Cold N.E. winds.	
March	44	68	63	Cold and dry.	
April	54	68	63	Cold and dry.	
May	54	68	63	Wind varies to S.W.	
June	54	68	63	S.W. monsoon.	
July	52	62	57	Strong S.W. and W. winds.	
August	52	62	57	Wind varies to W. and N.W.	
September	54	62	57	Wind S.W. and N.E.	
October	54	62	57	N.W. N.E. and E.	
November	49	61	55	N.E. wind, clear.	
December	45	60	55	N.E. wind, often violent.	
Total	...	...	60		

—James McPherson.

Many thanks to Mr. Anderson for his prompt reply to my queries. I am very pleased to learn what he found Odontoglossum growing on both systems, as he would thus be enabled to judge of each upon its own merits. I can corroborate all he says about the flimsy condition of the foliage when grown warm; for after reading the letter from "G. H." (given at p. 76, January 21), I determined to try an experiment with a few *Odontoglossums* in a mean of 70°. Eleven plants were selected, distinct species; five were taken direct from the cool to the warm house, but were kept in an intermediate house for a week, so that the sudden change should not harm them; they were then placed in a mean of 70°, and have been kept in that temperature till now. The results are these—*O. nebulosum* var. is so much injured that its recovery is doubtful; *O. coronarium* (imported) is not quite so bad, but it has become deciduous; *O. Alexandræ*, cordatum, triumphans, Schlimmii, (imported), Pescatorei, bictonense, grande, maculatum, and Lindleyanae are growing, but the foliage will bear no comparison with that the cool house, neither for strength nor colour. With your permission I will give your readers a short description of the cool house here, also a list of the plants which are grown in it. *Ex-Cantab.*

Viola cornuta var. *Perfection* is going to be the gem of the season; amongst the dwarfed and coloured for an edging it is A. 1. Its compactness of growth and neat habit will make it a general favourite, even more so than my old acquaintance *Viola cornuta*, although at this present time I have 600 feet in all its glory, and it is still a telling plant where it does well; if over fed it becomes a rampant grower. It does best on a cool bottom, with dull water, and a very useful tip got up with little trouble where extensive bedding is required. It is properly managed—as it used to be—with "Friend Bennett." The flowers of *Viola cornuta Perfection*, with me at present, are three times the size of those of the original variety, and are of very compact growth, sitting close on the ground, throwing the flowers well up, upon stiff foot-stalks, which enables them to stand against the weather, its colour being of a deeper mauve than any that I have seen of of the kind. I have seen it grow the two original varieties of *cornuta*. I could never see the difference; but with *V. cornuta Perfection* there is a marked difference: its colour being darker and richer, and the flowers larger, giving it a much better effect, and I have no doubt as it becomes better known it will be as much patronised as the original. *J. Miller, Workshop Manor.*

The Subtropical Garden.—Knowing that the "fate of books depends much more on what is written in them than what is written of them" by critics, I should not have taken any notice of your reviewer's observations were it not that he, having no fault to find with the book, makes invidious remarks as to the "tone" in which I speak of Mr. Gibson's work at Battersea, and charges me with "deriding" it, which I

certainly am not guilty of. I have the pleasure to know Mr. Gibson well, and esteem him as highly as your reviewer can, as your columns of a few seasons past bear witness. Anything in the "Subtropical Garden" advocating a different system than that pursued by him is not written because I esteem him less than ever, but my duty as a public writer more. In the "Subtropical Garden," as in other books of mine, I accept no standard but the highest, whether that be or be not recognised in the gardening of the day; and knowing that the heavy masses of *Canas* and other plants so persistently heaped out, both in London and Paris, not only do not represent the fairest aspects of the system, but prevent these from being seen or understood by the public generally, I plainly described them as they are, and advocated what I know to be a truer and better system. And for this, forsooth, your reviewer writes so as to lead people to believe I had descended into the arena in which abuse is more popular than praise. I do not think, and my letters say, so, but from impartial readers joining your reviewer in his "deprecations," they will rather look on his remarks as a feeble attack on that liberty of public writing and freedom of judgment which both critics and writers have hitherto fought for, and not against. Your reviewer speaks of my "deriding" Mr. Gibson's work, "especially the raised beds, which it is well known were adopted for a specific purpose, that of absorbing and retaining sun-heat." There is not a word in the book to justify this statement, or that I did not know the "specific purpose," which I explained on pp. 39 and 40. Nothing was further from my intention than to say an offensive word of these, though I did say, and can prove, that they are entirely unnecessary for many subjects for which they are used, and I did protest strenuously against needless formality, as I shall continue to do. I hope your reviewer remembers that those masses of *Canas*, &c., repeated at *Wentworth*, are not confined to one London park or one big city. The merit of my book, if it has any, lies in not merely enumerating any one collection of plants, or any one individual's mode of arranging them, but in broadly dealing with the subject in the interest of gardens in all parts of the country, and in clearly pointing out that the plan so vigorously carried out of late years in Paris and London was not the one for general use. This, I think, is known to most practical gardeners, and has satisfied the public, yet in this last your reviewer finds his grievance. Happily the book is to the good, and its readers will look at the matter in a very different light. Meantime, if the course I pursue should be painful in the slightest degree to Mr. Gibson, I shall regret it much, for I esteem him very highly in two ways—as a man, and as a chief amongst gardeners. But I should really deserve censure, if, having decided opinions on the matter, I hesitated for these reasons, to express them. *W. Robinson.* [We are glad to give Mr. Robinson an opportunity of making this disclaimer; but we cannot alter our verdict, as to the impression which the tone of certain passages left on our mind. When the plants are spoken of as "weeds," and their arrangement as "lumpish monotony," "to be particularly guarded against," and their grouping "unpleasant," it is not the most judiciously constructed as to thing to be avoided—and all this in connection with "Battersea," we do not look upon the terms of our reviewer as being at all too strong. Nor can we accept Mr. Robinson's dictum as to the superior effect of mixtures over masses in all cases. If the subtropical garden had been planted on the mixed system, it would never have become appreciated as it now is. *Eds.*]

Heating by Hot Water.—By what arrangement of boiler and pipes different from that in common use, greater advantage may be taken of the principle of gravitation to obtain increase of motive-power, seems to be successfully illustrated in the heating apparatus at Woolwich; but I submit that the success is but partial, and true principles not fully carried out. Two conditions of primary importance are required, in order that the principle of the hot water heating of pipes are well adapted to admit of their being carried out: firstly, the final fall or plunge of the condensed water to the bottom of the boiler should be from as high a level as by means of the motive-power may be attained; secondly, its elevation to that point should be accomplished with the least expenditure of power: for the excess of power beyond that expended in raising the hot water to the height of the boiler, and the circulation, which increases the rapidity of the circulation. Mr. Cannell's arrangements of the pipes comply with the first of these conditions, and I believe that this is the sole cause of his success. Having gained a high level for the water, he prudently keeps it until the water has gained all the weight, by condensation, that the cooling process can give it; he then gives it, at its final plunge into the bottom of the boiler, all the weight which altitude renders independent, and directness of descent can confer on it as a motive-power. But the second condition, I think, he violates, and the result of this will surely, I think, appear injuriously in extensive ranges; but if this second condition also be observed, the gain of it will become apparent in every apparatus so constructed, however extensive or however limited, in the increased rapidity of circulation, or in the simplicity and economy of pro-

guide; the latter, with Meissner, claims the discovery of having "seen the spermatozooids penetrate the eggshells through peculiar openings into the interior of the eggs of insects," called here "the micropylor apparatus"—that is to say, one or more small apertures at one of the poles, through which the spermatozooids must get into the interior as far as the yolk of the egg, in order to complete the act of fecundation. A note is added—"The cases of true parthenogenesis are, of course, to be understood as forming the exceptions to this rule." Dr. Siebold does not accept this Leuckartian conception, and believes the causes to be something different; but agrees with him that "it is impossible, from the external condition of the bee's egg, to arrive at any conclusion as to the sex of the bee which is to be developed in it." I beg to call attention to the statement of Leuckart, "that it is not difficult to discover the seminal filaments singly, or in strings, on the eggs, and always at the superior pole of the egg, which is the last excluded during oviposition (and afterwards contains the head of the young larva)." The egg-shell or chorion "is covered with a delicate hexagonal lattice-work, as with a network, as far as the hinder (lower) flattened end of the egg, which serves for its attachment." When Leuckart undertook the direct investigation of the fecundation of the eggs, the Baron von Berlepsch "could by no means bring a queen to deposit her eggs," so he confesses his failures thus: "On two occasions only I met with some un-

to become drones the eggs pass without fecundation), having from one to four seminal filaments in each: so we are to take for granted that these spermatozooids could not, and do not, fecundate the eggs on the ovaries. Where, however, the eggs are found in bunches ready to be extruded, placed just above the sperm receptacle—which is the reservoir of these filaments—any common observer may by examination find the eggs in every stage, in the breeding cells of the honey bee, during the season; but I would only point to the fact, that the larvae when hatched are transparent worms, apparently without "heads or tails;" the chorion, or egg-shell, having peeled off, the rings and spiracles, with the central canal, may be seen forming. These larvae grow by the gradual expansion of the pellicle, which is kept constantly moistened with honey and water (and cannot be pollen-fed, as has been hitherto stated). Mr. Desborough also distinctly writes—"Honey alone constitutes the food of the larvae." I leave these bare facts for practical beekeepers to test, whilst, however, I fear the "reviewers" of the monthly periodicals (who, perhaps, writing with "pin dried" specimens before them) have confused "heads and tails" of drones in some "grotesque drawings" of mine on a former occasion, and have actually found "the anterior pair of wings are attached beneath the thorax, close to the coxae of the anterior legs!" It is a pity they are not also described as shifting wings of the drones, "being also much smaller

together. These houses seem to us so admirably constructed, so conveniently arranged, and so well adapted for plant growing, that we have thought the accompanying view (fig. 761) and description of them would be useful to many readers who may be contemplating the erection of new plant houses.

The range is about 47 feet long by 20 feet wide, 44 feet high at the sides, and about 11 feet from the paths to the apex of the roof. It is divided into two compartments, one being fitted up for stove plants and the other as a greenhouse. Each division has a large centre stage and side stages, with slate tops and wood supports. Under the middle stage, at each end, is formed a bed, in which are planted climbers to be trained along the roof on light wooden trellis work. In the stove division there is also a hot-water tank for evaporation, which will be more fully described. The paths are tiled, and bordered with Portland cement curbs, on which the upright supports of the stages are fixed.

The hot-water apparatus is worked by one of Weeks' tubular boilers, which also has the apparatus of several other houses attached, and the temperature is easily raised and steadily maintained. The stove-house has four tiers of 4-inch pipes all round, and four tiers in the tank under the middle stage, and the greenhouse has three tiers all round. The pipes are so arranged, that the heat can be lowered, or entirely shut off from either house, and from the tank. When this tank is filled, the pipes are submerged, and a steady vapour rises.

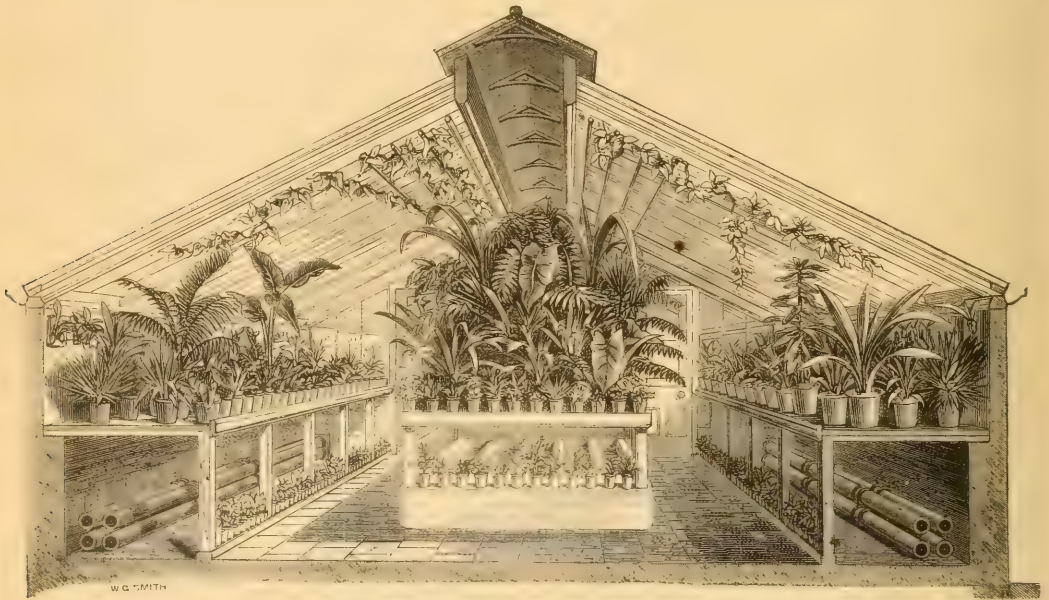


FIG. 761.—MR. BULL'S HOUSE FOR NEW PLANTS.

doubted seminal filaments upon the micropyle of bees' eggs; on one occasion a single filament, on the other several, four or five (and yet I have most carefully examined more than 50 eggs)—on both these occasions only on the worker's eggs, and never upon the drone's eggs." This, then, speaks in favour of Dzierzon's theory.

Before proceeding any further I must remind beekeepers that in "insect life" minutes must be calculated for weeks in their development, and weeks as months, taking into consideration, of course, climate and temperature. We are promised, however, in advertising articles in papers, in some future German and American works, a full statement of the gradual growth of the spermatozoa, from the egg to the perfect bee. But in the meantime we must be content with the facts given by Dr. Siebold, certainly one of the most earnest and accomplished professors of Germany, and who, like all true geniuses, is never ashamed to acknowledge any errors he may have been led into by mistaken guides, or by wrongly given data. The entomological world, therefore, may well have unbounded confidence in his interesting and numerous experiments regarding his theory of parthenogenesis, and Dr. Siebold would hail the circumstance with delight if others entered into the interest of science, and gave him wider fields of research, than Dzierzon's theory, in the honey bee; although, as I have stated before, Dzierzon had doubts upon his own evidences, or views on this point. We have then the question thus left, that the fecundated eggs receive the spermatozooids at the top pole, and become females, or worker-bees (but

than the posterior pair;" they might have to act as rudders, according to the circumstances and wants of the drones, when attached to the ("inferior") "posterior coxae!" But this is evidently my confusion in scientific terms and sentences, attempting "general orismology." [1] I have touched upon "affixion," "direction," &c., with which the egg has little to do when once in the cell. *W. A. Mann.*

Garden Memoranda.

MR. W. BULL'S ESTABLISHMENT, CHELSEA. — This nursery is now well known as an emporium of new plants, and we need go no further back than some two or three weeks, when the new Japanese Primrose, *Primula japonica*, was flowering there in all its glory, to show how successfully Mr. Bull caters to meet the public taste in this department of horticulture. Although the primary object and business of this nursery has always been the introduction of new plants, yet, to meet general requirements, such a large and varied collection is kept, that it was found many new plants became comparatively overlooked, sometimes even lost, when they were mixed up with the general stock. The growing of plants known and unknown together was, in fact, found so inconvenient in practice that it was resolved to provide accommodation by building a range of houses, in which all new plants not in commerce could be grown by themselves. According to this arrangement, all introductions new to this country are kept

This can be regulated by reducing the heat of the pipes, or the evaporation may be stopped altogether, and dry heat obtained by running the water off into a large rain-water tank, which is built below the stage in the greenhouse. By this arrangement the great advantage of being able to raise the temperature of the water in the large tank, before it is used for watering, is secured. To facilitate this latter operation a small pump is fixed beneath the edge of the stage.

Ventilation is effected by means of iron boxes, with sliding covers, built in the outer walls near the path level; and by an arrangement at the apex of the roof. This, as shown in the figure, follows the form of the roof, and extends over the opening made therein sufficiently to prevent any chance of the rain falling or drifting into the inside of the house. The ventilator is raised and regulated by a system of levers and quadrants, which, being easily used, gives great facility for maintaining the desired temperature in the house. In addition, the cool compartment has upright sashes on both sides, these are hinged at top, and may be all opened when necessary. The house was built by Messrs. J. Weeks & Co., of King's Road, Chelsea, and, we believe, at a very moderate cost. For the rest, we may refer the reader to the accompanying figure.

Obituary.

WE have with regret to announce the death of Mr. WILLIAM THOMAS CRIPPS, of the firm of Cripps & Son, Nurserymen, Tunbridge Wells, which took place on Sunday last. Mr. Cripps was in his 31st year.

THE WEATHER.

TEMPERATURE OF THE AIR AND FALL OF RAIN AT
DIFFERENT STATIONS,
DURING THE WEEK ENDING SATURDAY, JUNE 10, 1871.

NAMES OF STATIONS.	TEMPERATURE OF THE AIR.					FALL OF RAIN.		
	Highest.	Lowest.	Range of Week.	Mean of Day.	Mean of Week.	Mean.	Mean.	Fall of Rain.
Portsmouth	59.2	39.8	19.4	44.5	42.6	21.7	51.0	0.10
Blackburn	60.8	38.7	22.1	44.8	43.6	16.0	49.9	0.31
Bristol	61.7	38.5	23.2	45.1	43.1	18.0	50.3	0.29
Birmingham	63.0	36.7	26.3	49.7	45.6	17.1	49.3	0.25
Leicester	60.3	37.7	22.6	44.5	43.8	16.8	50.8	0.07
Nottingham	60.5	37.5	23.0	44.5	43.8	16.8	50.8	0.07
Sheffield	60.0	41.5	18.5	45.8	44.3	14.6	49.8	0.02
Liverpool	60.0	41.4	18.6	45.8	44.3	14.6	49.8	0.02
Manchester	60.0	41.0	19.0	45.8	44.3	14.6	49.8	0.02
Salford	60.0	41.0	19.0	45.8	44.3	14.6	49.8	0.02
Bradford	60.0	41.0	19.0	45.8	44.3	14.6	49.8	0.02
Leeds	60.0	41.0	19.0	45.8	44.3	14.6	49.8	0.02
Hull	60.0	41.0	19.0	45.8	44.3	14.6	49.8	0.02
Newcastle	60.0	41.0	19.0	45.8	44.3	14.6	49.8	0.02
Edinburgh	58.7	40.0	18.7	44.3	43.7	10.3	47.0	0.00
Glasgow	58.7	40.0	18.7	44.3	43.7	10.3	47.0	0.00
London	60.0	41.0	19.0	45.8	44.3	14.6	49.8	0.02
Aberdeen	60.0	41.0	19.0	45.8	44.3	14.6	49.8	0.02
Falmouth	60.0	41.0	19.0	45.8	44.3	14.6	49.8	0.02
Greenock	60.0	41.0	19.0	45.8	44.3	14.6	49.8	0.02
Leith	60.0	41.0	19.0	45.8	44.3	14.6	49.8	0.02
Perth	60.0	41.0	19.0	45.8	44.3	14.6	49.8	0.02
Dublin	60.0	41.0	19.0	45.8	44.3	14.6	49.8	0.02

STATE OF THE WEATHER AT BLACKBATH, LONDON,
FOR THE WEEK ENDING WEDNESDAY, JUNE 14, 1871.

1871. MONTH AND DAY.		At 9 A.M.				Hygrometric Deduction from Glaisher's Tables, 5th edition		
		Reading of						
June.		Barometer reduced to 32° Fahr.	Dry Ther- mometer.	Wet Ther- mometer.	Dew Point.	Degree of Humidity	Weight of Vapour in a Cubic Foot of Air.	
		Ins.	Deg.	Deg.	Deg.		Gr.	
8 Thurs.		29.76	50.8	51.0	48.5	71	3.6	
9 Friday.		29.76	50.8	51.0	48.5	71	3.7	
10 Satur.		29.82	53.1	53.4	51.3	88	4.0	
11 Sunday.		29.82	53.1	53.4	51.3	88	4.0	
12 Monday.		29.82	53.1	53.4	51.3	88	4.0	
13 Tues.		29.82	53.1	53.4	51.3	88	4.0	
14 Wednes.		29.77	52.0	52.4	50.8	89	3.6	
TEMPERATURE OF THE AIR.								
1871. MONTH AND DAY.		TEMPERATURE OF THE AIR.				WIND.	RAIN.	
June.		Highest.	Lowest.	Range in Day.	Mean.	Direction. Horizontal Movement.	In Inches.	
		Deg.	Deg.	Deg.	Deg.	Miles per Hour.		
8 Thurs.		56.0	40.5	15.5	47.7	N. N. E.	0.00	
9 Friday.		55.0	40.6	14.4	47.3	N. N. E.	0.01	
10 Satur.		56.0	40.5	15.5	47.5	N. N. E.	0.00	
11 Sunday.		55.0	40.3	14.6	46.9	N. E. S. E.	0.00	
12 Monday.		58.3	47.8	10.5	55.9	N. E. S. E.	0.70	

produced *Empress* by ALFRED (6732), and *Iris* 2d by SAUNTER (16,914), and from these two cows all the present Dido stock is derived. ACCORDION was well known to the property of Mr. Adkins, of Milcote, and his pedigree traces back through CLARENCE (14,202), SNOWBALL (2651), FAIRFAX (1023), &c. ALFRED was bred by Mr. Charge, and SAUNTERER was by MAMELUKE, and out of *Sweetheart* 2d, the property of Mr. Adkins. These good bulls have been followed by PALMERSTON (15,042), by BATES (12,452), and of the well-known "Fuchsia" tribe; ARCHER (17,317), bred by Mr. Langston, of Sarsden, and got by ARCH-DUKER 2D (15,588), out of *Crima* by GLOSTER'S GRAND DUKE (11,949); THE EARL (23,924), bred at Pewsey, by CHRISTMAS CAROL (17,566), and from *Lady Spencer* 4th, of Chilton origin, and FLORIST, bred by Sir G. R. Philips, by BARLEYCORN THE YOUNGER (21,209), and from *Florite*, descended from the best Milcote blood. The Rachels are from Lord Sherborne's stock, and trace from *Rachel* by CEDRIC (3311). Next in this tribe's pedigree followed Mr. Wilkinson's (Lenton) *Sweetheart* (8646), Mr. Langston's SARDEN (10,785) and GLOSTER'S GRAND DUKE (11,949), Mr. H. Hall's CAMBRIDGE GRAND DUKE by 2D DUKE OF CAMBRIDGE, and of the Chilton "Lady Spencer" tribe; Mr. C. W. Goode's VICTOR (23,134), which allies the Didos to the "Rachel" tribe; THE EARL (23,034), bred at Pewsey, and FLORIST (23,962), are the sires of the greater part of the young stock.

— Friday will witness the sale by Mr. Thornton of some pure bred Alderneys, the property of Mr. Joseph Savory, of Buckhurst Farm, Sunninghill, Berks. The farm is about two miles from Sunningdale station, on the Wokingham and Reading branch of the London and South-Western Railway, and five miles from Windsor.

SHEEP.

WE have received a catalogue of the Merton flock, which will be disposed of by Mr. John Thornton on the 29th inst. Accompanying the catalogue is a pamphlet of 19 pages of close type, containing a list of prizes taken by the flock from the year 1851 to 1870. The prizes have been principally secured at the Royal, the Smithfield Club, the Norfolk, Birmingham, Wiltshire, agricultural and fat shows. During this period of 20 years, 280 prizes, 88 medals, and 27 cups have been taken. Turning to the catalogue, we find, at its commencement, the following condensed information as to the origin of the flock:—

"This celebrated flock of pure Southdown sheep has been very carefully reared for the last quarter of a century. The ewes were originally selected from the flocks of Mr. Lord Elinor, of Glynde, and Mr. Robert Boys, of Eastbourne; and the rams were from Mr. Hart, Mr. Lugar, Mr. T. Ellman, Mr. Jonas Webb, and Mr. Rigen. Many of the sheep are of the same blood as the famous Swaledale rams—Plenipotentiary, Archbishop of Canterbury, Grandson of Salisbury and Reserve; also of Mr. Rigen's first prize ram at the Leicester Royal show, and of the Merton prize rams at the Royal meetings at Worcester, Newcastle, Plymouth, Bury St. Edmund's, Manchester, and Oxford."

Next follow references to all the principal rams which have been used, and which are referred to in the catalogue. The flock is now consisting of 100 ewes; 20 2 and 3-year-old rams, 65 yearling rams, 10 2-year-old ewes, 65 3-year-old ewes, 145 full-mouthed ewes, 30 broken-mouthed ewes, 120 ram lambs, and 160 ewe lambs.

HORSES.

AT Mr. Blenkinsop's first sale of yearlings, at Middle Park, last Saturday, by Mr. Tatnall, 46 out of the 60 on the catalogue were sold, the others being withdrawn or not offered. The sum total realised was 14,065 gs., or an average of 305 gs. The first eight lots, with two exceptions, made comparatively small prices, after which a bid came of 400 gs. from Mr. Withers, for a bay colt by Marsyas; a bay colt, by Breadalbane, became Mr. Weatherby's at 540 gs.; a chestnut colt, by Saunterer, was sold for 500 gs. to Lord Pallant; a bay yearling colt, by St. Alban's, for 750 gs. to Mr. Whitburn; and a bay yearling colt, by 600 gs., Mr. T. Brown; do., by Macaroni, 1650 gs. Mr. M. Dawson; do., by Marsyas, 500 gs. Mr. J. Dawson; bay colt, by Saunterer, 1150 gs., Mr. M. Dawson; bay colt, by Blair Athol, 600 gs. Mr. Withers; do., by Knowsley, 1000 gs., Mr. M. Dawson; and many other excellent prices were given. The day was most unfavourable, rain falling steadily during the sale, but it was not considered that a guinea less was given for any animal on that account. The result of the sale was considered highly satisfactory.

POULTRY.

THE following remarks upon fowls are abridged from the new edition of "Stephens' Book of the Farm," just published. The figures are in all probability trustworthy, but it is to be regretted that, in writing them a pulse in his valuable work, Mr. Stephens has not made us acquainted with the names of the authority—Pullets hatched about March or April should begin to lay about the beginning of November, and will lay on an average at least four eggs per week from that time to the moulting season the following year. Supposing the hens to stop in the moult six weeks—most good hens will get over it in a month—

and begin to lay again in November, I calculate they will lay on an average about five eggs a week each for about four weeks, and from this time during eight weeks about four eggs per week each, which would bring us well into the winter quarter. For 12 weeks in spring five eggs per week may be looked for, and during summer, for 22 weeks until the moulting season again, six eggs per week. This authority counts 214 eggs per annum as a fair average between pullets and hens, a number far in excess of the 150 eggs said to be the number laid by a hen during the year, in our impression of last week.

THE GARDEN OF THE FARM.—VI.

[We do not reproduce all the drawings with which Mr. Fish has supplied us. His descriptions will, however, supply to a great extent the omission.]

1. TAKE first a small garden, containing altogether a little over a quarter of an acre. The farm consists of 150 acres, entirely arable, with the exception of a small meadow, or sort of airing ground for a couple of cows. The land presses all round upon the houses, the farm buildings lying in a hollow to the south-west of this; the kitchen garden, divided into three compartments by walks, is at the back of the house, and in front of it is a simple, unpretending flower garden, consisting of five or six flower beds on the turf. The centre circle may either be introduced or dispensed with according as clear space there is desired or not. The lawn is bounded by a thick hedge, running along from the kitchen garden to the farm buildings, the kitchen garden in this case being bounded with a common hedge. Inside the lawn hedge a few shrubs are planted, a mixture of Laurels, Hollies, Roses, mock Oranges, Sweetbriar, and Lilac. At the north-west corner of the field, abutting the lawn, some large trees are shown, which shut out the prevailing wind. A few more fruit or forest trees would be an improvement in the cow meadow. Or a similar effect would be produced by the use of circles only. In employing circles to produce an irregular effect, it is important that no two should be of the same area. This irregularity of size in regular figures produces a familiar and a more pleasing effect than the use of the most out-of-the-way shapes. Circular figures are always pleasing, complete in themselves, and ready to fraternise with almost any other form. Ellipses or ovals are nearly equally effective, though not so satisfactory. They are, however, well adapted for furnishing small lawns of this character.

2. Here is a small garden upon quite a different plan, and in it the flower garden and lawn are the chief points. This is a farm of about 300 acres. On three sides the lawn is surrounded with a wire fence placed in a sloping ditch a yard deep, so that the eye looks away over or through the flower garden, and fills itself with far-reaching breaths of green fields. In the upper corner of the lawn a quadrant-shaped summerhouse is placed. This is the highest part of the garden, and commands the whole garden and a large track of rich country beyond. The kitchen garden is narrow and small, and in one corner near the farm are placed a block of pits to propagate and raise (from seeds) plants for the flower garden. In all cases I would recommend that pits or frames used for growing Cucumbers or any other produce, be placed near, or actually within, the farmyard. The manure is then at hand, and it cannot then be blown, as it often is, all over the garden. Every plan, given in this work, is observed that the kitchen garden abuts against the farm buildings, and that there is communication from one to the other. This arrangement lessens labour very much, and promotes cleanliness still more; while, as we have already seen, it may win over the farmer, by familiarising his mind with objects and pursuits that no degree of familiarity can ever make contemptible.

3. Yet another garden of quite a different sort to either of the preceding. It is about three-quarters of an acre in extent, and belongs to a dairy farm of about 800 acres. The whole of the home premises are enclosed with strong iron hurdles or wire fencing, and a river forms great part of the boundary. The garden is a small, but an object of great beauty from the house and grounds. The form of the ground, a long square, suggests the style of garden here. Curved lines relieve by their flowing gracefulness the stiffness of straight walls. One great merit of such gardens is that their form pleases us even when the beds, as they are called, are unfurnished. This is a most important merit in any garden, but especially of those that are not to be looked at. Few things can be more uninteresting in winter than many a piece of ground called a flower garden—lumps of grass of no particular shape, variegated with uglier blocks, or huge straight borders of bare earth; but curves and sweeps of turf, intertwined with regularly formed systematically disposed flower-beds or borders, lighten up its dead weight, and chase away its monotonous tameness like a gleam of sunshine thrown athwart a dark thunderous sky. In such gardens these the pleasant light abides. Semicircles in these plans would form a complete garden, and few designs could be more charming for very small areas. Three would be still more effective than two, and beyond that neither good taste nor congruity urge us. Beyond this each could determine for himself, in

accordance with his taste, space, and means. In this case all three are assumed to be good and sufficient, and hence the figure is considerably extended. A glass-house is placed near the farm, to provide plants for furnishing the flower garden. More ground could be spared here for flowers, as groups of fruit trees are planted in the meadow in front of the house; and if these do not yield a sufficient supply of fruit, a wire espalier, about a yard high, or a single wire at top and bottom covered with a rabbit-proof netting, could be carried all round within about a yard of the high cattle or sheep fence, and covered with fruit trees. This ought not to be necessary if the fruit trees were planted near well. The gravel walk is carried all round the kitchen garden against the boundary. The flower garden is assumed to be on grass, though such designs look charming on gravel. But then they are much more expensive in the making and keeping, as the centre beds must be edged all round with Box, Thrift, or some living boundary; or one of tile, stone, iron, or something durable. Each side of the curves must be edged, and also a straight line a certain distance from each side and ends. There good gravel is clean, and expensive no great object, such a flower garden on bright gravel is a very refreshing change, especially in grazing districts—ever clad in the most verdant green.

This chapter on form can hardly be complete without a few hints concerning the mode of getting these plans drawn upon paper. Any one can do it, and a kitchen garden, but many farmers would shrink from attempting to put down the flower-beds. Well, the start is alike in both cases, and is almost identical with that of staking out stretches for the plough. The basis of all flower gardens, however intricate they may appear, is a series of straight lines, intersected at various points by other straight lines intersecting them at right angles. First, determine the length and the breadth of your desired flower-bed, or garden, then run straight lines around its sides and corners. It is well to determine the matter on paper first; put the piece of ground on paper, allowing any number of feet to an inch, according to the size of the paper, facility of making the plans, &c. Eight feet to an inch is a convenient scale, as common foot-rules are thus divided, and nearly all plans are easier managed by beginning on a large scale. Whatever proportion is adopted must be carried throughout the whole. I had intended making my plan on a scale of 20 feet to an inch, but found it difficult to exhibit the flower garden designs on such a small scale, and therefore ignored the scale altogether. The consequence is, that the flower gardens occupy much more apparent space than they will real areas. They look larger on paper than they will prove on the ground.

As in the purchasing of new seeds, or the introduction of unknown breeds, your histories, pedigrees, and hints on culture and management are freely given, so, having offered these samples of desirable forms of gardens, I have thought it well to give these few hints concerning the means of getting them fairly launched into farm gardens. Where new gardens are to be made, or old ones to be remodelled, advice on such matters can generally be had easily from the landlord's gardener, or the most experienced gardener on the estate, and a helping hand to improve the farm gardens on the estate; and a good many farmers' wives are competent, not only to lay down such simple plans as these but likewise to improve them, or originate better ones. I have known some with the most cultured taste, they only lacked scope for its exercise; and I trust these examples of the size and form of farm gardens may at least provide ground enough around every farmhouse for the further development of gardening taste in those who possess it, and its origination in those who have none. In all such matters one good example is more potent than a thousand logical or good reasons. There is no danger of the pursuit of gardening making farmers effeminate, either in mind or body. Agriculture will lose none of its power or profit though every farmhouse be framed round with beauty and draped with sweet flowers. Does good husbandry cost nothing? On the contrary, it may cost much. Unless, for instance, a farmer or his wife, or both, delight in being their own gardener, a wall garden and a well furnished pleasure-ground of an acre will absorb most of the labour of a handy man. But what then? We assess the value of other investments, not by the amount we put in, but the revenue we draw out of them. Let gardening be judged in the same way, and you can estimate its value in the same way. A compound interest for our capital, and our returns flow in to us in two great streams—health and happiness. Fresh vegetables, good fruit, all the year round, are the very best possible health preservers to the entire household. Most of us, unfortunately, can estimate the value of health by its occasional loss. But who can measure the worth of that happiness which gardens pour without stint into the homes of the sons of their possessors? As we try to weigh the worth of a lower's sigh—that may have had potency enough to unite two lives into one—in a tradesman's balance, as to measure by a money standard those pure delights and ennobling pleasures that flow forth naturally from the pursuit of gardening. And the best of it is, that while on the farm only one or at most two crops can

be reached within the year, from the garden a rich harvest of joy and gladness may be gathered and carried to the home and heart every day in the year.
D. T. Fish, F.R.H.S.

INTERNATIONAL EXHIBITION.

Sheep Washing, Sheep Shearing, and Horse Clipping.—Messrs. Gwynne & Co., Engineers, Essex Street Works, Thames Embankment, London, W.C., exhibit (No. 6241 in the catalogue) a sheep washing apparatus, fig. 162; an American sheep-shearer, fig. 163; and an American horse-clipper, fig. 164. Only part of the former—the sheep washing apparatus and machinery—

is shown, viz., a single final washing cage, of which O, H, V is a side view, and U H a section, the latter showing a sheep inside the washing cage, but the plan view shows six washing cages, with the engine, pumps, and other apparatus in use in Australia. We shall first notice the objections to the old system, next describe the Australian practice as illustrated, following up our report on sheep shearing with notes of horse clipping.

In Australia the fleece of the sheep is liable to get very dirty from a fine sand and dust drifting into it. When exported to this country, as the bulk of it is, imperfectly washed, the wool realises from 4s. to 6s. less money per pound than well washed, clean wool. The reader will, therefore, readily understand the advantage a flockmaster, clipping from 10,000 to 100,000 sheep, will gain by having his sheep properly washed.

This, however, only shows part of the Australian shepherd's difficulty, for water in most sheepwalks is scarce—only to be found, at the washing season, in deep "creeks," gullies, and rivers; so that sheep washing, as performed in England and Scotland, is seldom practicable, and even in localities where it is, the English practice is too slow for the large flocks of our Australian colonies, granting that there was a command of labour to do the work on the English plan, which there is not. More need not be said in detail to illustrate the twofold position of our colonies in the Southern Hemisphere; and as the mother country is every day approaching nearer and nearer the exigencies of her colonies as regards the command and expense of labour—the importance of sheep washing by steam machinery, so as to economise labour, and do the work of washing better and with much less harm to sheep, comes home to every British flockmaster with telling efficacy. The fact, too, must not be concealed, that sheep washing in this country is, it must be confessed, rather a barbarous practice than otherwise. Three plans are in operation, and may be described in few words as follows. We shall take the more primitive practice first—that which is still in use in most of the Highland and hilly districts—viz., swimming the sheep across a pool in a river so many times until they are clean. No doubt the poet Dyer said not a little in favour of this time-honoured practice when he sang—

"Gay shearing time approaches. First, however,
Drive to the double fold, upon the brim
Of a clear river; gently drive the flock,
And plunge them one by one into the flood."

The second is to make a dam in a river; sink two or

more casks, in which the washers stand. The sheep, after they are dipped in a large tub, purposely to soak and loosen the dirt, are passed one by one from washer to washer, who handle them roughly, and then swim them out at the other side. The third plan is similar in principle, i.e., the sheep are one by one dipped in a tub to loosen the dirt, and then in a second tub, as it may be called, of larger dimensions, built of stone or brick, so that the washers can stand outside. The sheep are handled more rudely and objectionably than on the second plan, but with this advantage, that clean water is poured on the sheep's back. The practical reader will readily be able to contrast the flow of clean water on the back

swimmings of the first, and it is objectionable, especially when the washers lose their temper, or get the worse for drink, as they too commonly do. The third involves a greater amount of objectionable handling than the second, only when water is scarce, as it is in many places at the washing season, less water will serve; but putting the sheep's back under the spout does not wash the sides and belly, so that to make clean work you have to raise and lower the sheep in the water to get rid of the dirt.

The Australian practice, as represented by fig. 162, consists of two shower baths; the first for soaking the wool and the last for giving it a final cleansing, and two swimming baths, and both are so divided that only one sheep can pass along at a time, so that they follow each other as geese fly. The sheep are led on by decoy sheep, trained for the purpose, similar to training a decoy sheep to lead strange sheep on board a steamboat. And, as in the latter case, so in the former, the decoy sheep delights to lead its followers onwards through the narrow passages. K is a portable engine, which drives two centrifugal pumps, M N, for pumping the water out of the creek or river, P being the pipe for supplying water to the soaking shower bath, B, B, B, or "raining yard," as it is termed, and O, the pipe that supplies the six purifying cage shower baths on the other side; T and F are the swimming baths, fed by the tepid water tank, D, supplied with hot water from the engine, by the pipe, L, and with cold water from a branch pipe off P; C, is a resting yard, in which the sheep remain until the dirt in their wool becomes soft; and G, G, are resting yards, in which the sheep drip before they are directed and slung in through the cage baths, which we shall describe separately; Q and R show the drainage, the dirty water passing into the river below the pumps; I is an auxiliary pump. The unwashed sheep penned at A, pass in through the raining yard, B, B, B, into C. The engraving shows four perforated pipes showering rain on their backs. From C they follow the decoy sheep into T, from which they pass by narrow ways, not shown in the plan, into E; F shows two swimming baths, T only one, but the numbers should be equal, and any number may be constructed. From F they pass into G, and on through the cage baths—without a hand being put upon a sheep, save the decoy

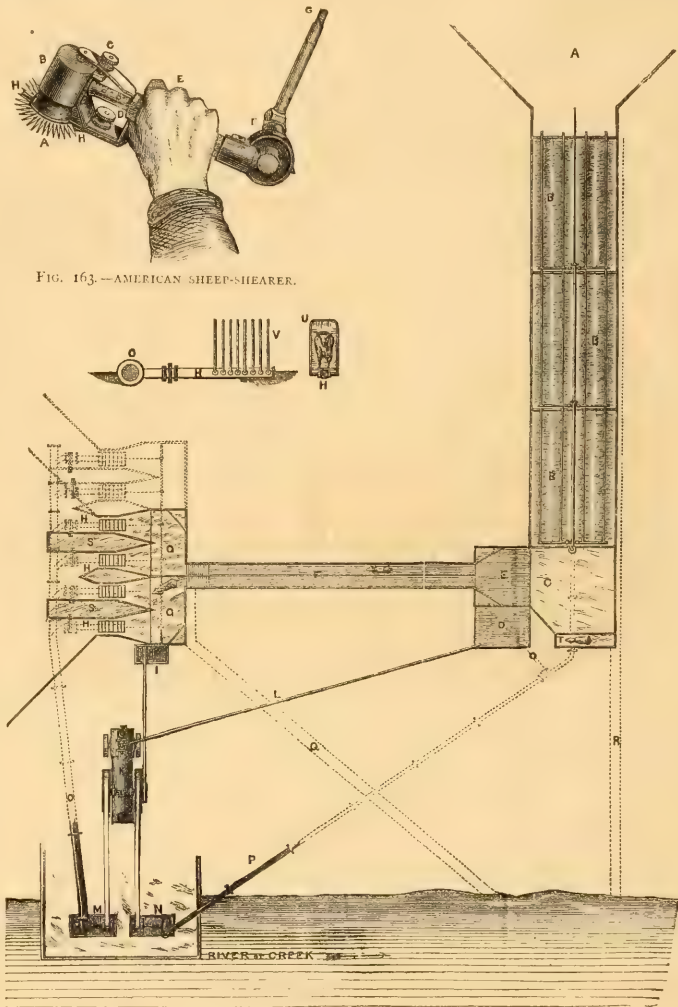


FIG. 162.—PLAN OF SHEEP-WASHING APPARATUS.

only of the third plan with the short single swim of the second, and the swimming across and across the clean pool of a mountain stream without putting a hand upon the flock until the fleece is clean. There is some art in swimming the sheep across the pool, so as first to loosen the dirt and then wash it out of the wool. Those who have seen the dirty water behind the swimming sheep becoming less and less dirty, until finally the river remains clean, will readily understand that giving velocity to the water is tantamount to the velocity of the sheep in swimming. It is necessary to understand this in order to distinguish between the merits of the three plans. We have had no little experience of each plan, and give an opinion in favour of the first, in which a hand is not put upon the sheep. The sheep, one after the other, jump in between the shepherds as fast as allowed, plunging into the pool—old sheep taking the lead. The rubbing and rough handling of the second plan is substituted for the several cross-

ones, when they prove refractory. O, H, V shows a longitudinal section of one cage bath, taken at H on the plan, and U H is a transverse section. The sheep as it passes through the cage is surrounded by a number of tubes perforated inside, which shower water on its back and sides with a velocity equivalent to a head pressure of about 10 feet or so. The sheep walks in upon a wooden platform, and H, on the transverse section, shows a pipe which showers up water on the sheep's belly, so that the fleece is equally washed all round. The platform of the cage shown in the Exhibition for single sheep washing is swung on four pendant bars, and has an oscillating motion lengthways, backwards and forwards, purposely to throw the water more effectually into the wool. It has two doors, one at each end, for letting the sheep in and out. The opening of the front door shuts off the water, and closing it turns it on. Prior to passing through the cage the sheep has to be dipped according

to this single cage plan in the usual way, to soak and loosen the dirt. The length of time will depend upon the state of the wool, but a 60-sheep pen per minute may be given as an average. In Australia they pass them through the several processes faster than this.

Fig. 163 shows the head of a sheep-shearing machine which cuts on the principle of a rotary mowing machine; A is a circular stationary comb or finger-bar; H H are two blades or knives to which a rapid rotary motion is given by the covered mitre wheel B, and which under ordinary driving make about 2500 cuts per minute. C is a regulating set screw for pressing the knives to the comb plate. D is another for holding the working parts firm to the stationary, and for removing the cutters to be sharpened. E shows the operator's hand. F another covered mitre wheel, the bevil gear acting as an elbow joint; and G is a part of the spindle that balances by a weighted lever, as in the horse clipper, so that it has no weight, and can be worked over convex and concave surfaces with far greater ease than the common sheep-shears; and as it cuts clean and even there will be a considerable weight of wool in its favour, now wasted by being left on the sheep's back, owing to the nature of the shear cut, however narrow it may be. The machine has not yet been sufficiently tried to speak of its practical merits; but if it proves as successful as the horse clipper it will be a boon to the large flockmasters of Australia, where troops of 40 to 100 professional clippers ride from flock to flock, demanding their own terms, and leaving much wool uncut. A single machine may be worked by a boy, or a number of machines by a line-shaft, actuated by a steam engine. Thus, if the axis of the upper pulley in the hand machine shown in the Exhibition of fig. 164, be taken as the line shaft, the required number of pulleys, each with a weighted lever, may be fixed on that shaft, placed right and left, so as to accommodate as many clippers as can work below.

The working of the horse-clipper will readily be understood from fig. 164, along with what has been said of fig. 163. On the end of the weighted lever, opposite the ball, is a covered wheel for transmitting motion down to the cutter by the spindle C, and which also acts as an elbow joint. A man, with the assistance of a boy, will clip six horses for one he can do with the common shears, making better work, and with more ease to himself and horse, so that for large studs and professional horse-clippers the machine commends itself. W. B.

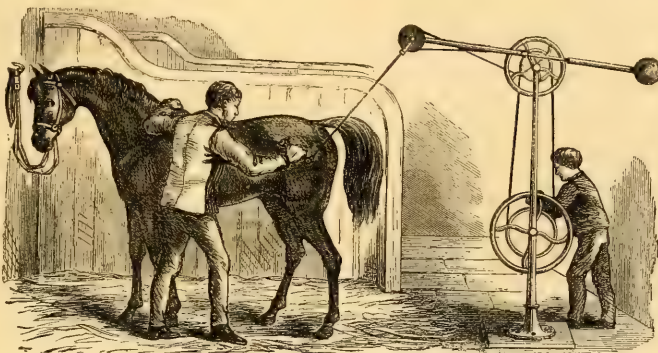


FIG. 164.—AMERICAN HORSE-CLIPPER.

desirable, to form another benefit society. I might have mentioned this subject at our annual gathering,—which I hope will still continue, our harvest home,—but it is a matter of business, and I don't think a matter of business is well considered or properly weighed after a good dinner. I don't think that figures go very well down with beef and plum pudding. I think upon those occasions, you prefer people to speak to you generally, of what is going on in the neighbourhood, but not particularly upon one subject, and therefore I have asked you to come down to-night, that we may have a little real business talk. My intention is not to use unnecessary words, but to try and explain to you as nearly as I possibly can the object I have in view in establishing another benefit society. The first thing I have to show you is this—I have to show, if I am able, the necessity for establishing another benefit society; and when I have shown you that, then to show you the means which I think will best promote it. I take it that all over England, at this very moment, the one thought amongst those who think at all is, what is to be done with the vast amount of unemployed labour in the large towns. People do not know how to deal with pauperism in those great towns; and it will continue until some means shall be devised to employ the labour which is now unemployed, and to make it productive. The stream of labour will continue to flow into the towns. As the poet says:—

"Men may come, and men may go;
But I flow on for ever."

Yes, like a great river, that stream will go on flowing into the towns where it is necessary it should be employed. But, my friends, I want to bring you nearer home. We must look to see whether for this great evil

Oakley, and Denham. I will mention one parish, Hoxney, to illustrate what I have said more precisely. In 1850, the population of Hoxney was 1262, but now it is about 1090; so that there are 172 less people in the parish of Hoxney at this date than in 1850. But what are the rates—what is the amount paid for the maintenance of the poor? In 1850, it was £567; in 1871, it was £787, that is to say, in the parish of Hoxney, the rates are now paid to the amount of £220 more than when there were 172 less people in the parish. Now, there is something radically wrong in this. Is it that you have less work? No. I used to be a very constant attendant at the Poor-law Board in 1850, and knew how you were all employed. At that time there were numbers of people standing idling in the streets wanting employment, and as a large employer of labour myself, as well as my father, I know that at that time we had 20 or 30 applicants for work every week—a state of things which does not exist now—so that the labourers were much less employed then than now. Then, have you been improvident? No. Since I can recollect, and even within 20 years, a vast number of benefit clubs have arisen amongst you. Some of them, no doubt, have failed from being on a rotten foundation, and others have sprung up of a better kind, so that there is evidence, as far as I can see, that you have done what you can to mitigate this great evil—but you have not mitigated it. Therefore, the fault has been his intention on the part of you all; you have desired to do your fair share in the reduction of the evil of pauperism, yet it stands where it was, and we have to pay heavier rates than we paid before. Now, I think, in the first instance, there is an evil in the management of the poor-rate itself. Now, in any thing that I am about to say to you on the administration of the poor-rates or the officials, I must guard myself against making any personal remark whatever. Those who have the administration of the Poor-law in the Hartismere and in the Hoxney Unions are especially men of the highest personal character. And I must also speak in the same terms of the medical men, the most underpaid of all the servants connected with the administration of the Poor-law. The relieving officers, Mr. Hart, of this district, and Mr. Thurston for Hoxney, are men who, if I had to pick men for the purpose, I don't know how to pick better. They are good, con-

scientious, and patriotic men, desirous of doing all that is right and fair to you. But I think the system which administers through officials that which really ought to be the genuine effort of the ratepayers themselves—that is in itself wrong. Now, I want to show you, labourers, how intimately you are connected with this. You who receive relief as paupers may make no attempt to assist yourselves or to lessen the poor-rate. You may look upon the Poor-law only as a means by which you obtain relief; but the vast majority of you, I know, look upon it in the same way as I do myself. You are as large ratepayers, in proportion, as I am. Take your cottages of £3 average rent—as to my own cottages, which let at an average of £3 10s., I pay the rates—but I will take the rates upon a £4 cottage in Eye as an example. The rates, paid by myself, are annually 5s.; annually, if they were paid by you, without commutation, they would amount to 7s. annually; so that for these cottages in this town, as well as in the neighbouring parishes, you, my friends, who perhaps may be on the pauper list, have to contribute your share, and therefore I tell you that it is to your interest to diminish that 5s. which I have put for argument sake, as it is for me to diminish my £5. It is for this reason that I want particularly to press upon you that we have all one interest in the matter of reducing the amount of money paid through the poor-rate—and not only, my friends, in the interest of economy, but also in the interest of independence. My great aim, and what I have come down here to-night for, is not only to see how money may be saved, but also how you, my friends, may, from this time, be more independent than you are now. When a person finds fault with the existing system, I think he is bound, at the same time, to proclaim a remedy. I think as far as regards the Poor-law administration, the plan I would recommend is founded on sound common sense, and it has been, as I will show you from two or three instances, most successfully worked. I have said that the fault of the Poor-law administration is, that it is an administration through officials, and I have guarded myself particularly in that in telling you that the officials with

of pauperism—which exists all over England—there are not some means of allaying it within our own neighbourhood, whether there are not some means for us who are in the habit of saying "These rates are growing, we must get some one to pay them," to reduce them ourselves. We are sometimes looking out too much like young thrushes with our mouths open, waiting till somebody comes to put something into them, but as in the case of the thrush when the mother is dead no one comes, and the thrush dies, so shall we find we have nothing if we expect others to help us. Don't let us wait for some to come to pay the rates for us, but let us see what this evil is around us. In this county, you will hardly believe it, but it is a fact, and it may be proved, that the sum of £140,000 is annually paid for the relief of the poor. That money is paid merely to keep body and soul together, not to get employment for labour, not to create that which reproduces itself, but merely to keep body and soul together.

Let us come nearer home. In the Hartismere Union, in which I am now speaking, in the year 1850, the cost was £3493 for the general purposes of the Poor-law. In 1870 we were paying £3563, or £70 more than we did 20 years ago. Well, the remarkable part of this statement is to come. In this 20 years we have reduced the population by two thousand and odd people. We have increased the natural population—or our population has increased in the same ratio as in other places, that is to say, by 2444, but that 2444 have thought it best to go to places where they may get more money for their labour. Here we are then; in these 20 years we have lost 2000 in this union, and we pay £70 more for our rates. Now there must be something wrong in this. There must be either some want of care in the administration of the Poor-law or some want of prudence and foresight in yourselves: it will be for us now to consider which of the two is the true reason, or whether either of them taken alone would, if removed, be sufficient to mitigate this evil. There are five parishes here—Eye, Brome, Hoxney,

is wrong which administers through officials that which really ought to be the genuine effort of the ratepayers themselves—that is in itself wrong. Now, I want to show you, labourers, how intimately you are connected with this. You who receive relief as paupers may make no attempt to assist yourselves or to lessen the poor-rate. You may look upon the Poor-law only as a means by which you obtain relief; but the vast majority of you, I know, look upon it in the same way as I do myself. You are as large ratepayers, in proportion, as I am. Take your cottages of £3 average rent—as to my own cottages, which let at an average of £3 10s., I pay the rates—but I will take the rates upon a £4 cottage in Eye as an example. The rates, paid by myself, are annually 5s.; annually, if they were paid by you, without commutation, they would amount to 7s. annually; so that for these cottages in this town, as well as in the neighbouring parishes, you, my friends, who perhaps may be on the pauper list, have to contribute your share, and therefore I tell you that it is to your interest to diminish that 5s. which I have put for argument sake, as it is for me to diminish my £5. It is for this reason that I want particularly to press upon you that we have all one interest in the matter of reducing the amount of money paid through the poor-rate—and not only, my friends, in the interest of economy, but also in the interest of independence. My great aim, and what I have come down here to-night for, is not only to see how money may be saved, but also how you, my friends, may, from this time, be more independent than you are now. When a person finds fault with the existing system, I think he is bound, at the same time, to proclaim a remedy. I think as far as regards the Poor-law administration, the plan I would recommend is founded on sound common sense, and it has been, as I will show you from two or three instances, most successfully worked. I have said that the fault of the Poor-law administration is, that it is an administration through officials, and I have guarded myself particularly in that in telling you that the officials with

SIR EDWARD KERRISON'S BENEVOLENT SOCIETY.

WE take from the Ipswich Journal the following report of an address by Sir E. Kerrison, Bart., at a meeting held recently at Eye, when a Benevolent Society was inaugurated, of which the following are the objects:—

"The objects sought to be obtained by the founder of this Benevolent Society are:—

"1. To encourage the sons of labourers to form habits of thriftiness at an early age by enabling them to insure a sum of money for their first start in life by small quarterly payments.

"2. To supply a great need, which benefit societies have failed satisfactorily to secure, viz., a provision for men of 60 for the rest of their lives.

"Agricultural labourers as a class, have, by experience, been found unable to provide the annual sum necessary to secure an annuity at 60; thus honest, hardworking labourers, after years of toil, are often reduced to extreme poverty.

"Under the arrangements set forth in the following rules, these difficulties are obviated, and an allowance after 60 can be secured by a small quarterly payment, within the means of any labourer in the parishes of Eye, Hoxney, Brome, Oakley, and Denham.

"The society also becomes a kind of savings' bank, for in the event of the death of a member before he has received the benefits of his membership, or under any extraordinary circumstances in his lifetime, the money subscribed by him, with an addition (made at the option of the committee), will in all cases be returned."

Sir Edward Kerrison, in addressing the assembly, before reading the rules, said:—My friend, I have come here for the purpose which is stated on the bill which has been sent to the different parishes—to consult with you as to whether it is desirable, or not

whom I am acquainted are all of them men of high character, who, to the best of their ability, carry out the Poor-law Act. I ask you what one man—however clever, however good, however full of sympathy and kindness he may be—how is that one man to represent the wants and requirements of ten thousand people which is about the number that such relieving officers have to attend to—the Board of Guardians? What is the course pursued at the Board of Guardians? Some of the guardians are present and some are absent; but even if they are present, how much do they usually know of the wants of the people applying for relief? The opinion of the relieving officer is usually taken, and perhaps he may know, or he may have known a week before, about the people applying for relief. But there are circumstances in the lives of poor men which require constant looking into. What do you do yourselves? You have Friendly and Benefit Societies, and by which you pay 10s., or more or less, to your sick members. Do you rely upon officials and upon official returns? No, you send people to ask about the condition of those who are in receipt of your money. All I say is, carry this practice into the Poor-law work, and if you do you will diminish the rates and increase the comforts of the working man. I say, if you could get into every town and every village six or eight relieving officers, and in every 300 of the population, who would represent to the guardians on Board days their opinions, and communicate their knowledge of the cases before the Board, you would then be in a position to relieve the deserving poor, and you would be preventing that which it is your interest to prevent—that those who call upon the rates as a refuge for their own idleness and laziness should be enabled to impose upon the rates.

I will give you an example of what I mean. In a parish in which a well-known divine, Dr. Chalmers, lived, in Scotland—not under the Poor-law under which we now are acting—Dr. Chalmers found the parish full of paupers, he found the rates very high, and he found, as far as I recollect, that the rates had risen as high as £1400 a-year. In four years he had reduced the amount of the rates in that parish, by the system he lay viz., to £100. Now, the number of paupers, he began with 1400 paupers in 1000 inhabitants, and at the end he had reduced the number to 38 in 1000. That will show what individual exertion, and what unpaid people and those who are interested in the welfare of the poor can do, if they put their shoulders to the wheel. I will give another instance of a town abroad where in a population of 55,000, the numbers were reduced between the years 1852 and 1857 from 4000 to 1400. Now in giving these instances, I don't say these things are to be done in a minute. I don't say that they are to be done at all without exertion, but I do say that, before people come to you saying, "these taxes begin to eat us up," let them set an example at home—as I am willing to set the example of working with all classes, not only my own, but with the farmers and the labourers—and report to the Board of Guardians what they can do, which may be deserving their support. Now, my friends, there may be another reason why the rates have risen to a considerable extent, and that is, that while a number of people have left this neighbourhood, it is the younger men who have so left, and they have left behind the old people—those who are sickly and not able to go away, and consequently they have remained with us; they have been more frequently in need of assistance, and necessarily they have needed a heavier charge upon the rates. Now, the question is, there is no more of relieving such people? I have watched with the greatest possible interest all your exertions on behalf of your friendly societies. I am not godfather to them all, only to one, the "Hartismere Friendly Society," established 15 years ago, and I can tell you, for your satisfaction, that we have plenty of money; but they only touch sickness. You have got the Heart in Hand, the Foresters, the Manchester Unity, the Odd Fellows, and lots of other clubs, some of which are not sink in the crisis; but where these clubs have usually failed, is in the enormous amount of money they pay for supervision. I have seen as much as 13s. paid for managing the disbursement of every 20s., and one society paid as much as 20s. for the management of £1. Now, my friends, you pay about 25s. a-year, upon an average, to secure you 6s. or 10s. a-year in sickness, with something at death. Well, taking also into consideration 10s. or 3s. that the wife pays for the clothing club, and the pence for the schooling of the children, it seems to me that you have almost reached the amount that your weekly wages can bear. That is why I have come here to-night. When I find the Mayor of Blackburn saying, in 1859, of the cotton operatives, that he believed every man, woman, and child earning 10s. 6d. per head, per week, ought to be able to maintain themselves, not only in sickness, but in old age, without the assistance from anybody, it is singularly to the credit of the agricultural community that in their large towns the rate of deposit in Savings Banks for the future good of the depositor is exactly equal to theirs. I will give you a few instances of this. In Wallingford, Cirencester, Gloucester, Hereford, and Leominster, towns with an average of 20,000 inhabitants each, and agricultural towns, the average amount of the money laid up by the poor was £27 per head, and one in eleven of

the population contributed. In Manchester, Stockport, Salford, Oldham, and Warrington, towns with an average of 105,000 inhabitants, the deposits were exactly the same, only £27 each, or the same as in the agricultural districts. That fact is wonderfully to the credit of the agricultural community. In Bradford the number of depositors was only 10,000 in 1844, in comparison with the ordinary number of depositors in the agricultural districts, one in 12. But people who have worked hard in the agricultural districts to raise money for yourselves in sickness, I cannot see where the money is to come from for old age. If you want to be independent and to feel dependent on no one but yourselves as you grow old, you must lay up some provision for old age. It is pitiable for me who live amongst you to see men, whom I have known all their lives never to have lost a day's work when they could do it, who have contributed to their clubs, who have filled the position of father to their children in an exemplary way, to see such men reduced to what? Reduced either to break stones on the road, when they could do it, or to the pittance of the Poor-law Board of 2s. 6d. a-week. Well, may people in this neighbourhood try to see if they can do better by going elsewhere, try to see if they can make more wages by removing; I say that I don't wonder at it, but I want to tell you here, my friends, I don't want to lose you. I should not like to see you go to-night if I did. I want to see the real, legitimate amount of labour that the neighbourhood is capable of carrying remain in it, and not only to remain but remain in a contented position.

Having said so much I will proceed at once to show you what my views are, and how they may be best carried out. I shall ask no opinion of you to-night; I shall hurry no one, but I shall merely read the rules for your consideration. After I read them I shall be good enough to place in your hands printed copies, and then you will be able to ask of your friends whether what I advance is not for your interest.

Sir Edward then read the first of the objects of the Society as set forth in his preface, and said he had confined the operations of the Society to the five parishes, namely, Hartismere, Kettlewell, and his own parish, &c. But he must distinctly say that he felt precisely as much bound to any other parish in which he had property as to those five parishes. He should ask the owners in other parishes, where his interest was not so large, to ask the same question of themselves, and to do so. His object was not to interfere with the other benefit societies, but merely to supplement them, and in fixing the contribution at 5s. a-year, he wished them to remember that they now paid that in rates to keep people who were not able to keep themselves. As to the annuity at 60 years of age, no other body that he was aware of gave annuities at such a low rate, and the members who died before that age could have money drawn out for their friends. Mr. Francis Woolnough was the secretary; because he was a poor man, in that neighbourhood, and known about Friendly societies. He had appointed himself President, and in the event of his death he had asked his nephew, Lord Henniker, who was equally interested with himself in the welfare of the poor, to succeed him. Further than that he had not returned to the actuary, but had asked his calculations to be for them to form a committee, and there would be no one else but the members and himself, and if they thought fit to out-vote their President they could always do it. The result of their joining would be, to those who joined at 25 or 35 years of age, an annuity of 10s. a-month at 60 years of age. That was not much, but when they came to think that an aged couple received but 2s. 6d. from the Board of Guardians, they would see that 2s. 10d. would do much to assist them in their old age. The object of the Society was to assist the young married life was to give the younger portion of the labourers to embark in the society at once. In order to increase the amount which they received, he was willing to invest £1000. That would be the means of adding 4s. to the 5s. a-year that the members would pay, and they had no return for it to the actuary, but had their calculations in the simplest possible way on the Government tables. The Hon. Baronet also suggested that they might have a feast once a-year, as any other society had, and begged of those present to examine the scheme and see if it was not worth adopting. At the end of a month they might apply to Mr. Woolnough, and he (Sir Edward) would also try to meet them and set to work to form the society. All he could say was that he had but one object, and that was to raise the labourers socially in that way. If he had a long time to spare, he would say that it mattered not at all, if he could be thinking and believing he had done something to relieve and aid the poor in that neighbourhood.

Copies of the rules were then distributed by Mr. Woolnough, and we understood that it was the intention of that gentleman to visit each of the parishes and ascertain the wishes and opinions of the labourers as to the proposal. There is no doubt that the society will be formed in a short time.

WRITERS ON THE DISEASES OF ANIMALS.

Not long ago it was stated, in a review in the columns of the *North British Agriculturist*, that for some years past veterinary essayists and lecturers in this country had found an inexhaustible store of fresh facts and ideas in Professor Gamgee's writings. It was, moreover, asserted that, unlike accomplished medical writers, those who used Professor Gamgee's material seemed to find the grateful task of acknowledging

their master. I was greatly surprised at reading your notice on Professor McBride's lecture on cooked food, when I considered that the first statistics ever published, showing that of the horses used for agricultural purposes that die annually, nearly one-half die of intestinal diseases, and that by far the highest mortality was when the food was cooked, and that published by Professor Gamgee. In a lecture delivered by him on November 3, 1858, and which appears in the first volume of the "Veterinary Review" (1858–1859), I find the following—

"The number of horses in Scotland is 185,409, and the average annual loss on this number amounts to 4,755 per cent., or, in more telling expression, calculating every horse at the low value of £10, the loss in horses every year is at the very least £590,000. I am more especially referring to that which affects our farmers, the total mortality would raise this average to a more alarming number. I find that in some counties the mortality is greater than in others, and one part of a county is sometimes found more healthy than another. In some measure this must be ascribed to the nature of food and work. For instance, in Mid-Lothian the loss on farm-horses has been 4.6 per cent., but in some parts of the county it has been as high as 25 per cent., in others as low as 2.8 per cent. Taking different counties, such estimates may be found as a loss of 6.84 per cent. in the lower ward of Lanarkshire, and 12.5 per cent. in the eastern division of Renfrewshire. In the Case of Stirlingshire the loss is 8.507 per cent., and in several other counties the loss is reduced to 3½ to 3¾ per cent. It is very remarkable that many of our farmers, from the relative prevalence in different parts of colic or indigestion—that disease which last year was the cause of death, on an average, of 44 animals out of 100 that died—that disease which care in feeding and moderation in working would entirely prevent, and which judicious and rational treatment will almost invariably cure."

Again, at p. 48, of "Plain Rules for the Stable," published in 1866, Professor Gamgee says—

"All horses, whether in town or country, are injured by the boiled or steamed mashes of straw, corn, turnip, and barley, &c., with which they are extensively supplied in Scotland. The mortality from colic is always high where the boiled meat system is in vogue. Pulping roots has met with its strong advocates for horses used on the farm, and it is well known that the roots are the best food, 'the best, cheapest, and most healthy food horses can eat.' This may be the fact under extraordinary circumstances, but we condemn boiling, steaming, and pulping for general purposes, and when horses are required for hard and fast work. This is the only good reason for giving prepared food to some of the French and German horse-breeding establishments."

Since nearly all the veterinary lecturers appointed of late years, with the exception of those at the St. Pancras College, have been Mr. Gamgee's students, I presume Mr. McBride must be one, and he doubtless learned years ago in the lecture room that cooked stables are deadly to horses.

I am quite sure it would be hard to trace in any profession or in any country a more glaring instance of unrequited merit than there is furnished us by Professor Gamgee. He is, it is true, from his own energy and industry, well known, and he has shown us how can we expect men to devote themselves, as he has done, to the advancement of a much-neglected science without meeting with further reward than the consciousness of having done their duty?

Permit me to note a few of Mr. Gamgee's efforts, all of which bear a relation to the interests of general agriculture in a more or less degree. 1. He was the first to demonstrate the purely contagious character of epizootic diseases; and all the statements frequently made relating to the introduction of a disease into a country since our ports were opened to foreign cattle originated with him. Medical opinions on the subject of contagion have been vastly modified since Mr. Gamgee commenced and published the results of his labours. 2. He attacked the nefarious traffic in sick animals, and agitated for years against the sale of diseased and unwholesome meat as human food. 3. He was the first to break through a monopoly in veterinary teaching, establishing an extensive curriculum of veterinary studies, and for years he familiarised English readers with the researches published in foreign languages, and especially with the wide range of German veterinary literature. 4. He stamped out the small-pox in sheep in Wiltshire, and proved how wrong it was to inoculate in this disease. 5. He suggested and advocated the establishment of special markets for foreign stock and the systematic separation in trade of home and foreign animals. 6. He originated the International Veterinary Congresses, by summoning a meeting, which took place in Hamburg in 1863. 7. Professor Gamgee's labours in 1865, and succeeding years, in connection with the cattle plague are well known. We were compelled to follow his advice, and his only reward was the expenditure of some hundreds of pounds in the publication of the best book ever written on the subject of cattle plague. In Germany, and in Germany, and the country behaved badly to him during the time of the pestilence, and have not mended their ways since. 8. Of late years Mr. Gamgee has prosecuted with great assiduity the subject of meat preservation, with a view of putting an end to the importation of diseased cattle. But for the war his system, we are told, would have been in full play for some months past. 9. He has brought to light the properties of one of the most remarkable agents of the sick and antiseptics and disinfectants, which is being extensively used in medicine. It is doubtful

whether of late years more important agent than the chloride of aluminium, or, as it is popularly called, chloralum, has been introduced in the arts and therapeutics as a preservative of organic substances, and a destroyer of contagion. 10. Mr. Gamage's most recent success in the establishment of the "Milk Journal," in which all relating to the dairy is skilfully and learnedly handled, in which the cheese factory system is meeting with timely support, and in which his old and pet subject of exposing adulteration is being practically worked out.

Persons in Professor McBride's position should be able to write volumes in exposition of Professor Gamage's labours in the field of veterinary science, and they will know that his reward has been *nil*. We may well expect a man of Professor Gamage's parts to have inspired an untold amount of jealousy amongst those he has excelled, but the farmers and the public generally should look beyond; and let it not be a lasting blot on our day and generation that such untiring, painstaking, and disinterested labours as he has devoted to one of the important branches of agriculture shall pass unnoticed and unrequited. *A Practical Farmer.*

QUANTITY OF SEWAGE DELIVERED PER ACRE BY THE METROPOLIS SEWAGE COMPANY AT BARKING.

A WISE man has recorded his opinion that the beginning of strife is like the letting out of money. For the reason I said I was sorry for Mr. Morgan, the Secretary of the Sewage Company, had made an uncalculated attack upon me in your columns. The remarks that I made on his paper, at the Institution of Surveyors, were never, so far as I know, printed in any public journal, and therefore his public attack upon me in your columns was absolutely unjustifiable. However, although I dislike strife, I am always ready for it when it is forced upon me, and having already in 1864-5 defeated him in the same question, the great Baron Liebig himself in single combat, I am not afraid of the Secretary of the Sewage Company.

Mr. Morgan starts by asserting that I rely upon his ignorance in 1865 to justify my denial of his statements in 1871, instead of giving your readers "reasons" for disputing his figures. But far be it from me to deny, as an abstract proposition, that the pupil of 1865 may here become the master in 1871. Every day we see instances of men who shoot ahead of their master. Indeed in the ordinary course of Nature he must do so, except when the master is a man endowed with such powers of mind and body as enable him to work as hard at 70 as he did at 30. Still the pupil can only advance with the same slow and painful steps in solid work as his master, else his knowledge is but superficial and deceptive to himself as well as to others, and at such events I had many years' start of the gentleman whom I had the honour of proposing in 1865 as Secretary of the Sewage Company. Many persons might therefore be inclined to think that the *prima facie* evidence was in favour of my statements being more reliable than those of a gentleman who gave me such a long start in the race. However, I was under the impression that, in my letter published in your number of the 27th ult., I had really given "some reasons" for disputing the official figures of the Secretary of the Sewage Company. I have since read over your readers as well as Mr. Morgan have failed to take up my meaning, I will repeat my statements categorically:—

1. The Metropolis Sewage Company possess "absolutely no appliances for ascertaining or registering the total quantity of sewage delivered on to the Lodge Farm in a day, or a week, or a month, or a year; still less for subdividing such total quantity and apportioning it among the different areas and crops."

2. Mr. Hassard's statement about pumps is altogether illusory. As Mr. Morgan knows perfectly well, the pump was frequently out of order and quite unable to deliver anything like the theoretical quantity.

3. This as regards the total quantity which he and his directors profess to have used on the whole farm. What then are we to think of Mr. Morgan's apportionment to the individual areas and crops of this imaginary quantity—an apportionment which it amuses Mr. Morgan to work out into the third and fourth place of decimals!

Probably any one but Mr. Morgan would think these three statements in my previous letter sufficiently explicit, but as the question whether a man or a sheep is the more valuable stock to keep on a farm is really of such very great importance to the community at large, both urban and rural, perhaps I had better enlarge a little upon these three statements.

I have no doubt that Mr. Hassard is strictly correct in stating that, "during one of his visits" the quantity of sewage delivered on the farm agreed with the quantity that—in the ordinary course of the day—Nothing more likely; but when the packing of the pump wore out (as it was always doing), what then? When a cork got into the valve, holding it open, and allowing the sewage to run back, what then? or, in the case of a bit of stick, or accumulation of paper, or other matter, what then? Yet a tell-tale drop from the engine or pump was only means Mr. Morgan had of arriving at even approximations to the total quantities he was using, for occasional "gauging" in an irregular wooden trough are of course quite inadmissible when we are talking of decimals. In short,

Mr. Morgan's figures are altogether unreliable and imaginary, because they are nothing if not minutely accurate. Had he contented himself with round numbers I should probably not have disputed them, at all events they would have been more difficult to dispute, but he has given us exact figures, worked out into decimals, and this not merely for the total quantities delivered on the farm, but for the subdivisions for all the different crops, and therefore for each individual dressing; and he fondly believes, or at least he asks your readers to believe, that this Herculean task of calculating and recording these quantities was performed by his "friend Mr. Hebelor," single-handed, without mortal aid of any kind! Had Mr. Hebelor accomplished this he would have achieved more than the united efforts of the entire committee of the British Association were able to effect on my Romford farm, although we keep an assistant always on the spot; and, although the committee comprise some of the first hydraulic engineers of the day, such as Mr. Baily Denton (whose name is a household word to your readers), and some of the most eminent chemists, including the ex-president of the Chemical Society.

Mr. Morgan states that, by some unexplained process unknown to all the senior wranglers who ever took their degrees at Cambridge, his friend, Mr. Hebelor, has been able, without any mechanical appliances, to calculate and enable Mr. Morgan to express in decimals of tons, the exact total quantities of sewage delivered on to the Lodge Farm day by day by a pump delivering an uncertain and unknown quantity at each stroke, and farther, to determine the exact quantities, also in decimals of tons, in which such total quantities were subdivided and distributed among different crops on different and distant parts of the farm, by common farm labourers through irregular openings.

I say first, that if Mr. Hebelor, or Mr. Morgan, or both of them, have done this, they have made the greatest mathematical discovery of the age; and I promise to procure for them, by representations in the proper quarter, the gold medal of the Royal Society. I say, secondly, that their decimals are rubbish, and that I am willing to submit our respective statements to the justices of the Royal Agricultural Society, or the loser to pay the costs of the investigation. Will Mr. Morgan accept the challenge? If not, your readers will know what value to place upon his statements for the future, and perhaps he will cease attacking me, and sneering at my pitiful ignorance and ridiculous theories about sewage.

With regard to Mr. Morgan's precious 335 persons per acre of Italian Rye-grass, he seems so little to understand the sewage question as not to appreciate the difference between Mr. Morgan's statement that the sewage is sufficient to cleanse the sewage of 100 persons, and his own statement that he had consumed the sewage of 335 persons on 1 acre. Had he used the word "consume" in the chemical sense of burn, he would have been right; but, in an agricultural sense, it was, what I ventured to term it, a "transparent absurdity." But the most astounding blunder that Mr. Morgan falls into, when he supposes, as he is pointing out that Mr. Denton's average of 324 tons of sewage per head per annum did not apply, and was not intended to apply, to London, the real figure for which was about 50 tons, I was trying to "swell" the equivalent of guano, according, as he says, to "some chemist." This is really comical. How can water added to the sewage "swell" the equivalent of guano? The larger figure would have diminished the number of persons per acre, by adopting the smaller figure (not applicable to London), Mr. Morgan unconsciously "swelled" the number of persons per acre. By the way, it may interest him to learn that the calculation of the equivalent—not "in guano," but—in the nitrogen of guano, of the sewage of 335 persons, was not borrowed from "some chemist," but was my own.

But enough of this. I wish to say to your readers that I have laboured for years, and incessantly, to arrive at a fair estimate of sewage utilisation, and the result is that after the most careful and anxious consideration of all the evidence ever given before royal commissioners and parliamentary committees, after consultation with most of the principal chemists in the country, after all the experience which, in common with Mr. Morgan and every one else connected with my child, the Metropolis Sewage Company, I gained from the Lodge Farm, and after the fair experience I have gained in utilising the entire sewage of one small town (Romford) night and day continuously—which is far more instructive,—I am satisfied that the full intrinsic value—say *8s.* a head—may be realised, by proper appliances, for the sewage of a mixed population of men, women, and children; and farther, I beg to state that my farm at Romford is always open to inspection, the only condition being that visitors sign their names in my book. *W. H. Pears, Parsloes, June 4.*

Home Correspondence.

Clay Land Management.—Fully admitted that I have much to learn in the management of clay land, and that, where such land is naturally or by artificial drainage sufficiently porous to allow of the escape of excessive water through the subsoil, summer fallows

may be perhaps unnecessary and therefore a waste of time and crops, I must ask Mr. Smith to allow me still to hold my view that for some parts of my particular farm a summer fallow is needed, for the sake of giving warmth and allowing water to escape from the soil. My impression is that Mr. Smith would himself find on some of my land such a course advisable unless he could make a contract with the fabulous person called the clerk of the weather to give him a very dry autumn; but without presenting to enrich his ideas on that question, perhaps he will allow me to question his estimate of the value of nitrogenous artificial manures even on clay land. No one will, I believe, dispute the fact that such manures are most properly used when applied for the production of crops intended to be fed on the land, and that it is only where employed for producing crops which are to be sold off the farm that they can properly be called exhausting manures. I would not remind him that there are in the several kinds of nitrogenous manures differences in their behaviour, and that the question of waste of nitrogen from the soil depends partly upon the time of year, and also in great measure upon the form in which it is applied. Thus the nitrogen in such manures as dung, hair, bones, or bone superphosphate, does not become liable to be carried away by water of drainage till the gradual process of decay, and the consequent change from a solid condition into a form of salts containing nitrogen, in which state it is (as formed) taken up by the plants. And in the case of applying nitrate of soda or salts of ammonia after the great bulk of the winter rains have fallen, there is small danger of any appreciable quantity being carried away in the drain, as the rainfall during the summer months for the most part passes away, not by drainage, but by evaporation. The absence of the element of evidence of the value of such manures must be a bold man who will dispute the fact. But in the use of highly nitrogenous manures, the choice of kind should, I believe, be regulated by the question of slow or rapid growth of the plant. For Wheat the preference should be given to such manures as only give off their nitrogen slowly, and the same may be said of all the grain crops; but for such crops as Cabbage or Mangel, or even Swedes, the time of application being in summer, and rapidity of the action of the manure, the most valuable forms of nitrogen will in many cases be desirable, and for such crops, especially Mangel and Cabbage, we need not fear waste, as the plant will take up all they can during summer growth, and of course the larger the crops grown and consumed on the farm the greater will be the quantity of dung returned to the land. Mr. Smith is unquestionably right in using superphosphate for his succession of crops, but he includes in any of these others he should also express the fact, that, unless mixed with the soil by harrowing before sowing the seed, the grain-producing effect of the phosphate is reserved for the following crop, and that the nitrogenous part of the manure is that which chiefly affects the present one. *G. W. Gray, Gatton, Reigate, June 7.*

Scientific Education for Farmers.—Mr. W. Little has called the attention of our members to the Council (see p. 724) to want which we have no doubt all felt, though it has rarely found such a lively and forcible exponent. This letter is all the more forcible because he has confined his remarks to a single class of evils, resulting from the want among farmers of the special knowledge now needed in their business. Those who have no exact knowledge of the nature of artificial manures must doubtless often suffer from frequent and serious losses, but he includes in his list as Mr. Little urges, a sufficient reason for wishing the sons of farmers to be better instructed than their fathers in the principles of their art. But want of knowledge causes enormous annual loss in other ways. How frequently, for instance, do we find artificial manures unused and wasted after purchase, often being applied to the wrong crop or soil, or badly combined or timed. Again, an elementary knowledge of botany and agriculture would have prevented the ordinary practice of seed-doctoring. The fraudulent seedsmen has simply acted on the presumption that not one farmer in a hundred possesses that scientific and exact knowledge of seeds required to detect the adulterations now practised with impunity. I feel so hearty an interest in the question of agricultural education generally, that I should be very sorry to meet Mr. Little's invitation to discuss his subject in any other way than by the direct and simple method of seed-doctoring. The fraudulent seedsmen has simply acted on the presumption that not one farmer in a hundred possesses that scientific and exact knowledge of seeds required to detect the adulterations now practised with impunity. 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THE half-yearly meeting of this Society was held last week, Mr. Lefroy in the chair. The half-yearly report was read as follows:—Your Council, in submitting the report of the Society's transactions during the past half-year, are happy to state that there has been a fair accession of members during that period, although a more active co-operation on the part of those interested in the promotion of agriculture in Ireland is most anxiously to be desired. The annual exhibition of your Society, to which has been added a

special horse show, will be held in the first week in August next, in Dublin, for the province of Leinster, under the presidency of His Royal Highness the Prince of Wales. Your Council have to report that, in consequence of legal difficulties having arisen, the results of which might possibly have interfered with the holding of the exhibition in Stephen's Green, the intention to do so has been abandoned, and the consent of the trustees of the Pembroke estate has been obtained for the use of a large plot of ground most suitable for the purpose, adjacent to the railway station at Lansdowne Road. A trial of mowing-machines and other haymaking implements will be held early in the month of June on the grounds above referred to. The local committees are uniting in their endeavours to render the undertaking in every way attractive. The prize sheet has been considerably augmented, and additional inducements have been held out to tenant-farmers to compete in the several classes set apart for them. In anticipation of a very large attendance of visitors, your Council have decided on complying with the suggestion that the exhibition should open on Tuesday and continue until Friday, thus adding one more day to the time usually occupied by the show. The social condition of the labouring classes continues to occupy the attention of your Council. They are happy to state that the competition for the provincial gold medals for newly-erected and improved labourers' cottages has increased in this year, as well as for drainage and the reclamation of waste lands. The following is the report of analyses made by Dr. Apjohn during the past year:—

"Dear Sir,—During the year 1870 I have made 56 analyses for members of the Royal Agricultural Society; the substances reported on being three oil-cakes, two waters, one sample of Cambridge coprolites, three soils, one specimen of sulphate of potash, eight phospho-guanos, 16 guanos, and 22 superphosphates. The superphosphates and the phospho-guanos (a name given to superphosphates to which ammonia has been added) were generally well made, and contained, as a mean, 17.49 per cent. of bi-phosphate, corresponding to 27 of phosphate of lime made soluble. The results obtained in analysing 11 of the 16 guanos are deserving of special attention, being materially different from those which genuine Peruvian guano was, until recently, accustomed to yield. I subjoin, in a tabular form, the amount of the phosphate of lime and of the ammonia occurring in each:—

No.	Phosphate of Lime.	Ammonia.
1	19.04	11.28
2	23.00	10.74
3	18.30	10.20
4	16.80	11.01
5	19.20	10.71
6	18.76	11.11
7	20.00	10.40
8	27.26	9.79
9	25.71	10.74
10	20.00	10.74
11	20.80	12.10
Mean ..	20.72	10.80

The inspection of this Table is quite sufficient to show that the article at present sold as Peruvian guano is much inferior in quality to the guano of same name which until recently was found in the European market. The latter included about 22 per cent. of phosphate of lime, and was capable of yielding, on an average, 16 per cent. of ammonia; while the mean results for phosphate of lime and ammonia of the guanos in the above Table are only 20.72 per cent. of phosphate of lime, and 10.75 per cent. of ammonia. In fact, a ton of such guano is less valuable than a ton of the Peruvian guano with which, until lately, farmers were supplied, by no less a sum £3 18s. 10d. It is obvious, therefore, that henceforward it will not be safe to purchase what purports to be Peruvian guano, unless it be first analysed, and valued in accordance with its composition and the prices of its valuable constituents, which may be deduced from the present state of the manure market." [Dr. Apjohn proceeded to discuss the valuation of manure, to which we shall refer hereafter.]

Farmers' Clubs.

KELSO.

Feeding Cattle without Turnips.—At a recent monthly meeting of the Kelso Farmers' Club—Mr. Purves, president, in the chair—the evening's discussion was opened by Mr. Thomson, Belleville, the subject being—"What is the best mode of keeping feeding cattle profitably after this season when Turnips have failed?"

Mr. THOMSON said that in his experience he had seen a good many cattle fed without Turnips. There was one great thing to be considered in the feeding of cattle, and that was to have plenty of water. He could not see his way to feed without Turnips unless there was a copious supply—not muddy water carried in by the byreman in pailsful, but a regular supply of fresh, pure water running in. He thought cattle could not be fed profitably without that. After that, there were many ways of feeding without Turnips. He should think not a bad substitute for them was plenty of good hay. He should prefer to have hay from old

grass, but if that could not be got, then clover hay might be used, and he had seen cattle fed without anything else. Then the question came, whether it was best to give the hay as it was taken from the stack, or to mix it up with something?

Mr. THOMSON said that he had tried it, in order to soften it and make it not so dry. Then the question came, what would be best to mix it with? He had known cattle do very well with hay cut into chaff and some cut straw put amongst it, the whole being softened with treacle and barley meal. They were not only fond of it, but he believed they did uncommonly upon it. If they were going to give other sorts of meal, and not to give cake, he should think that the best way would be to give a little bean meal would do very well. Treacle could be bought at about £13 a ton, and if they gave something like 4 lb. of it along with perhaps 6 or 8 lb. of meal, and plenty of hay, he had no doubt the cattle would feed well upon it. He would not give them less than 4 lb. of treacle. Then they might give them cake if they wished to bring them on faster. He would not speak of Potatoes, because he considered they were mixed with the straw and hay, and they could take them into account. He did not think a man's back was a bit to the way if he had Potatoes. It was only after Turnips and Potatoes were done that he was speaking of. Some people might not have hay, and the next question was, What was to be the substitute for it? They could not feed cattle without bulk of some kind, and he would say that the next thing to make bulk was just some good cut-out straw. But if straw was not to be had, and they were to give meal, treacle, cake, or whatever else they were feeding with. Anything that required to be added was a proportion of salt. The different materials should be nicely mixed together and salt put amongst them. He thought salt was a good thing for cattle. There were many things they could substitute for Turnips, but if he was to have his own way of keeping cattle, it would be just as he had mentioned, with hay, treacle, and salt, or, if preferred, barley meal, because it was softer when Turnips were not given, and it was not so hot as some other things; but bean meal might be used instead. It was necessary to mix these different articles with care, so as not to have the food either too laxative or too hot. He recollected when he was buying cattle himself that once some of his friends ran short of Turnips about the first week of April, but he advised them not to sell their cattle at that time, but to keep them on for some time longer. They did so, and put them on old hay, and gave them plenty of fresh water. He could not have given more than £20 for the cattle on the 1st of April, but by keeping them on for six weeks longer, till May 12, and feeding them as he had stated, his friends got £27 for them.

Mr. BORTHWICK, Cowbog, said his Turnips were all done, and he was feeding a few cattle, giving them hay, cake, and a little barley meal, with Potatoes and plenty of water. He had heard a gentleman mention that week that he had fed cattle profitably during the winter without giving them any Turnips at all. He reserved all his Turnips for his sheep. His cattle were of large size, and he got a good price for them. He understood that he fed them with cut hay, cake, and some meal, all mixed together into a pulp.

Mr. HOWIE, Haddon, said he had a good many fat cattle at present, but fortunately he had a large quantity of both Turnips and Potatoes for them. He had seen a great deal of the necessity of having to use artificial food to a great extent, even before this time of the year, and he quite concurred in the remarks that Mr. Thomson had made. Last year he kept his fat cattle up till the middle or end of June, giving them chopped hay, bean and barley meal, and other things, with water *ad libitum*. He never used treacle, but he thought it would be a great improvement.

Mr. USHER, Stodrig, said he had been accustomed to feed his Turnips, and the other things, with the auxiliaries that they all had. He had that morning sold the last of the cattle that he had fed this year. He had been out of Turnips for them for three or four days, and they had been turning gradually worse since, although they had been getting plenty hay and some Potatoes, but no treacle. He had listened with a great deal of interest to what Mr. Thomson had said. He had never tried his plan, but he thought it was perfectly feasible. As Mr. Thomson said, they must give some way, and he thought that giving hay, mixed with treacle and broken barley, was a likely thing. They had the hay in that way for bulk instead of the Turnips. He did not agree with Mr. Thomson regarding Potatoes, because they could not give them in bulk, but only in small quantities, because they were apt to scour. Mr. Thomson's remarks had convinced him that there were not only good substitutes for Turnips, but that they might economise their Turnips, and make them go a great deal further than they did at present by using these things along with them. Mr. Thomson brought them to think seriously whether they could not do without Turnips altogether. They were about the most expensive and precarious crops that farmers grew, and what Mr. Thomson said made him think they might substitute something else in their place. Mr. Thomson had given him a great many useful hints, which he thought he would not forget for some time to come.

Mr. HUME, Sunlawhill, thought they were much

indebted to Mr. Thomson for the clear statement he had made. Mr. Usher had remarked that his cattle had fallen off when Turnips were taken from them. He had noticed the same thing, for not only did the cattle seem to make no improvement, but they seemed to be turning worse, although they got cake and cut straw, with plenty pure water always running in to them, but still the want of the Turnips after having been used to them for so long a period was greatly felt. He agreed with Mr. Thomson that water should not be carried into the closes, but should be kept fresh and pure by running in constantly in a stream.

Mr. BURN said: Turnips consisted to a large extent of water; and if plenty of Turnips were given to cattle or sheep that required no water, they would die, if they gave them cold Swedes, they drink water instead of eating the Turnips, but if they did not get water, they had to eat the Swedes to obtain it. He had thought again and again that he could put down all his straw with profit without putting a Turnip into his curtains, by eating the Turnips on the ground with sheep. He had fed as good bullocks as ever crossed Kelso Market Place, and they never saw anything for six months but Turnips, and he thought he was feeding them profitably all the time. It was a great consideration in bringing in Turnips that two-thirds of them at least consisted of water, which they were at the expense of conveying to their steadings when they had plenty running away that cost them nothing. The principal benefit in feeding with Turnips was that they furnished water, but in good bean meal and hay and Potatoes there were excellent feeding qualities. When giving his animals bean meal he never gave them one ounce of cake, not even in feeding them off. They should take great care not to withdraw Turnips all at once from cattle that had been receiving them. They should be taken from them by degrees, and he had seen great harm done by the opposite course. When it was followed, they might give something better in place of the Turnips, but instead of improving, the cattle turned worse. He agreed that the Turnips were not given in the winter, and he thought they might feed bullocks to profit, and never give them any Turnips at all, letting their sheep eat the Turnips either on the land on which they were grown or on grass fields to which they could be removed.

Mr. ROBERTSON, Ladrigh, thought that Turnips and Potatoes could only be looked upon as auxiliaries in the feeding of cattle, and not as requisites. They could feed bullocks without either Turnips or Potatoes. When a person ran out of them he had only to resort to good hay or straw, and by cutting it down and pouring boiling water upon it, and mixing it with meal and a quantity of salt (which was a necessity), and letting it stand 12 hours, and then giving as much of it to their bullocks as they could eat with some cake, they required neither Potatoes nor Turnips. There should be also plenty of good cold water. That mixture could be given either in the winter or in the summer. He thought that Turnips should be consumed on the fields by sheep, and if they could not be eaten on the land where they were grown they should be taken to a fallow break where they could also break down their straw into manure. It is important, however, not to have manure in open curtains, because when it was exposed to the weather it deteriorated 50 per cent.

The CHAIRMAN said—They had been getting very high prices of late for their cattle, and he thought if they did not give them Turnips, they would give them would have a profit. They could calculate on a fat bullock putting on about a stone of beef in the week, and if they spent 7s. on artificial food—either linseed cake, or cotton cake, or rape cake, or Indian Corn meal, or barley meal—he held that they would have a good profit. They were getting 9s. or 9s. 6d. a stone for good beef, and if they could produce it at 7s. with artificial food, they need not be afraid to expend that sum. He was anxious to hear of other ways of giving them good feeding than by giving them inferior articles. He had lately bought Indian Corn at 27s. or 28s. a boll, and it was as cheap feeding as anything that could be got after Turnips were finished. They could use any of the mixtures they might think best, but he would advise them not to spend beyond 1s. a day, and then they could depend on feeding with a profit. Artificial food, along with a few Potatoes, made cattle thoroughly fat.

Farm Memoranda.

BAFFNSHIRE, BOYNE DISTRICT: June 5.—Turnip sowing is the principal occupation on all our farms at present, and in most cases it is almost finished; as the spring was dry, the land was got cleaned in good time, and well done, so that the sowing of Swedes commenced generally from the 12th to the 15th of May. Those that were sown early are well up, and taking on the rough blade; but where there was not a good mould, that inveterate enemy of the farmer, the "beastie," as it is termed in homely speaking, is doing immense damage to the tender plants, and re-sowing will have to be resorted to. Wheat in the Boyne is looking excellent, and promises to be a good crop—although, at any rate, but also look well, unless on cold wet clays, where the frosts and cold drought have made it brown. Barley also promises to be a heavy crop in this district. Potatoes are now

beginning to come through the ground; but, like the Turnips, they have an enemy watching their first appearance: the rooks almost pull them out as fast as they come through. But a movement has begun for destroying them. Every farmer sent a man and some ladders to the Earl of Fife's plantations in the beginning of May, and pulled down the nests. In this way a good many thousands of young ones were destroyed; but they have got to be half a million, I may mention that the Earl of Fife has done a handsome thing in regard to the game: every farmer paying £20 of rent, and above, is granted full liberty to shoot hares and rabbits on his farm, himself or by any member of his family mentioned by him, trusting to the farmer to preserve the winged game, also to prevent poaching by persons unauthorised. This concession goes a long way in settling the vexed question. Grass is plentiful for pasture, but the want of rain in May has spoiled our chance of a heavy hay crop; but should we get showers yet it may come to be something like an average.

We had some very important dispenlsh sales in May, and all kinds of stock sold well at high prices; horses, especially, were very high. We are sorry to say that foot-and-mouth disease has broken out again in our district on two or three farms, but we hope the vigilance of the local authority may prevent it spreading.

A movement for substituting register offices for feeding markets has resulted in little, as the feeding market at Whitsunday was fully larger than usual, and the wages were about the same as formerly, viz., from £12 to £8, according to age and capability; women, from £5 to £6—of course, with bed and board—for six months. *W. Y.*

THE EXPERIMENTAL FARM AT ROTHAMSTED, HERTS.—On Tuesday, the 6th inst., a large party of Hampshire agriculturists inspected this interesting farm, by the invitation of Mr. Lawes. The party comprised Messrs. Raynbird and Caldecott, of the firm of Raynbird & Co. of Basingstoke, &c., seed merchants, and the agents for the sale of the manure manufactured by Mr. Lawes; who were accompanied by Messrs. H. Portsmouth, J. Barton, E. Cobden, H. Downs, G. and H. Barton, Rodd, T. B. Reid, W. Egan, W. Wigg, J. C. Carter, T. Welshman, and J. Hutton, of Basingstoke and its neighbourhood; and Messrs. S. H. Allen, W. Potchary, Ringer, and J. Bailey, from Andover; Mr. E. Barley, from Whitechurch; Messrs. T. Lunn and S. Burdass, from Micheldever; Messrs. W. Fairthorne, Charlwood, R. Evans, R. Mundy, and W. Spackman, from Newbury; Mr. L. L. Warren, from Winchfield; Mr. J. Simpson, agent on the Duke of Grafton's estate, in Northamptonshire; and Mr. W. Raynbird, from Bury St. Edmund's, joined the party at Harpenden—a station of the Midland Railway, only a short walk distant from the park and farm at Rothamsted.

As occupiers or agents the gentlemen forming the party are interested in the cultivation of upwards of 60,000 acres of land, and naturally enough feel a deep interest in an experimental farm having so great an influence on that most important branch of agriculture, the proper application of manures.

The experiments of Mr. Lawes on the effects of various manures on agricultural crops are unequalled for their variety and for the length of time during which they have been carried on, and for the scientific and careful manner in which it has been attempted, with considerable success, to solve various questions connected with the growth of plants.

There is probably no locality, either here or on the Continent, where such a series of experiments have been carried on, for which, to conduct them successfully, such a variety of favorable circumstances as can hardly be combined in the same individual.

We require for them a practical knowledge of agriculture, a plentiful capital to carry out costly experiments and trials, which must entail great pecuniary sacrifices, and a constant supervision; and besides these it requires, what is much rarer, a scientific training, and a tact to apply that science to agriculture.

With these must be added a perseverance to carry out the same series of long-continued experiments, for Nature does not reveal her secret workings in one or two years; it requires almost a lifetime to learn the true bearings of such experiments, and to eliminate all causes of error. The ordinary agricultural experiments on one crop may be of some utility to an individual on his own farm, but such as those of Mr. Lawes are of true scientific and national value. In other countries such experiments are carried on at the expense of governments, and at a salaries paid to scientific men; but with us one individual, at his own expense, has equalled any of the results arrived at on the Continent, and by so doing has corrected the errors of some of the most eminent Continental chemists.

The Royal Agricultural Journal contains many of Mr. Lawes' very interesting articles on manures and feeding stuffs, and to these we must refer those taking an interest on the subject, and here simply give a short description of a most instructive and enjoyable day spent at Rothamsted.

On reaching Rothamsted the party were met by Mr. Lawes, who kindly explained everything personally. They proceeded after luncheon in the first instance to the park, in which 18 plots of grass, each half an acre,

have been tried for the last 16 years with the same manure, the experiments commencing in 1856.

The results are, that the unmanured land has averaged 22½ cwt. of hay per acre, that superphosphate of lime is almost useless on grass unless ammonia is supplied, that sulphate of potash, soda, &c., encourage the growth of Clover but do not greatly increase the bulk of the crop, that ammonia, soda, and nitrate of soda act most powerfully and are the real manures for grass crops. Ammonia, however, destroys the Clover and encourages the coarse grasses; the crop where the greatest quantity of ammonia was sown producing nearly all Cock's-foot Grass. The ammoniacal salts produced an average of 3 tons of hay per acre.

A valuable discovery in connection with the application of nitrate of soda (also a great fertiliser of grass, from its rapidly supplying nitrogen) is that by repeating heavy doses yearly, it washes into the soil and fertilises it to a great depth, so that the roots of the grass following the fertiliser get beyond the depth affected by drought, and produce a heavier crop in a dry season. Thus, in 1870, nitrates produced nearly 3 tons per acre, while other manures had comparatively a very slight effect. Indeed in a dry season the cause of top-dressings failing is that they encourage the growth of surface roots, which cannot endure a long drought.

The next field viewed was the Barley, in which experiment had been carried on during 16 years with the same crop, showing the possibility of cultivating corn crops successfully for any number of years, if the land is well tilled and stimulating or ammoniacal manure supplied. Also that superphosphate alone is of very little value, nor does it greatly add to the effect of ammonia; nor are the mixed alkalis useful, but rape cake applied at the rate of 1000 lb. per acre, and nitrate of soda at the rate of 25 lb. per acre, since 1856, have mixed alkalis only 1½ bush, while nitrate of soda and ammonia salts were still the most productive—nitrate of soda when added to superphosphate and alkalis producing an average of 3½ bush. Still the nitrate alone, and the ammonia alone, were not so productive as when combined with alkalis or superphosphate. The Wheat was sown on November 1, and had suffered considerably from the frost.

The experiments on oats and corn only commenced in 1859, but the same results appeared. Unmanured in 1870, yielded 16½ bush. of corn, and 4½ cwt. of straw; while a heavy dressing of nitrate of soda with superphosphate increased both corn and straw threefold.

In the leguminous (Beans and Peas) crops, and in Clovers, no such results appear. It is impossible with any mixture to grow Clover or Beans for a long continuance of years on the same land, still a plot in a rich garden soil has grown a fine crop of Clover since 1854, and the same result has been obtained since 1854, and this year is also very lush in appearance. But the old garden ground has been richly manured for more than a century. Still this experiment proves that the theory of the excretions of the Clover roots poisoning the soil, is not the correct one, it is more probable that the Clover is starved out when it fails.

In root crops superphosphate of lime has been proved the most effective manure.

Experiments are now being carried on with the Sugar-Beet, the plants of which are dibbled in, and have come up very regularly and well; but at present it is impossible to decide on the value of the manures.

In Sawpit Field 22 varieties of Wheat were being grown; all looked healthy and likely to be productive. But at this early period the varieties could not of course be compared; but the Red Rostock and Red Brompton could be selected as having somewhat the advantage over others in luxuriance of growth.

At the laboratory, presented about 15 years ago to Mr. Lawes as a testimonial of the subscribers to the value of his services to agriculture—passing by the garden allotments, in which 19 or 20 acres are let, we were told, by Mr. Lawes, at the rent of 5s. per 20 rods—and taking a peep at the village club-room, also established by Mr. Lawes, in which, besides reading, &c., the members have the opportunity of supplying themselves with wholesome beer at a most applicable rate. In the Hall, where a handsome dinner was ready, at which Mr. Lawes presided. After dinner the health of Mr. Lawes was proposed by Mr. Hugh E. Raynbird, who alluded to the great benefits of Mr. Lawes' experiments to English agriculture, and stated that he had proved that on clay lands the rotation of crops might in a great measure be dispensed with, although on light lands it is probable that the present rotation might be more applicable. Mr. Raynbird concluded by calling for a hearty Hampshire cheer for their hospitable entertainer.—Mr. Lawes returned thanks, expressing his gratification in meeting practical agriculturists.

The meeting then concluded, and the party returned to the train at Harpenden, much gratified and instructed

by the events of the day. Mr. Lawes, who accompanied the party round the farm, was unwearied in the explanations which were necessary where so great a variety of experiments were being carried on. The thoroughly clean and practical manner, with the firm crops were cultivated excited most admiration; the crops bid fair to be productive, much more so than the soil, naturally a rather poor stony clay, would appear calculated to produce.

FENTON BARN, DREM, N.B.—[We abridge the following from Mr. Jenkins' papers in the Journal of the Royal Agricultural Society.]—Mr. Hope's occupation consists of 660 acres at Fenton Barns, and 230 acres at Dirleton. The whole of this is arable land, with the exception of 3 acres on the home farm; but Mr. Hope nets the grazing of about 60 acres of old grass in Dirleton Park, besides the run of 400 or 500 acres of "links." He also, like many other Lowland farmers, has a sheep farm in the Highlands.

On Fenton Barns the soil generally rests on interbedded felsstone, but in parts intrusive greenstone or columnar basalt comes to the surface. The subsoil on two-thirds of the farm is composed of stiff retentive clay mixed with stones. On the southern portion of it, along its boundary, the Peffer Burn, there is a vast bed of alluvial clay, which rendered fit for growth by slightly elevated banks of sand of the colour of dark raw sugar, though the clay comes to the surface in a few hollows. At the close of the last century this portion of the farm, extending to about 150 acres, was unutilised; it lies from 25 to 35 feet above the level of the sea, which is 3 miles distant. Though the whole sandy portions had been early covered with clay, and the clay drained, its cultivation was unprofitable until tile-strained, which rendered fit for growth of Turnips. Nearly one-half of the remainder of the farm is composed of excellent loam, and the other half of heavy and lighter clay land, the last portion being the least productive of the whole. As remarked by Mr. Stevenson, "the whole soil originally was more or less retentive, but has been changed in character by furrow-drawing and a long course of liberal manurings." I learned from Mr. Hope that the whole farm has been drained with tiles 6 yards apart, and almost every ditch has had large tiles placed in it, and covered up, giving the fields a warm and comfortable appearance.

The course of cropping, however much it may vary from time to time, in order to prolong the interval between grass and grass, is always subordinate to one principle, viz., to maintain a certain proportion between the various crops. At present, two courses are pursued: the first, which is the general course in East Lothian, on two-thirds of the arable land, and the second on the remainder:—

- | | |
|-------------------|---------------------|
| No. 1. | No. 2. |
| 1. Seeds. | 1. Seeds† pastured. |
| 2. Oats. | 2. Seeds† |
| 3. Oats or Beans. | 3. Potatoes. |
| 4. Wheat. | 4. Wheat. |
| 5. Turnips. | 5. Turnips. |
| 6. Barley. | 6. Barley. |

In addition to the change which can thus be made by allowing the seeds to remain a second year, instead of taking a crop of Oats, another alternative has been resorted to. Every field on the farm, with the exception of one, has once, but generally twice, been under Potatoes after Turnips, followed by Wheat, and afterwards Grass. This course was adopted in the first instance because the farm was literally overrun with wild Oats; indeed, Mr. Hope once found it necessary to take three green crops in succession, for the purpose of cleaning a field. The Potatoes taken after Turnips perhaps scarcely yield so large a crop as those taken in the ordinary course and dressed with farmyard manure; but this depends mainly on the proportion of Turnips consumed on the land by sheep, and almost every field of linseed cake they have devoured, and the state of the land when the sheep were folded on the land. The succeeding Wheat crop is invariably excellent, while the seeds, particularly the red Clover, grow with a vigour unexampled after any other preparation. One 30-acre field of grass, which had been three times subjected to this cleaning process, carried more stock last year than any 60 acres on the farm.

1. *Oats*.—A strong furrow is now preferred for Oats, although for many years Mr. Hope ploughed shallow. The lea is ploughed by steam, to the depth of 9 or 10 inches, in December or January, and the Oats are sown in February if possible. Several experiments have been made on the farm in reference to the quantity of Oats which they may sow to cover, and it has been found that about 2 bush. per imperial acre will generally give the best result, taking quantity and quality together. If the seed is sown too thin, there is lack of quality, and with too thick sowing the quantity is deficient. About 9 pecks is the quantity generally drilled on Fenton Barns; it is got in as early as possible, and the land is then harrowed, according to the season.

Cutting is done by the usual farm labourers with reaping machines; and it is not found necessary, as a rule, to employ any extra men. Last year, reaping was commenced with the Wheat about August 1, and carrying about the 12th, by which date nearly the whole of the Oats and Barley had been cut. As a rule, cutting takes about three weeks, as it is rarely that a whole field can be finished off without an interval.

Ten days after reaping is over the whole of the carrying should be done.

2. *Beans*.—The Oat stubble is dunged with about 16 cartloads per imperial acre, and the manure is ploughed in by steam with a very strong furrow. The land is harrowed down in February, and the guano is put through it to the depth of 12 inches immediately after. The seed is distributed on the flat by a Ransome's drill, which has had every alternate spout removed, making the rows 16½ inches apart. A mixture of Beans and Vetches is generally sown, the proportions being 2½ or 3 pecks of Tares to 4 bush. of Beans. About 9 pecks of the mixture are drilled per imperial acre as soon as the weather will allow, generally about the end of February. Mr. Hope considers that by this system he gets a larger crop, and keeps his land cleaner, because covered, than by the 27-inch ridge system. He prefers Vetches to Peas, because they yield a better price, and because cattle prefer tare-straw. Tare-straw and bean-straw are also given to the lambing ewes in spring, when Turnips are getting short. When the Bean plants are well above ground they are horse-hoed once or twice, and hand-hoed and weeded once or twice. The produce of the crop of 1870 was the above 4½ bush. of Beans and 2 qr. of Tares per imperial acre. The relative proportions of these grains vary with the seasons, there being generally fewer Tares and more Beans. A few acres of Tares mixed with Oats are sown for cutting green, and are found useful for most kinds of stock in dry seasons.

3. *Potatoes*.—The land is steam-ploughed as soon as possible after harvest, and grubbed in the spring after Barley sowing. It is then drawn off in 27-inch drills and dressed with from 16 to 18 tons of farmyard manure per imperial acre, as well as 7 cwt. of artificial manure, chiefly Peruvian guano, and the remainder of the cake and cotton cake. Mr. Hope finds the cotton cake answer extremely well; but, in his opinion, nothing can approach guano; he has used potash, but has given it up. Half a ton of Potatoes are required to plant an acre. The sets are cut tubers, with one, or at most two, eyes. If the tuber is small, it is sufficient to cut off the "rose" end, and throw it away, planting the remainder in one or two pieces. Mr. Hope's observation as to the effect of a number of eyes confined to the above 4½ bush. of Beans, and 2 qr. of Tares, the extra shoots carefully pulled out. The after-management depends somewhat upon the season, as it is considered ruinous to touch Potatoes in wet weather. As a rule, the land is rolled down immediately after planting, and then harrowed before the stems appear above ground; the crop is then carefully hand-hoed, and when the plants are strong enough, the land betwixt the drills is deeply grubbed with two horses, and by-and-by it is rolled up with the double mouldboard-plough; finally a narrow grubber is used when the stems are nearly touching each other (provided the weather is dry), the double mouldboard-plough again following. Harvesting is done with the ordinary Potato-plough; and most of the crop is sent to London, as is usual in East Lothian.

One-third of the Potato course is on a two-years' lease, the seeds having been sown by sheep and young cattle getting cake and Turnips. In January, the lea is turned over with a furrow of not more than 4 inches, one of Howard's wheel-ploughs, with two horses, being preferred, as steeper than a swing-plough. This is followed by a strong furrow of 12 inches, done by three horses; and it is calculated that if the lea is broken at Christmas, both these operations should be finished by the first week in February. The land then gets a dressing of 4 cwt. of guano and 4 cwt. of dissolved bones, or cotton or rape cake, and the further management is precisely the same as for Potatoes after Oats. Very little labour is necessary on this course during the summer, the land being thoroughly clean. Any Couch-grass or weeds are exterminated by the shallow ploughing being followed immediately by the deeper furrow, which covers and kills the sod; and as the land becomes covered with Potato haulms early in the season, it has no chance of getting foul.

4. *Wheat*.—The Bean stubble is ploughed with a shallow furrow immediately after the Beans are harvested, and in a month or six weeks afterwards the land is ploughed a second time to the depth of, say, 10 inches. This affords time for the springing of any Beans or Tares lost in the cutting and harvesting, which are thus worked over and buried; but above all, it in some way destroys the eggs or larva of a minute white grub with a black head, which in spring comes to the surface of the Wheat plants, and thins and frequently altogether destroys the crop. It is necessary to re-sow the seed. This had happened so frequently to Mr. Hope that he had resolved to sow no more Wheat after Beans; but learning from a friend that a second furrow, as described, was an effectual remedy, he tried the experiment some years ago, and it has always met with perfect success.

After this the whole Wheat break is treated alike, whether after Beans or Potatoes. It is steam-ploughed with a deep furrow about the end of October or beginning of November, and, in the course of a week or two, issown with 2 bush. of Fenton Wheat per imperial acre. Mr. Hope likes to sow on a stale furrow, and he would not get his Wheat in until

December if he could be sure that the weather would allow of its being done then. He finds that the quality of the crop is better, and that it is ready for cutting a week sooner, by sowing as much as 2 bush. per acre than by using a smaller quantity of seed. After the seed has been harrowed in, it remains until March or the beginning of April, and when well up it is harrowed and rolled, and then generally Dutch-hoed by hand. The Wheat, whether thick or thin on the ground, is invariably harrowed once; and when thick, a second turn of the harrow is given, which prevents any over-crowding of plants. Sometimes it is horse-hoed, but generally there is sufficient strength on the farm for hand-hoeing. As a rule, Wheat is not top-dressed; but a bad piece would get some nitrate of soda and guano mixed. Top-dressing is not much in favour at Fenton Barns, the theory and practice adopted being in favour of manuring heavily the previous green crops. The average produce runs from 5 to 6 qr. per imperial acre.

5. *Turnips*.—All the manure made previous to the ploughing of the Wheat stubble is applied at the rate of 16 cartloads per English acre, as far as it will go; and the whole of the Turnip break is steam-ploughed and harrowed. The manure thus applied is not found to have quite the same effect on the crop as the equivalent quantity of as good dung applied in the spring; but Mr. Hope thinks the loss sustained in this way is not so great as would accrue to the manure if it were kept in a heap during the winter, and, besides, it saves a great deal of labour in the more busy months. In the spring the land is harrowed, grubbed once or twice, and drawn into ridges, winter-made manure being then thrown into the drills, on that portion of the land which had received no farmyard manure in the autumn. A good allowance of artificial manure is then sown previous to splitting the ridges—namely, from 6 to 7 cwt. of a mixture consisting of 4 or 5 cwt. of Peruvian, or a mixture of Peruvian and Ichaboe, guano, and the remainder superphosphates. The Ichaboe guano imported into Leith for some years past has been of excellent quality, and relatively cheaper than Peruvian. Preferably two-thirds of the roots, or at least the larger half, are Sowerby's, and the remainder consist of Fenton Yellow Hybrid, and either Greystone or White Turnips, the quantity of seed sown per acre being about 2½ lb. The after management consists of two horse-hoings and one hand-hoeing, after the plants have been singled with the hoe. The root crops generally range from 20 to 25 tons were imperial acre.

Not more than one-third of the roots are now fed on the land. Formerly as many as one-half were thus consumed, but it has lately been necessary to reduce the quantity, owing to the high condition of the land making the following crop of Barley so strong that it destroyed the seeds. The land is rather heavy for sheep, so that it is frequently impossible to keep them on Turnips continuously. In such cases they are taken on seeds, and one inducement to draw Turnips is the opportunity of feeding them on seeds, and thus improving the succeeding crop of Potatoes. Wheat is still sown after the Turnips, but only on the land where sheep have consumed part of the crop on the ground, and which can be sown in good order before Christmas; but Barley is preferred for spring sowing, as it always commands a very high price and meets with a ready sale.

6. *Barley*.—The land for Barley is ploughed to a moderate depth as soon as the Turnips are off and the sheep have run over to pick up the leavings. It is liked to get as much land as can be cleared exposed in winter and spring frosts for as long as possible. Spring cultivation consists chiefly of harrowing; but a piece of rough ground would be grubbed and gone over with a Norwegian harrow until a good tilth was obtained. About March 8, or as soon after as the land is fit, it is drilled with Chevalier Barley, about 9 pecks of seed being used per imperial acre. As soon as the Barley is braided, the mixture of seeds is sown with a broadcast machine, doing 18 feet at a time and hoed in by hand with a Dutch hoe; and, if the Barley is not after the first week in April, it is hoed again. Some farmers prefer to sow the Barley broadcast, and use the harrows afterwards, thus getting rid of wild Mustard. The Barley crop will average from 6 to 7 quarters, but some fields yield more.

8. *Seeds*.—The following is the mixture of seeds which is to stand for one or two years only, the quantities being per imperial acre—¾ lb. red Clover, 3 lb. white Clover, 1½ lb. Trefoil, 1½ lb. Alsike, and 2 pecks of mixed perennial and Italian Ryegrass; but sometimes the quantity of Ryegrass is increased. No white Clover is sown for cutting, but the quantity of red is increased to 2½ cwt. and the Ryegrass is either about 1½ peck of perennial, or 2 to 2½ pecks of Italian, or generally part of each, the quantities of Trefoil and Alsike remaining the same in both cases. The seeds which stand only one year are fed with sheep and a few cattle running together, and, as a rule, getting cake, especially if the stock is intended for the butcher. On the seeds intended to stand another year, it is essential that the stock should be allowed to eat them. From 20 to 25 acres are annually mown for hay and stall-feeding; the aftermath is also cut, and in the autumn the land is grazed with sheep, which usually get Turnips and cake for a time to ensure a full Oat crop.

Sheep.—At present Mr. Hope keeps at Fenton Barns a breeding flock of not more than 80 Border Leicester; but formerly he had an additional score. His original flock was bred from the Buckley blood, but it was afterwards crossed with Border Leicester tups. The ewes run with the ram in October on the best seeds, getting either Turnips or Cabbage if the bite is not very good; afterwards they go on the two-year-old grass until lambing time, getting Turnips, as before. If roots are scarce their place is supplied by meal and wheat-chaff, or by meal and bean-straw. Lambs begin to drop about the middle of February, but the beginning of March is a more favourite time. As the ewes lamb they are put on young grass until the end of March, shelter-sheds being erected in the fields, in which they get Turnips and cake, or meal; Oats and bran are also esteemed good food at this time. The meal at present given to sheep is the refuse from the manufacture of starch from Indian Corn, and the quantity given varies from 1 to 1½ lb. per day, which is given mixed with chopped straw damped with water and a little salt.

Lambs are weaned about the first or second week of July, except in the case of those ewes to be drafted, whose lambs are taken away three or four weeks earlier. Weaning is done by sending the ewes to Dirleton links for a month or six weeks, which prevents their getting fat, the lambs remaining and getting the same food as before. Lambs are dipped soon after weaning, and again about the end of November or beginning of December. Shearing is commenced about the end of October, and done by the two shepherds, assisted by three or four of the ordinary farm labourers, who get their food in addition to their usual wages while the operation lasts.

About 25 gimmers are annually introduced into the Fenton Barns flock, and the remainder are sold to the butcher when shaired. The crop of lambs is generally large, but it depends to some extent upon the food given to the ewes for a certain time previous to lambing. If Cabbages have been given to them in any quantity, the lambs are more likely to nurse up to 175 the every 100 ewes. The hoggets are folded on Turnips, the top hoggs getting cake, but not the females.

Cattle.—The East Lothian system of paying labourers in kind necessitates a certain amount of provision for cow-keeping on the part of the farmer. Mr. Hope employs from 12 to 14 men, each of whom has the privilege of keeping a cow; he therefore keeps a pure-bred bull, and the farmer who keeps the calves, he keeps about four cows to rear them, the number annually brought up running from 16 to 20. As there are from four to four and a-half calves to each nurse-cow, they are given porridge or bruised linseed cake with milk and water, and are soon taught to eat roots and Oats. Ultimately they are put with the sticks, and fed off with them. Half-Ayrshire and half-Shorthorn are the cows generally preferred in the east of Scotland for milk cows, but feeding beasts are liked the better the nearer they approach to a pure Shorthorn. October is the best month for buying beasts to feed on Turnips, and Mr. Hope generally secures about 20 2-year-old Shorthorn steers from England, if possible, as well as about 30 yearling stirks, at this time. He also purchases in spring from 30 to 35 2-year-old cattle, which are grazed from home, but brought to Fenton Barns about the end of September and fed off; thus making a saving of from 90 to 95 cattle fed off on Fenton Barns every year.

The steers are put up on Turnips, with a little meal and salt; and in about six or eight weeks they begin with 3 lb. of cake per day, increasing ultimately to 6 lb. They are frequently given as many small Potatoes as they can eat, so they do not consume a very large quantity of Turnips. Mr. Hope has in this way sometimes consumed nearly 300 tons of Potatoes in a season. The stirks are put on 10 to 12 lb. per day of pulped Turnips, with either 3 lb. of linseed cake, or 6 lb. of meal, or 4 to 5 lb. of cotton cake, and chopped straw. By this treatment they are got into good condition for grazing the following summer, in the park already mentioned, until the first week in August, when they are put up in strawyards to be fed for the London market. Their food at the finish includes besides Turnips and from 6 to 7 lb. of oilcake, either cut straw or wheat-chaff, and bean straw.

The stirks are always wintered at Dirleton, where, by the assistance of cake, they convert the straw into a fair manure with but few Turnips, nearly the whole of this crop being eaten on the ground by sheep. Besides the purchase of upwards of £1000 worth of artificial manures annually, for many years the bill for cakes and feeding stuffs has run from £1200 to £1500.

The Week's Work.

JUNE 17.—*Rape* sow on land prepared for it. The first sown, if in rows, horse and hand hoe, giving the plants "a rough singling." If sown broadcast on heavy land, and too thick, yet to be sown in rows; if not too thick, hand-hoe. On soft or friable land, thinning a broadcast crop with the hand-hoe is generally preferred; but broadcast sowing is now the exception, drilling being almost the universal practice. *Parsnips* and *Carrots* horse and hand hoe. If

not singled, look before you in singling, so as the best plants shall fall each in its place, 12 inches apart. If grown on stiches, draw the earth up to the plant in hand-hoeing, as it is apt to go the other way by horse-hoeing. Hoe deep and close, but do not touch the roots with the corner of the hoe; skimming the surface does no good.

Chicory, when grown for its root, horse and hand hoe as directed for Carrots; and in singling leave the plants somewhat closer in the rows.

Lucerne.—Old crops require hoeing after every cutting, and all weeds or grass which cannot be removed by the hoe pull with the hand. If the land was not forked between the rows last autumn, it should get a broad forking just now, loosening it well, but leaving the winter-made mould on the surface, which is better for aeration, for the absorption of the night dews, and also for the retention of the natural sap in the ground, than the raw soil brought up by a close forking. The work can be done with a narrow spade on the principle of deep Dutch hoeing.

Sundry works, if not already performed, should now be so. Make new roads. Road metal can be broken to any degree of fineness with Blake's steam stone-breaker, at 8 tons for 9d., and at the rate of 100 tons per acre, and upon the same principle, but lessening it to make a considerable length of road it will pay to purchase a machine; and this applies to the repairing of old roads with broken stones. Hedges cut, and if infested with "goss" (caterpillar), as many hedges this season are in Surrey, switch close in time, so as to remove the young shoots, and thus deprive the insects of food. Stone fences build and repair. As rivers and their tributaries fall low, they should be cleaned, straightened and deepened, if necessary. The heavy thunderstorms of the current season have shown the need there is for straightening and deepening many rivers and watercourses, so as to increase their fall and capacity for the removal of water. Narrow places also tail back the water, so that widening the channel lowers the surface level. Collect earth for compost. On steep inclinations the lower land's end is apt to increase in depth, so that a spit may be carted off without doing harm. Marl and chalk provide for application after "hay" and "clover" crops, but the latter is like that on an old rule, which may be carried out either by carting or warping. When carted direct from the pit and spread rough over poor, sandy, gravelly, chalky, and peaty pastures or stubble, at this season, the clods, when they get dry, are easily broken down with the clod-crusher, and worked in with a chain-harrow. Clay warp may be applied to a large area of soft, bog land more readily just now than in winter. New homesteads and labourers' cottages may be built, or the old ones repaired. Stackyards and thatch get ready for hay and corn harvest.

Hay Harvest usually commences with Rye-grass and Clover, and, unlike the last season, the current one will be no exception. In bright, sunny weather both plants are liable to "roast," more especially Clover, to avoid which the swathes should be carefully turned in time. When mown with the scythe the swathe is easily turned with a fork or rake handle; when cut with the mowing-machine, as the bulk of the crop now is, "track" clay or "clay" leaves the broad flat swathe thicker and more compressed on the one side than the other, so that the hay does not make equally. When the crop is light, and the weather forcing, turning may be unnecessary; but, if heavy, the thick half of the swathe should be turned over on the other half, and this will generally fit it for hand-cocking. If the weather is precarious, put it into grass-cocks as soon as it is ready, and these, weather permitting, spread out next day, taking care not to break the grass, and when ready put up into full handcocks. There is no use in shaking out grasscocks in a moist atmosphere, greatly loaded with vapour, in which case they may have to be turned upside down to prevent heating, or the making of "hay vinegar," should the grass be much broken. The hay remains in the handcock until fit for the "trampcock," and in the latter until fit for stacking, and the sooner these changes are made the better the quality of the hay. Some put up the hay in large handcocks and allow it to remain in that until fit for stacking, but there is a twofold loss in the practice; for, first, the grass must remain longer in the swathe, and second, the handcocks require to stand longer in the field, and in both these the greater exposure wastes the hay. Well made Rye-grass and Clover hay is green, soft, and pliable; but when too much exposed to the weather, and injured in making, it is white, hard, and brittle.

Clover, Sainfoin, and Lucerne, when grown separately for hay, require careful turning in separating weather, to prevent roasting—the leaves being rapidly burnt to "tinder" or "snuff." In other respects the work closely resembles that of making Rye-grass and Clover hay. Sainfoin is sometimes carried with straw, and stacked in layers alternately with straw, to which it imparts much of its odorous and sapid properties, the two when cut into chaff being wholesome, and much relished by cattle. Lucerne, Clover, and Tares may also be stacked in the same way.

Milk Cows attend to, whether used for dairy or breeding purposes. Whether soiled at the homestead or grazed in the pastures, they should on no account be roasted in the sun or tormented with flies, as such

treatment reduces the quantity and depreciates the quality of the milk. A plentiful supply of pure filtered water is also essential. Some pastures yield an abundance of rich milk; but generally speaking a larger quantity of butter and cheese, and of richer quality, can be produced by soiling than by grazing, under ordinary good management. Vetches, irrigated meadow grass, sewage grass, when forced forward at this season require to be mixed with other forage plants, as Clover, Sainfoin, and Lucerne, or properly seasoned with pea and bean meal, otherwise the milk will be inferior. The current season, so far as gone, has rather increased the quantity of pasture grass than improved its quality, more especially on cold, imperfectly drained clay land; and this will less or more affect the quantity and quality of the milk unless a daily allowance of meal is given, and in the pastures meal cannot be so successfully given as at the homestead. As the natural grasses of rich grazings in fine seasons consists of mixtures of several varieties, so must the artificial supply of green food for milk cows, to produce similar results. And in a similar way the produce of inferior pastures must be supplemented.

Grazing Stock in pastures without trees or any shelter from the rays of the sun, suffer much at noon-day, and to avoid this, and the torment of flies, some farmers take home their stock about 11 A.M., and turn them out again about 4 P.M. The plan, too, affords an opportunity of giving a meal of Tares, Clover, or whatever forage crop is grown when the pastures get bare, so that the question arises ought not forage crops to be grown for the purpose?

Swine keep clean, and as cool as possible. For a single litter, June is considered a favourable month for farrowing, and therefore is very generally chosen for young sows to bring forth their first litters, but it is too late, under ordinary management, to be followed by a second litter. Rather more sour food is required than during the previous month; but in other respects rather less food should be consumed. *W. E.*

Notices to Correspondents.

CEMENT FOR FLOORING: *An Old Subscriber* will find three of the base, whatever it be—sand, gravel, "breeze," broken bricks, &c.—and one of Portland cement, to be the right proportion. Mix them dry, add water, and spread like mortar. At least 3 inches upon a 6-inch floor of rammed stones would be necessary for a pigsty.

NAME OF WEED: *Lungwort.* The common yellow Rattle (*Rhinanthus Crista-galli*).

Markets.

HAY.—Per Load of 36 Trusses.

SMITHFIELD, Thursday, June 15.

Prime Meadow Hay, 132s. 10d.	Clover, old 138s. 145s.
Interior do. 100 120	Interior do. 110 130
New Hay 60 100	Prime 2d cut do. .. 135 140
Interior do. 40 100	Interior do. 100 120
Straw 36 44	

CUMBERLAND MARKET, Thursday, June 15.

Sup. Meadow Hay 140s. 10s. 10s.	Interior Clover .. 120s. 10s. 10s.
Interior do. 120 130	Prime 2d cut do. .. — —
New do. 80 100	New do. — —
Interior do. 40 100	Straw 44 48
Superior Clover .. 140 150	

JOSHUA BAKER.

MARK LANE.

MONDAY, JUNE 12.

With a short supply of English Wheat to this morning's market factors asked an advance, which millers were unwilling to concede, and up to a late hour but few sales were made. For foreign the demand was limited to retail purchases, at the prices of this day's night. There was no change in the prices of Barley, Beans, or Peas. With a better supply of good Oats the improvement of last week was lost, and lower descriptions were a dull sale. Flour was steady at late rates.

PRICE PER IMPERIAL QUARTER.		s.	d.	s.	d.
WHEAT, Essex, Kent, Suffolk.	White 47-60	Red	55-60		
— " do.	do. 59-63	— " do.	60-62		
— Talavera	do. 62-65	— " do.	62-65		
— Norfolk	do. 48-50	— " do.	48-50		
— Foreign	do. 48-50	— " do.	48-50		
BARLEY, grist & dist.	do. 34-40	— " do.	34-40		
— Foreign	do. 34-40	— " do.	34-40		
OATS, Essex and Suffolk	do. 25-28	— " do.	25-28		
— Scotch and Lancashire	do. 25-28	— " do.	25-28		
— Irish	do. 25-28	— " do.	25-28		
— Foreign	do. 25-28	— " do.	25-28		
RYE, MEAL, Foreign	do. 34-36	— " do.	34-36		
BEANS, Mazagan	do. 37s. to 47s.	— " do.	49-50		
— Foreign	do. 51s. to 59s.	— " do.	51-59		
— Peas	do. Small 45-46	— " do.	42-44		
PEAS, White, Essex, and Kent	Boilers 35-40	— " do.	40-42		
MAIZE,	do. 44s. to 45s.	— " do.	36-40		
FLOUR, best marks, delivered	per sack 42-50	— " do.	36-42		
— 2d ditto	do. 42-50	— " do.	36-42		
— Foreign	do. per barrel 27s. 10s.	— " do.	36-40		

WEDNESDAY, June 14.

Under the influence of wet weather and the frequent heavy showers, the grain trade exhibited much quietness, and prices generally favoured purchasers. There were short supplies of English Wheat on sale, and those from abroad were not good. The demand for both red and white produce was dull, and prices in some instances were reduced. Barley met with a quiet sale, at Monday's

prices. Malt was dull, on former terms. The supply of Oats was large; trade was inactive, and prices with difficulty sustained. Beans and Peas were in slow request, at previous values. Flour experienced a dull inquiry, at dropping prices.

ARRIVALS OF GRAIN, &c., INTO LONDON BY WATER CARRIAGE.

	Wheat.	Barley.	Oats.	Flour.
English & Scotch ..	Qrs. 710	Qrs. 300	Qrs. 300	Sacks. 290
Irish	—	—	—	—
Foreign	5610	3600	—	—
	5920	3020	300	—

LIVERPOOL, June 13.—The transactions both in red and white Wheat were only limited, and the improvement of Friday was rather more than lost, so that quotations can be made scarcely equal to last Tuesday's. Flour was neglected, and the quotations of last Tuesday were nominally maintained. Beans unaltered. Peas sold in retail, at Friday's reduction. Oats and Oatmeal firm upon moderate sales. Indian Corn in fair request, but soft mixed and yellow American were depressed in value, and difficult to sell.

AVERAGES.

	Wheat.	Barley.	Oats.
May 6	5911d.	37s. 3d.	2611d.
— 20	58 7	37 10	26 11
— 27	59 11	37 7	27 11
June 3	60 0	38 11	27 7
— 10	59 9	38 6	25 11
Average	59 3	37 4	27 4

METROPOLITAN CATTLE MARKET.

MONDAY, June 12.

We have a much larger supply of foreign Beasts and about the same number of English as last week. Trade is slow, at lower prices, and a clearance cannot be effected. The demand for larger numbers of English is a few more foreign Sheep than last week; prices are considerably reduced, and many lots remain unsold. Lambs and Calves are also lower. Our foreign supply consists of 2255 Beasts, 11,350 Sheep, and 440 Calves; from Scotland there are 133 Beasts; from Norfolk and Suffolk, 1600; and 472 from the Midland and Home Counties.

s.	d.	s.	d.	s.	d.	s.	d.
Best Scots, Here-	5	6	8	Do. Shorn	5	4	8
ford's, &c. ..	5	6	8	Do. Shorn	5	4	8
Best Short-horns ..	5	4	8	Do. Shorn	5	4	8
2d quality Beasts ..	3	8	4	Do. Shorn	4	4	8
Best Downs and	—	—	—	Lambs	—	—	—
Half-breeds ..	—	—	—	Calves	—	—	—
Do. Shorn ..	5	8	0	Pigs	—	—	—
Beasts, 4650; Sheep and	31,350	Calves, 454	Pigs, 170.				

THURSDAY, June 15.

The number of Beasts on offer to-day is very small, yet it exceeds the demand; trade at the dead market is bad, and the weather is unfavourable, consequently Monday's quotations are with difficulty realised. There are not quite so many Sheep and Lambs as on last Thursday; trade is, however, exceedingly dull, and it is difficult to make a clearance at our quotations. We have a very large supply of Calves; prices are lower, and they cannot all be sold. Our foreign supply consists of 160 Beasts, 4120 Sheep, 730 Calves, and 5 Pigs.

s.	d.	s.	d.	s.	d.	s.	d.
Best Scots, Here-	5	6	8	Do. Shorn	5	4	8
ford's, &c. ..	5	6	8	Do. Shorn	5	4	8
Best Short-horns ..	5	4	8	Do. Shorn	5	4	8
2d quality Beasts ..	3	8	4	Do. Shorn	4	4	8
Best Downs and	—	—	—	Lambs	—	—	—
Half-breeds ..	—	—	—	Calves	—	—	—
Do. Shorn ..	5	8	0	Pigs	—	—	—
Beasts, 470; Sheep and	31,350	Calves, 800	Pigs, 40.				

METROPOLITAN MEAT MARKET, June 15.

Best Fresh Butcher	15s. per dozen lb.
Second do.	13s. 10d.
Small Pork, 4s. 4d. to 4s. 8d.; Large Pork, 3s. 4d. to 4s. 0d. per 8 lb.	

ENGLISH WOOL.

Business during the past week has been on a fair scale, at steady prices; the values have not for the moment materially improved, as when the clip is coming into the market there are always some sellers. We believe, however, that prices are bound to go yet higher before the close of the year.

HOPS.

BOROUGH MARKET, June 12.

The market is gradually advancing, in consequence of the continued mild weather entirely stopping the growth of the bine. The Belgian market has also advanced considerably, the reports from their plantations being equally bad with ours.

COALS.—June 14.

Hastings Hartley, 10s. 6d.; Holywell Main, 16s. 6d.; Eden Main, 15s. 0d.; Walls End Hutton, 18s.; Walls End Hutton Lyons, 15s. 3d.; Walls End Hartlepool, 17s.; Walls End Original Hartlepool, 18s.; Walls End South Kellon, 17s.—Ships at market, 10s. 9d. unsold, 1s. at sea, 15s.

No. 1, Peel Street, Manchester, 1871.
OUR HORTICULTURAL SHADINGS form a thorough Protection from Winds, Frost, and Hail, whilst at the same time they admit Light and Sun. They are used and strongly recommended by the most successful Exhibitors and Scientific Horticulturists in the kingdom, as well as on the Continent; in fact, are pronounced the only "proper shadings" ever offered to the public against Birds, Wasps, Blight, &c. As covering for Strawberries, Tulips, Hyacinths, Seed-beds, Greenhouses, &c., they have no rival. The price, being very reasonable, brings them within the reach of every one. With ordinary care they will last for many years. Samples sent free on application.
DANIEL COLLINGS AND SON.
 No. 1—54 inches wide at 85d. per yard run.
 No. 2—54 inches wide at 76d. per yard run.
 No. 3—54 inches wide at 57d. per yard run.
 No. 4—54 inches wide at 47d. per yard run.
 No. 5—54 inches wide at 34d. per yard run.
 In pieces of about 30 yards each, or any longer lengths when specially ordered. Sent free by post in 30 days from date of invoice.

Bee-Hives.—Two Silver Medals Awarded to
GEO. NEIGHBOUR AND SONS, at the Paris Exhibition of 1867.
 The only English Exhibitors who obtained a Silver Medal for Bee-hives.
NEIGHBOURS' IMPROVED COTTAGE BEE-HIVE, as originally introduced by **GEORGE NEIGHBOUR & SONS,** working three bell-glasses, is neatly and strongly made of straw; it has three windows in the lower Hive. This Hive will be found to possess many practical advantages, and is more easy of management than any other Bee-hive that has been introduced.
 Price complete .. £1 15 0
 Stand for ditto .. 0 10 0
 The **LIGURIAN** or **ITALIAN ALP BEE** being much in repute, **G. N. & SONS** supply a Swarm of Bees with genuine Italian Queen, in the Improved Cottage Hive, at £4, Hive included.
 An Italian Alp Queen, with full directions for uniting to Black Stocks, 18s. each.
 ENGLISH BEES.—Stocks and Swarms may be obtained as heretofore.
 THE APIARY. By **A. NEIGHBOUR**, 37, postpaid 6d.
GEO. NEIGHBOUR AND SONS, 127, High Holborn, W.C.; or 240, Regent Street, London, W.
 Agents for Straw, Woodbury, and other Hives and Supers, made by **JAMES LEE**, of Wigan, at his prices.

A newly arranged Catalogue of our Improved Hives, with Drawings and Prices, sent on receipt of two stamps.
 Address, **GEO. NEIGHBOUR AND SONS,** 127, High Holborn, W.C.; or 240, Regent Street, London, W.
 Agents for Straw, Woodbury, and other Hives and Supers, made by **JAMES LEE**, of Wigan, at his prices.

Rosher's Garden Edging Tiles.
 THE above and many other PATTERNS are made in materials of great durability. The plainer sorts are especially suited for **KITCHEN GARDENS**, as they harbour no Slugs or Insects, take up little room, and, once put down, incur no further labour or expense, as do "grown" Edgings, consequently being much cheaper.
 GARDEN VASES, FOUNTAINS, &c., in Artificial Stone, very durable and of superior finish, and in great variety of design.
F. AND G. ROSHER, Manufacturers, Upper Ground Street, Blackfriars, S.E.; Queen's Road West, Chelsea, S.W.; Kingsland Road, E.
 Agents for **LOOKER'S PATENT "ACME FRAMES" PLANT COVERS** and **PROTECTING BOXES** also for **FOXLEY'S PATENT BEADED GARDEN WALL BRICKS.**
 Illustrated Price Lists sent by post. The Trade supplied.

ORNAMENTAL PAVING TILES for Conservatories, Halls, Corridors, Balconies, &c., from 3s. per square yard upwards. Pattern Sheets of plain or more elaborate designs, with Prices, sent for selection.
WHITE GLAZED TILES, for Lining Walls of Dairies, Larders, Kitchen Ranges, Baths, &c. Grooved and other Stable Paving of great durability, Wall Copings, Drain Pipes and Tiles of all kinds, Roofing Tiles in great variety, Slates, Cement, &c.
F. AND G. ROSHER, Brick and Tile Merchants.—See addresses above.

SILVER SAND, fine or coarse grain as desired.
 Fine 14s., Coarse 12s. per Ton. In Truck Loads 1s. per Ton less. Delivery by Cart within three miles, or to any London Railway or Water, 2s. per Ton extra. Samples of Sand free by post.
FLINTS and BRICK BUNKERS for Rockeries or Ferneries. **KENT PEAT** or **LAM** supplied at lowest rates in any quantities.
F. AND G. ROSHER.—Addresses see above.
 N.B. Orders promptly executed by Rail or to Wharves.
 A liberal discount to the Trade.

COTTAM'S Iron Hurdles, Fencing, and Gates.
 COTTAM'S HURDLES are made in the best manner, of superior Wrought Iron, by an improved method. Illustrated Price Lists on application to **COTTAM & CO., Iron Works, 24, Winsley Street, Oxford Street, London, W.**
COTTAM'S PATENT PORTABLE UNITED COW FITTINGS.
 Their advantages are—Portability, no fixtures, removable at pleasure; no Woodwork or Partitions to impede Ventilation or breed Vermin; Hay Rick disengaged with as unnecessary increase of height and depth of Feeding Troughs, Water Cistern, and Patent Drop Cows to prevent over-gorging. Cleanly, durable, and impervious to infection, being all of Iron. Price of Fittings per Cow, 50s.
 Prospectuses free of **COTTAM AND CO., Iron Works, 24, Winsley Street (opposite the Post Office), Oxford Street, London, W.** where the above are exhibited, together with several important Improvements in Stable Fittings just secured by Patent.

WINDOW GLASS, SHEET LEAD, PAINTS, &c.

THOMAS MILLINGTON & Co.,

IMPORTERS AND MANUFACTURERS.

NEW LIST of PRICES for MAY, transmitted or furnished on application.

87, BISHOPSGATE STREET WITHOUT, LONDON, E.C.

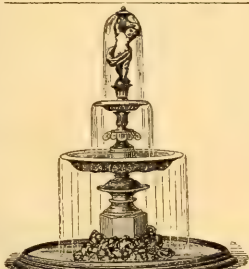
VASES AND FOUNTAINS FOR THE GARDEN AND CONSERVATORY.

ILLUSTRATED CATALOGUE, containing Prices and full information concerning FOUNTAINS and VASES, and with 30 large pages of beautifully Lithographed Designs, Post Free for 6 stamps.

ANDREW HANDYSIDE AND CO.,

Britannia Works, Derby;

LONDON OFFICE:—32, WALBROOK.



THE "AUTOMATON" LAWN MOWERS,

THE BEST, SIMPLEST, AND MOST DURABLE MACHINES.



They leave no ribs in the Grass, and are unsurpassed for keeping a Lawn or Croquet Ground in first-rate order.

They will either Collect the Cut Grass in the box according to the approved English method, or leave it on the lawn, by the best off. They are fitted with the best wheel gearing, the best steel-edged knives, and hardened steel pivots and bearings.

5000 are now in use.

Sizes from 8 to 20 inches. Prices from 55s.

Carriage paid to all the principal Railway Stations in England. They are warranted to give satisfaction, and a month's trial is allowed.

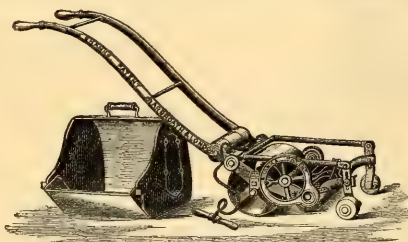
ORDERS EXECUTED ON RECEIPT.

ILLUSTRATED LISTS Free by Post, and TESTIMONIALS from THIRTY ENGLISH COUNTIES. Also,

NEW AND IMPROVED GARDEN ROLLERS.

RANSOMES, SIMS, AND HEAD, IPSWICH.

SHANKS'S IMPROVED LONG GRASS NON-COLLECTING LAWN MOWER FOR 1871.



During the season of 1870 a good deal was written on the desirability of allowing the Grass to remain on the Lawn after having been cut, "for the purpose of acting as a mulch to protect the roots of the Grass from heat or drought." To those Gardeners who still advocate this plan of keeping their Lawns in order, **A. S. AND SON** beg to intimate that they have succeeded in bringing out a machine which they feel confident will be found to answer the purpose better than any hitherto tried. The Cutter of the Machine is made to cut long Grass; it is fitted with **SHANKS'S PATENT DOUBLE-EDGED STEEL SOLE-PLATE.** A Grass Box is sent out with each Machine, its use, however, being quite optional. As there is no Roller or other obstruction in front of Cutter, **LONG OR WET GRASS** can be readily cut with it. At the same time **A. S. AND SON** wish it to be borne in mind they do not recommend this Machine as the best for an English Lawn, or as a substitute for their "New Patent Lawn Mowers for 1871," particulars of which will be found in separate Advertisement, or sent free on application. These are alone adapted to keep an English Lawn clean, close, and smooth as a piece of velvet, and hitherto this has been the aim of the English Gardener. The long Grass Cutting Machine is only recommended as an excellent and valuable addition to the Lawn Mowers here referred to.

PRICES, DELIVERED FREE AT ANY RAILWAY STATION IN GREAT BRITAIN:

14-inch, £5; 16-inch, £6.

A. SHANKS AND SON, DENS IRON WORKS, ARBROATH; and 27, LEADENHALL STREET, LONDON, E.C.
 Illustrated Circulars, with full particulars, sent free on application.

Great Reduction in Prices for 1871,

OF THE

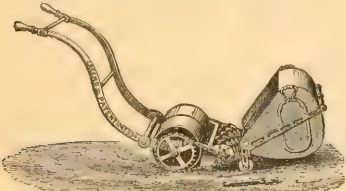
GREEN'S

PATENT SILENS MESSORS

OR

NOISELESS LAWN MOWING, ROLLING AND COLLECTING MACHINES.

During the last few years our Machines have been submitted to numerous practical tests, and found to possess all the advantages in working and keeping a Lawn in the greatest possible state of perfection. We therefore have no alterations to report, as they are unnecessary.



The above Machines have carried off every Prize that has been offered in all cases of competition.

They are warranted to be superior to any others. We guarantee them to give entire satisfaction, otherwise they can be returned, free of cost to the purchaser. With the increased facilities we possess for the Manufacture of Lawn Mowers, we are enabled to Sell them at a reduced rate for former years, as will be seen from the following Scale of Prices.

To cut 8 inches	Price £ s d	
" 10 "	" 3 0 0	Can be worked by one person.
" 12 "	" 4 0 0	
" 14 "	" 5 0 0	
" 16 "	" 6 0 0	This can be worked by one person on an even Lawn.
" 18 "	" 7 0 0	By Man and Boy.
" 20 "	" 7 10 0	
" 22 "	" 8 0 0	
" 24 "	" 8 10 0	

GREEN & SON have pleasure in announcing that the demand for their Lawn Mowers has grown far exceeds all previous ones, and from this fact they are led to believe that the machines of their manufacture are held higher in the estimation of the public than ever.

Prices of HORSE, PONY, and DONKEY MACHINES on application.
Repairs executed with efficiency and despatch, both at Leeds and London Establishments.

GREEN'S IMPROVED

PATENT ROLLER,

FOR LAWNS, DRIVES, BOWLING GREENS, CRICKET FIELDS, AND GRAVEL PATHS, Suitable for Hand or Horse-power.



PRICES OF HAND ROLLERS.

Diameter.	Length.	£ s d	Diameter.	Length.	£ s d
30 in.	32 in.	7 10 0	20 in.	22 in.	3 10 0
24 in.	26 in.	4 10 0	16 in.	17 in.	2 15 0

PRICES OF ROLLERS, fitted with Shafts,

Suitable for Pony or Horse-power.

Diameter.	Length.	£ s d	Diameter.	Length.	£ s d
30 in.	32 in.	10 0 0	30 in.	60 in.	15 10 0
30 in.	36 in.	10 15 0	30 in.	72 in.	17 10 0
30 in.	42 in.	11 15 0	30 in.	84 in.	19 10 0
30 in.	48 in.	13 10 0			

These ROLLERS possess many advantages over all others; they are made in two parts, and are free to revolve on the axis, affording greater facility for turning, and the outer edges are rounded off, or turned inwards, thus avoiding the unsightly marks left by other Rollers. They are manufactured of the best materials, and are got up in a manner surpassing any ever yet brought out.

The ROLLERS, 24 by 26 inches, 20 by 22 inches, and 16 by 17 inches, are also made in one part, at a reduced price; and for Rollers of that size, will be found to answer many requirements, as the handle can be reversed to either side of the Roller at pleasure.

PRICES.
24 inches by 26 inches £ 4 0 0
20 " " " " " 3 2 0
16 " " " " " 2 10 0
Delivered Carriage Free to all the principal Railway Stations and Shipping Ports in England, Ireland, and Scotland.
THOMAS GREEN AND SON, Smithfield Iron Works, Leeds; and 54 and 55, Blackfriars Road, London, S.E.

THE STEAM-ENGINE TRIALS

OF THE

ROYAL AGRICULTURAL SOCIETY of ENGLAND, OXFORD, 1870.

The FIRST PRIZES at this SHOW were again AWARDED to CLAYTON and SHUTTLEWORTH, viz. 1.—First Prize for Horizontal Fixed Engine of 10 H.P.; First Prize for Steam Engine, with Boiler combined.

At the previous Trials of Steam Engines, at Bury, 1867, CLAYTON and SHUTTLEWORTH took ALL the FIRST PRIZES for ENGINES; also a PRIZE of £100 for THRASHING MACHINES, and the Society's SILVER MEDAL. CLAYTON and SHUTTLEWORTH have received FIRST PRIZES at all Trials of the Royal Agricultural Society of England at which they have competed since 1849. N.B.—All the principal Makers of Portable Engines, &c., compete for this Society's Prizes, being the only Trials in Great Britain conducted by competent and impartial Judges, and where the capability and value of each Engine is thoroughly tested by practical experiments. CLAYTON and SHUTTLEWORTH therefore do not compete at any other show.

PORTABLE ENGINES, from 4 to 25-Horse Power.
THRASHING MACHINES, Single, Double and Treble Blast, with Patent Rolled Steel Beater Plates, and all other recent improvements.
GRINDING MILLS, SAW BENCHES, STRAW ELEVATORS, &c.
CATALOGUES ON APPLICATION, OR FREE BY POST.

CLAYTON and SHUTTLEWORTH, STAMP END WORKS, LINCOLN;
78, LOMBARD STREET, LONDON, E.C.; and TARLETON STREET, LIVERPOOL.

BAMFORD'S "MODEL" GARDEN ENGINE,

FOR STRENGTH & DURABILITY UNEQUALLED.

65/-

PRICE LISTS & TESTIMONIALS SENT POST FREE
BAMFORD & SONS, UTTOXETER,

GRAY'S OVAL TUBULAR BOILER.

INTERNATIONAL EXHIBITION, CLASS IX., No. 2119.

MR. GRAY begs to call the attention of the Nobility, Gentry, Nurserymen, Gardeners, &c., to his **NEW OVAL TUBULAR BOILER.**

Acknowledged by practical judges to be a great improvement on every form of Tubular Boiler yet introduced. It has proved itself superior to all other Boilers for quickness of action and economy of Fuel, doing its work with one-third less the amount required by any other.

Extract from Report in GARDENERS' CHRONICLE of International Exhibition, May 24, 1862, page 476.
"The upright form of Boiler is usually made on a circular plan, rather than a square, it seems feasible that the Boilers on the oval plan should bring the tubes more completely within range of the burning fuel; and thus being so, the change, though a slight one, with the fire. The usual form of a furnace being a parallelogram is no doubt an improvement."

They are made of all sizes, which, with prices, may be had on application.

JAMES GRAY, HORTICULTURAL WORKS,
DANVER'S STREET, PAULTON'S SQUARE, KING'S ROAD, CHELSEA, S.W.

J. C. & J. S. ELLIS,

HORTICULTURAL ENGINEERS,

NORFOLK FOUNDRY, SHEFFIELD,

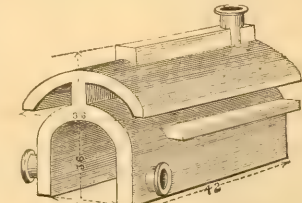
MANUFACTURERS and ERECTORS of HOT-WATER APPARATUS

OF EVERY DESCRIPTION, FOR
HEATING GREENHOUSES, CONSERVATORIES, HOTHOUSES, CHURCHES, PUBLIC BUILDINGS, PRIVATE RESIDENCES, WAREHOUSES, &c.

The great advantages of these Boilers are:—

The fire acting directly under the flow pipe, the water begins to circulate immediately.

The Flues all being formed by a continuous water-way, the fire and all the hot gases are brought in direct contact with the heat-absorbing surface of the Boiler, thereby



PATENT DOUBLE-ARCH BOILER.

TESTIMONIALS.

"DEAR SIR,—After using your Patent Double-Arch Boiler for the past 12 months, enables me to speak with a practical knowledge of its merits; and I have no hesitation in saying, out of many Boilers, of all sorts of construction we have in use, it is the most efficient, and I believe it to be the best Boiler extant; neither do I think there is another that exposes so much surface to the direct action of the fire. Its efficiency, economy in fuel, and the minimum of attention, renders this Boiler a valuable improvement in Horticulture, and it reflects great credit on your good sense in designing it. I shall be glad to show the one I have in use to any person calling at Chatsworth."
"Mr. Ellis."
I remain, dear Sir, yours truly,
"Westbourne Gardens, Sheffield, October 27, 1870."
THOMAS SHERR.

giving a greatly increased amount of power, and by which an immense saving of fuel is effected.

These Boilers offer great facilities for banking-up the fire, and will burn easily from 12 to 14 hours without attention.

The arrangement of Soot-doors in the brickwork is such that all the flues can be cleaned in a few minutes.

"The Gardens, Chatsworth, January 19, 1871."
"DEAR SIR,—Your Patent Double-Arch Boiler, that you have put down for us lately, to heat the whole of our houses, answers admirably. Its heating surface exceeds all others which I am acquainted with. The small amount of fuel required, the way it is set, and the arrangement of soot-doors, renders it the most complete and economical Boiler I have had to do with.—Believe me, Sir, yours truly."
"Mr. Ellis, Norfolk Foundry, Sheffield."
"W. H. BIRD."

BY HER MAJESTY'S

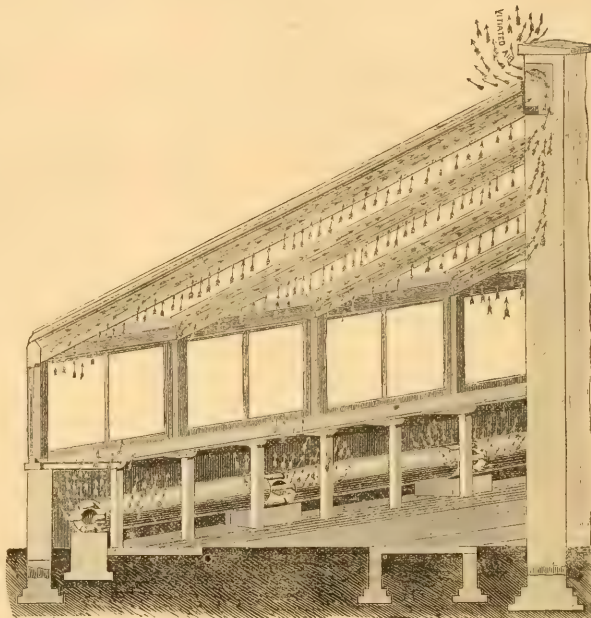


ROYAL LETTERS PATENT.

ORMSON'S NEW PATENT SYSTEM OF VENTILATING HOTHOUSES,

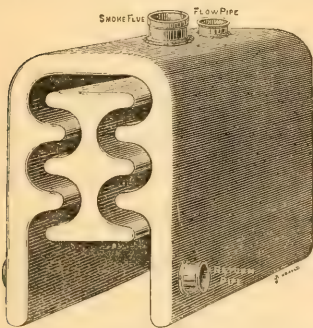
Combined with his Patent VENTILATING HOT-WATER APPARATUS, may now be seen at the Royal Horticultural Gardens, South Kensington, and Gentlemen about to build, Gardeners and Horticulturists generally, are invited to inspect this great improvement in Horticultural Building.

These Ventilating Hothouses and Ventilating Hot-water Apparatus, secure perfectly, at all times, that zephyr-like movement of the atmosphere in Hothouses, which has been so long desired by the most eminent horticulturists.



Provision is made for carrying off ALL CONDENSATION, so that all drip and dampness is effectually prevented. These structures are remarkably strong and light in appearance. The glass used being in large squares and of great thickness, the usual repairs will be done away with, and it will also be hail proof. There is no putty exposed to the action of the sun and atmosphere, either inside or outside of these Hothouses, and painting will be reduced to a minimum.

ORMSON'S IMPROVED WELDED WROUGHT-IRON CONVOLUTED BOILERS.



ORMSON'S PATENT CONVOLUTED BOILER.

Are better than Cast-Iron Boilers, because—

THEY DO NOT CRACK,
THEY REQUIRE NO INSURANCE,
THEY WILL BURN ANY KIND OF FUEL,
THEY ARE SAFE FROM SUDDEN FAILURE;

AND BY THEIR USE

£700 A YEAR HAS BEEN SAVED

IN THE

ROYAL GARDENS, KEW,

And a very large percentage in many other Establishments.

H. ORMSON is prepared to make a Boiler on his Patent Convoluted Principle to Heat WITH SAFETY a larger amount of Pipe than any "One" Boiler in the World can now be found doing.

H. ORMSON also supplies the WELDED WROUGHT-IRON COMBINED SADDLE and FLUE BOILERS. For Testimonials, see *Gardeners' Chronicle* for March 4 and 11, 1871.

HENRY ORMSON, HORTICULTURAL BUILDER TO HER MAJESTY,
AND HOT-WATER APPARATUS MANUFACTURER TO THE COMMISSIONERS OF HER MAJESTY'S ROYAL PALACES AND PUBLIC BUILDINGS,
AND TO THE ROYAL HORTICULTURAL SOCIETY,
STANLEY BRIDGE, KING'S ROAD, CHELSEA, LONDON, S.W.

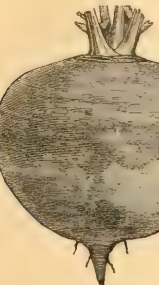
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SUTTONS'
HOME-GROWN FARM
SEEDS.

SUTTONS TURNIP SEEDS FOR PRESENT SOWING.



THE BEST SUBSTITUTES FOR SWEDES.

SUTTONS' GREEN-TOP YELLOW HYBRID TURNIP.

SUTTONS' PURPLE-TOP YELLOW HYBRID TURNIP.

These Turnips are very distinct from the common Yellow Scotch, being larger and quicker in growth, if sown at once, they produce heavy crops, scarcely inferior in quality or quantity to Swedes sown in June. Price per cwt. or bushel on application.

All goods carriage free, except small parcels. Five per cent. off for cash payment.

SUTTON AND SONS, Seedsmen to the Queen and H.R.H. the Prince of Wales, Reading.



Red Spider. Magnified.

Water Your Gardens.

CANVAS TUBING for the above purpose more durable than India-rubber, and bearing very much greater pressure, at a third the price. Can be seen at, or particulars with prices, &c., will be sent post on application to
BUTLER, McCULLOCH, and CO., 27, South Row, Covent Garden Market, London, W.C.

Horizontal and Window Glass Greenhouses.

JAMES MILNES, 6, High Street, and 12 and 13, Blossom Street, Shoreditch, London, E.C.
CONSERVATORY AND ORCHARD-HOUSE GLASS.
Genuine White Lead, Oil, Colours, Brushes, &c.
GARDEN ENGINES, PUMPS, SPRINGES, INDIA-RUBBER HOSE, TAPS, CONNECTIONS, &c.
Prices upon application.

BICKLEY'S PATENT HORIZONTAL SASH.

BICKLEY'S require neither Putty nor Drip, and are the cheapest and best for Orchard-houses, Greenhouses, and Roofs of all kinds. One hundred feet can be firmly glazed or unglazed in one hour. An ORCHARD-HOUSE constructed with these Sashes will be Exhibited at the Royal Horticultural Society's Show at Nottingham, June 27; also at Wolverhampton, July.

Made only by the Inventor and Patentee, **THOMAS A. BICKLEY**, 20, Smallbrook Street, Birmingham.

EXHIBITORS OF CUT FLOWERS, GRAPES, CUCUMBERS, SALADS, &c., will find CHAPMAN'S PATENT VENTILATED WATER TUBE CASES the best now in use, either for Exhibition or Transmission purposes. May be obtained through any of the Agents: the PATENTEE, Gloucester; or W. EASLIE and CO., who have arranged for their sole manufacture. Price Lists and Testimonials on application.—Water.

The Cases will be Exhibited at the Royal Horticultural Society's Show, to be held at Nottingham, on June 27.

Caution to Gardeners.—When you ask for

SAYNOR AND COOKER'S WARRANTED PRIZE PRUNING AND BUDDING KNIVES, see that you get them. Observe the mark SAYNOR, also the Corporate Mark, OBTAIN Warranted, without which none are genuine. S. & C. regret having to caution Gardeners and others, but are quality, having been sold for the genuine ones and which cause many complaints to be made to them of Knives which were not of their make, all of which are warranted both by Sellers and Makers. S. & C.'s PRUNING AND BUDDING KNIVES are the best and the cheapest in the market.

Faxton Works, Sheffield. Established upwards of 125 years.

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Manufactured Solely and Only by the Silicate Zopissa Composition and Granitic Paint Company.
For Price Lists, Testimonials, and Patterns of Colours, apply to **THOMAS CHILD, Manager, 304, King William Street, London, E.C.**

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TO CURE DAMP IN WALLS, and Preserve Stone, &c., from Decay. Manufactured Solely and Only by the Silicate Zopissa Composition and Granitic Paint Company.
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E. T. ARCHER'S "FRIGI DOMO."—Patronised

and used for Fyrmogrene and Kew Gardens. It is made entirely of prepared wool, and a perfect non-conductor of heat or cold where it is applied.

PROTECTION AGAINST FROST.

WOOL NETTING, made in any size, at 6d. per yard.

"FRIGI DOMO" CANVAS.
Two yards wide 12 6d. per yard.

Three yards wide 18 6d. per yard.

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SCOTCH CANVAS, 11 inches wide, 70 yards long, 55d. 108 6d. per yard.

HESSIAN CANVAS, 40s. 4d. 14 and 22 inches wide, 56d. and 81 6d. per yard.

ELIA T. ARCHER, (Only Maker of "Frigi Domo," 3, Cannon Street, City, E.C.) and of all Seedsmen in London or the Country.

NOTICE.—Removed from 7, Great Trinity Lane.

CARTER'S DEVONSHIRE GREY STONE TURNIP

Is the best for present sowing.



This Turnip is of remarkably quick growth and very hardy. Per lb., 10d. Cheaper per cwt. or bushel.

From R. OSBORN, Esq., *The Bury, Stratford, Dumfriesshire, Jan. 13, 1871.*

"I consider the Devonshire Grey Stone Turnips are the best sort for general purposes in cultivation; I have thought so for several years."

All the leading kinds of Turnip and Swede kept in stock. For full particulars and Prices, see CARTER'S FARMER'S CALENDAR, Price 6d., Post Free, Gratis to Purchasers.

All Seeds Carriage Free. 5 per cent. discount for cash.

JAMES CARTER AND CO.

The Royal Seedsmen, 237 and 238, High Holborn, W.C.

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GEO. NEIGHBOUR AND SONS, at the Paris Exhibition of 1867.

The only English Exhibitors who obtained a Silver Medal for Bee-hives.

NEIGHBOUR'S IMPROVED COTTAGE BEE-HIVE,

as originally introduced by **GEORGE NEIGHBOUR & SONS**, working three bell-glasses, is neatly and strongly made of straw; it has three windows in the lower Hive. This Hive will be found to possess many practical advantages, and is more easy of management than any other Beehive that has been introduced.

Price complete . . . 4s 15 0

Stand for ditto . . . 4s 10 0

The **LIGURIAN** or **ITALIAN ALP BEE** being much in repute, G. N. & S. supply a Swarm of Bees with genuine Italian Queen, in the Improved Cottage Hive, at 4s. Hive included.

An Italian Alp Queen, with full supply of Bees, for uniting to Black Stocks, 18s. each.

ENGLISH BEES. Stocks and Swarms may be obtained as heretofore.

By A. NEIGHBOUR, 58, postage 6d.

A newly arranged Catalogue of other Improved Hives, with Drawings and Prices, sent on request, post free, by stamp.

Address, **GEO. NEIGHBOUR AND SONS, 127, High Holborn, W.C.** or 149, Regent Street, London, W.

Agents for Slings, Woodbury, and other Hives and Supers, made by **JAMES LEE**, of Witleigh, at his prices.

Keep your Strawberrybeds Clean by using

PAXTON'S REGISTERED STRAWBERRY CRINOLINE.

Patented in 1865, and is the only one in use.

The contrivance is by the late Sir Joseph Paxton, who after testing them in his own garden at Rye House, Sydney, gave his approval to their usefulness. The right to Manufacture them was transferred to **R. HOLLIDAY**, Horticultural Wire Worker, 24, Portobello Terrace, Notting Hill Gate, W.

and Manufacturers of Archers, Flower Stands, Baskets, Trellis Work, Reapers, Netting Huts, &c. Conservatories fitted up with all kinds of Wire Work.

Illustrated Catalogue and Testimonials on application and stamp.

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Great Reduction in Prices for 1871, OF GREEN'S PATENT SILENS MESSORS

OR NOISELESS LAWN MOWING, ROLLING AND COLLECTING MACHINES.

During the last few years our Machines have been submitted to numerous practical tests, and found to possess all the advantages in working and keeping a Lawn in the greatest possible state of perfection. We therefore have no alterations to report, as they are unnecessary.



The above Machines have carried off every Prize that has been given in all cases of competition.

They are warranted to be superior to any others. We guarantee them to give entire satisfaction, otherwise they can be returned, free of cost to the purchaser. With the increased facilities we possess for the Manufacture of Lawn Mowers, we are enabled to Sell them at a reduced rate on former years, as will be seen from the following Scale of Prices:—

To cut	8 inches	Price £	2 to 10	Can be worked
"	10 "	"	3 0 0	by one person.
"	12 "	"	4 0 0	"
"	14 "	"	5 0 0	"
"	16 "	"	6 0 0	"
"	18 "	"	7 0 0	"
"	20 "	"	8 0 0	"
"	22 "	"	9 0 0	"
"	24 "	"	10 0 0	"

T. GREEN & SON have pleasure in announcing that the demand for their Lawn Mowers this season far exceeds all previous ones, and from this fact they are led to believe that the machines of their manufacture are held higher in the estimation of the public than ever.

Prices of HORSE, PONY, and DONKEY MACHINES on application.

Repairs executed with efficiency and despatch, both at Leeds and London Establishments.

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30	2 14 0	50	5 14 0



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Train from Disgate Station, Great Eastern Railway, and St. Pancras Station, Midland Railway, to WALTHAM STATION, in about 14 minutes. Entrance from platform, Waltham Station.

PAUL'S Nurseries, Waltham Cross, London, N.

Noteworthy Horticulturists and Botanists.

NOTICE.—A SERIES OF PORTRAITS OF NOTEWORTHY HORTICULTURISTS AND BOTANISTS is being published in the "GARDENERS' CHRONICLE AND AGRICULTURAL GAZETTE." The following have already appeared, and copies may be had on application to the Publisher, viz.:—*DR. HOOKER*, C.B., F.R.S.; *W. WILSON SAUNDERS*, F.R.S.; *REV. M. B. BARRELL*, F.R.S.; *PROFESSOR REICHENBACH*, of Hamburg; and *DR. MOORE*, of Glasnevin. Published by W. RICHARDS, 41, Wellington Street, Covent Garden.

Royal Horticultural Society's Show at Nottingham.

NOTICE.—THE GARDENERS' CHRONICLE AND AGRICULTURAL GAZETTE FOR JULY 1 will contain a FULL REPORT OF THE SHOW, with a VIEW OF THE INTERIOR OF THE LARGE TENT, and other ILLUSTRATIONS. May be procured in the Show Ground, and at Messrs. W. H. SMITH AND SON'S Bookstalls, Pall Mall, at a post 5s.6d. Published by W. RICHARDS, 41, Wellington Street, Covent Garden, W.C.

The Gardeners' Chronicle

SATURDAY, June 24, 1871.

MEETINGS FOR THE ENSUING WEEK.

TUESDAY, June 27 { Royal Horticultural (Great Show at Not-
tingham).
SATURDAY, July 1 { Royal Horticultural (Ireland Show).
THURSDAY, June 29 { Royal Horticultural (Great Show at Not-
tingham).

"NOTTINGHAM undoubtedly existed at a very remote period," so states the local chronicler. It occupies a somewhat elevated position on a sandy rock, and contains many objects of interest. Unlike some other manufacturing towns, the leading streets are spacious and clean. A well-to-do aspect pervades it, its commercial ramifications are in a very flourishing condition at the present moment, and a vacant house is scarcely to be seen, so much has its trade flourished since the outbreak of the Franco-German war. The first object that attracts the eye of the visitor, coming in by the Midland Railway, is the Castle, now a mere shell of smoke-blackened walls, having been fired by a riotous mob in October, 1831. From its great elevation, a grand view can be obtained from it of the surrounding country. The great market place, a "triangular area of about 5½ acres;" St. Mary's Church, "the most imposing ecclesiastical edifice in the town;" Stoney Street, containing several handsome and commodious lace warehouses; the general commerce on the north side of the town, with the Arboretum close by, with its war trophy, consisting in part of guns taken at the siege of Sebastopol, and a Chinese bell, taken in the war against that ancient people, round which is arranged a very pleasant flower garden, that will bear and repay inspection; the church cemetery beyond, with "caverns scooped out of the living rock;" the racecourse lying in the hollow below; and a magnificent range of country lying beyond are among some of the principal features that cannot fail to interest visitors going into the town for the first time. The walk round by the park, too, especially on the high terraces on the town side, is very enjoyable, and enables fine views of the surrounding country to be obtained.

The Allotment Gardens in the vicinity of the town will bear comparison with, and in extent, in regard to the conditions under which they are held, as well as in the way in which they are kept, they excel those found in the neighbourhood of any other city or town in the United Kingdom. The Rev. S. R. HOLE, in his "Book about Roses," describes them as "tiny allotments on sunny slopes, just out of the town of Nottingham, separated by hedges or boards, in size about three to the rood; such an extent as a country squire in Liliput might be expected to devote to horticulture." It is computed there are 10,000 of these allotment gardens, some of which are divided; most of them are held under the Corporation, while some are freehold, or held under other proprietaries. There are two Corporation estates split up into allotment gardens: one of these is known as the Bridge Estate, the other as the Chamber Estate. The rents derived from the gardens lie under the first of these go to maintain the Trent Bridge, those from the other are devoted to the maintenance of public baths, wash-houses, &c. The rents of these allotment gardens vary from 10s. to 30s. per annum, according to size. Generally a neatly trimmed hedge parts each from the other, and there is a numbered gateway

leading to the gardens. The gardens are set down in blocks, with pathways running the length of the block at certain intervals, to give access to each allotment; and a stranger entering one of these paths finds himself in a labyrinth of passages, where he might wander for hours vainly seeking an outlet! Thousands of persons spend their happy Sundays in these gardens during the summer,—a social advantage of great moment in a large commercial centre like Nottingham. In the majority of the gardens there is a pleasant summer-house, a parlour, convenience for cooking, and in many instances sleeping apartments. Severe restrictions as to the sale of intoxicating drinks are in force; and, as we are informed, the conduct of the people on a Sunday is in every respect praiseworthy. In some cases there is ample accommodation for an entire family, even to sleep, during the summer months; in a few cases, the holder has taken entire possession of his accommodation, making it his constant place of abode, though liable to be turned out by the Corporation at a moment's notice. All buildings are erected by the tenants; consequently it is the invariable rule to put up the tenant's right of an allotment garden to public auction when it becomes vacant, the price of which varies from £10 to £80 or £100—let it be remembered for the tenant-right and stock and buildings only, not the freehold. The tenant-right of a garden cannot be obtained under £10, so keen is the competition.

Mr. S. P. KNIGHT, the President of the St. Ann's Amateur Floral and Horticultural Society, is looked up to and venerated as a monarch among the tenants of these gardens, by whom he is familiarly designated the "Knight of St. Ann's." Long may he live to bear a designation to which he attaches more honour than he would to the mayoralty of Nottingham. An ubiquitous and indispensable individual, by name "BILLY NEEDHAM," familiarly known under the sobriquet of "General Jack," acts as general budder to the Rose-growing fraternity, and is himself the holder of an allotment garden. NEEDHAM'S capacity to name varieties of Roses from a mere glance at their foliage is something astonishing, and scarcely a single variety, out of the many grown in these gardens, appears to be unknown to him in this way. HENRY GRUNDY'S garden (the tenant a tailor by trade) contains some excellent Roses in pots; from these are obtained the fine blooms seen at the Easter shows in this town. This garden is very nicely kept indeed, and is considered to be one of the neatest in the group. Next comes the garden of GEORGE BURNHAM, the landlord of the Scots Greys' Inn, the headquarters of the St. Ann's Society. This is a capital Rose garden, laid out in circular and oblong beds, and when the Roses are in full bloom it must be a very pretty sight. Any new Rose of acknowledged value is instantly added to the collection. Though an much exposed position the Roses are doing remarkably well. Another good Rose garden belongs to MARK HOE, the secretary to the St. Ann's Society; and further on is one belonging to CHARLES WRIGHT, one of the best cultivators of the Rose, who last year cut something like 2000 Roses from his tiny garden. The gardens of W. COLLISHAW, of ANDREW MARDEN, an expugilist, a charming Rose garden, very neatly laid out, the paths nicely asphalted; of GEORGE PICKERELL, a joiner, a grower of Tulips, and in whose garden was raised that fine byblomen Tulip, Mrs. Pickerell; together with others too numerous to mention, are all enjoyable spots, the good order and neatness of which would put to the blush the occupants of many places served by a professional gardener. Two others still deserve a notice, however; the one belonging to SAMUEL HAMPTON, a labourer in a foundry, earning about 20s. per week. This man works from 6 A.M. to 5.30 P.M., and yet rarely misses a night's visit to his garden, winter and summer. He cultivates Pelargoniums, Camellias, by the sale of the flowers of which he makes his rent, and other plants. He has two greenhouses, roughly constructed, but suitable for his purpose, and he has held the tenancy of his garden 40 years. The other is a freehold allotment belonging to HENRY MARRIOTT, a one-armed man, known as "Lime-light," because he prepares the materials necessary to the production of his brilliant rays. This man has at the back of his dwelling-house two capital houses, like conservatories; in these he has various plants, Plums, Peaches, &c., planted out, and

bearing capital crops of fruit. Vines overhead, &c. Notwithstanding his manifest physical infirmity, the houses and garden are well kept, and the condition of the plants evidences a practical knowledge of no mean degree.

The St. Ann's Society is perhaps one of the most successful of its character in the country. The site of its show is a field of gravel opposite the Scots Greys' Inn, inconveniently situated on a sloping bank, for which the sum of £42 per annum is paid, but which sum is realised by the sale of the grass crop. The show is for amateurs only residing within four miles of Nottingham, and the floral constituency is made up mainly of the holders of the allotment gardens. The principal tent is 80 yards long by 10 in width, and on a fine day some 15,000 persons attend the show. To give some idea of the extent of the competition, it may be stated that 15 prizes are offered for 12 Roses, varying in value from 2 guineas to 3s.; 20 prizes for 6 blooms, varying from £1 to 2s.; 22 prizes for 4 blooms, and 25 prizes for 3 blooms. Many of the holders of these allotment gardens will be competitors at the coming show at Nottingham, but the duplicate entry required—one to be sent to London, the other to Mr. E. J. LOWE—seems sorely to puzzle many of these homely gardeners. Happily they have an excellent adviser in Mr. KNIGHT, who is ever accessible, and unwearied in the cause he so ardently espouses.

It is comparatively seldom that we have the pleasure of calling attention to gardens of so much intrinsic interest. Our legislators and political economists would gain many a profitable hint from the Nottingham allotment gardens. In another column we make further allusion to some of the more important garden establishments in the vicinity of the town, gardens in which wealth and opportunity bear their necessary fruit, but the fruit here is a luxury which may enervate—the fruit of the allotment gardens must ennoble.

GARDENERS, at least those of the better sort, are a notoriously underpaid class of the community, and comparatively few of them will be enabled, of their own gardening resources, to visit NOTTINGHAM at the approaching SHOW, unless employers will enable them to do so. As in all probability the show will be of unusual interest, employers who study their own interests will do well to afford their gardeners the opportunity of visiting it.

The 28th anniversary festival of the GARDENERS' ROYAL BENEVOLENT INSTITUTION was celebrated at the London Tavern on Tuesday last, under the Presidency of Mr. F. T. WRENCH, who was supported by several influential horticulturists, including members of the Council of the Royal Horticultural and Royal Botanic Societies. In proposing the toast of the evening, "Continued success and prosperity to the Institution," His Serene Highness made an earnest appeal for increased support, the more so as, from the number of eminent horticulturists who were either connected with the Institution, as subscribers, or as managers, it was highly likely that the aid given would be applied otherwise than for the object in view, which was to provide for the support of gardeners or their widows in their old age. The treasurer, Mr. WRENCH, whose name was coupled with the toast, thanked the Prince for the able manner in which he had advocated the claims of the Institution, and, as usual, returned thanks to those who had furnished plants and flowers for the decoration of the room, and which were closely examined by the Prince before leaving. These contributors were Messrs. WRIGHT, WILLIAMS, TURNER, and LEE; and Mr. WRENCH wished he could have added the names of some donors of fruit, the scarcity of which was a standing reproach to the profession. He then stated that he had received a cheque for £50 from Dr. HOGG, accompanied with the following letter:—

"Some time ago I undertook, after consulting a few friends, to raise a subscription for a portrait of Mr. RIVERS, of Sawbridgeworth, as a recognition of the efforts he has made during a long life to advance the art of horticulture. Although, by desire of Mr. RIVERS, no special efforts were used, and no direct application was made to any one, a sum was raised which proved more than sufficient for the object intended. The portrait has been secured and handed over to the trustees of the LINDLEY Library, at South Kensington, where it may now be seen suspended in the Council Hall of the Royal Horticultural Society. I have a balance remaining of £50, which I have proposed to Mr. RIVERS to add to the funded stock of the Gardeners' Benevolent Institution, and I have now the pleasure, with his consent, to hand you a cheque for that amount. The only condition which accompanies this gift is, that a special paragraph be printed in all the annual statements of the Institution, setting forth the purposes of the gift, as a testimony to Mr. RIVERS. I trust that this may be the precursor of many such contributions to the funds of the Gardeners' Benevolent Institution; and that they who wish to honour those who are worthy of honour will not think their testimonial the less honoured because it has

been given in aid of the comforts of their needy and suffering brethren."

Several other toasts followed, including "The health of the Chairman, and that of Her Royal Highness the Princess MARY;" "The Horticultural and Botanical Societies," responded to by Mr. BATEMAN and Sir WALTER STIRLING; and "The Secretary," in responding to which Mr. CUTLER said that the Institution was never in a more flourishing condition, and announced subscriptions to the amount of about £450.

— M. CARRIÈRE has lately thrown some doubt on the statement that the PEAR cannot be GRAFTED on the APPLE. This assertion, says he, is too general, for though true in many instances, it is not so in all, as witness a Beurré de Malines Pear in the Jardin des Plantes, and a Beurré Spence, or Fondante des Bois, both of which were grafted on the Doucin stock in 1856, and which are healthy vigorous trees, which produced last year a good crop. We hope that some of our experimentalists will adopt M. CARRIÈRE's suggestion, and carry on a series of experiments in this matter.

— Under the name of the "CLIMAX," Messrs. FOLLOWS and BATE, of Manchester, have introduced a LAWN MOWER of simpler construction and easier working than any other with which we are acquainted. The roller is entirely dispensed with. The cutter consists of one fixed plate as usual, and four revolving knives fixed slant-wise to a central pivot. These are driven by a simple wheel and pinion. A grass box is placed behind the cutters to receive the cut grass, but the box can be removed at will. We have as yet only tried the machine on wet grass, and on an uneven lawn; nevertheless we found it very easy to work, and the cut quite satisfactory, though with a little tendency to clog, which would probably not be noticeable when the grass is dry. For cutting the grass on narrow verges and steep slopes this machine is superior to all others that we have tried. This may be readily understood from its lightness and simplicity of construction, and from the circumstance that, if necessary, one of the driving wheels may be entirely removed so that the machine can be worked close up to vases or shrubs, in corners and narrow spaces inaccessible to the ordinary machines. We found the machine to act much better without the grass box than with it. With the box, while most of the grass was collected, some of it was scattered and had a tendency to clog the knives. The Climax seems particularly adapted for small establishments and for amateurs' use. It is really, and not merely professionally, easy enough for a lady to work.

— We hear that Dr. SEEMANN has once more returned to the mountains of Nicaragua, and will consign any new plants he meets with to Mr. W. BULL.

— We learn from a report in the *Nottingham Express* that it has been arranged that the DINNER is to take place on the first day of the show—Tuesday, at half-past 6 P.M., in the Exchange Hall. The tickets will be 5s. a head. The prospects of a large and brilliant exhibition are most encouraging.

— The BICYCLE NUISANCE ought to be put down with a strong hand, since from the incompetency of nine-tenths of the riders it is a perpetual source of danger to the public. As a recent case in point, we may mention that on the return from the South Kensington show on the 5th inst., Messrs. F. & A. SMITH's van was overturned in consequence of one of

these pests of the road being abandoned by its incompetent rider, who jumped off and allowed it to fall between the horse's legs. The result was that the horse ran away, the van was overturned and reduced to a mere wreck, the beautiful variegated Zonal Pelargoniums, which had just won an extra prize, were totally ruined, and, worst of all, three attendants were seriously injured, one conveyed insensible to the hospital, one with dislocated shoulder and bruised hip, and the third lamed from having the knee-cap cut and bruised.

— Well done, M. DU SOMMERARD! will be the exclamation of all those who visit the FRENCH ANNEXE just opened at the INTERNATIONAL EXHIBITION. When the enormous difficulties the French Commissioner and his assistants have had to contend with are remembered, the display now made will be found of unusual interest.

— The MAXIMUM TEMPERATURES of the air in England during the week ending June 17 ranged from

mean for England was 1.45 inch, and for Scotland 1.19 inch. At Sheffield, on the 15th, 1.70 inch was measured in four and a-half hours.

— We hope to commemorate the NOTTINGHAM SHOW, not only by our report on the general features of interest in the vicinity of the town, and by the portraits of the Hon. Local Secretaries, which we give in our present number, but also by a full report of the exhibition, and a view of the interior of the tent, which will appear in our next issue.

New Garden Plants.

PHALÆNOPSIS PARISHII, *Rehb. fil.*: var. LOBBII, *Rehb. fil.*; Saunders, *Refig.* vol. 1, 85! Labello calloso semiovato magis tumido, toto labello albo, vittula longitudinali castanea utrinque.

Flowers milk-white, lateral parts of the lip yellowish, with brown streaks and dots; the base of the callus bearing the bristles brown; around the base are little violet and white bristles. Two brown streaks over the lip, alternating with a white middle field and white edges. Limb of fovea violet. The broad base of the column white, with one brown dot at each side and a few brown short streaks beneath.

I made out by the kindness of Messrs. Veitch that this variety had been discovered, long before Rev. C. Parish, by T. Lobb, in 1845, in the Himalaya, where it also has been observed by the excellent botanist, Gustav Mann. It is very satisfactory that the very same variety grows also in Moulemin, it having appeared some time since in the famous Dayan collection at High Cross, Tottenham. *H. G. Rehb. fil.*

DENDROBIUM ACROBATICUM, *n. sp.*

Chrysantha. Stachyobia. Caulibus oblongo-ligulatis tumidis parvis alen caulibus involutibus: foliis oblongo-ligulatis; racemis apice paucifloris, lateralibus, mento obtusato; sepalis ligulatis obtusatis tepalibus oblongis basi cum callo gibbibus intus: labello obtusangulo rhombico, callo transverso, ligulato in ungue, disco minutissime velutino; columna apice utrinque dolabriformi, fovea in basi transversa sursum acuta.

A dwarf, yellowish flowering species, with the entirely new and odd peculiarity of having a callus at the base of each petal. It is near *Dendrobium polyanthum*, Lindl., and comes from Moulemin. I have to thank Messrs. Veitch, not only for a good specimen, but also for a sketch of its peculiar growth in the way of that of *Dendrobium Aphrodite*, *Rehb. fil.* (1) Aug., 1862; (*D. nodatum*, Lind. (2) Aug., 1862!)—one stalked bulb coming out of the side of the first, and the third one very high out on the opposite side. Having thought when looking at that sketch, of the acrobats, who stand one on another to amuse the public in the theatres, I called the species acrobaticum. *H. G. Rehb. fil.*

REV. S. REYNOLDS HOLE, M.A.

APART from the interest attaching to the "Nottingham show," and to those who have laboured alike with zeal and discretion to make it a success, among whom the Rev. Mr. Hole stands conspicuous, there must be a large number of our readers to whom the portrait of the author of "A Book about Roses" will be welcome. The book itself relieves us of the necessity of saying much about its author. Till lately, the visitor entering St. Paul's Cathedral was admonished to look around him, and see in its domed expanse and vaulted aisles the fittest monument of the genius and skill of its architect; so, more than in any book we know,



REV. S. REYNOLDS HOLE, M.A.

79° at Norwich to 64° at Newcastle, with a mean for all stations of 72°.7; and in Scotland, from 69°.8 at Glasgow to 65° at Dundee and Leith, with a mean for the several stations of 67°.2. The MINIMUM TEMPERATURES in England descended below 40° at one station only, viz., Hull, where 35° was recorded; and in Scotland the lowest temperature was 40° at Dundee and Leith, the means for the two countries being, for England 43°.6, and for Scotland 42°.5. MEAN TEMPERATURES.—These values are much higher than during the preceding week, the weather on most days being warm, and thunderstorms were frequent in different parts of the country. In England the weekly mean temperatures ranged from 60°.8 at Manchester to 52°.5 at Newcastle, with a mean for all stations of 57°.4, or more than 4½° above the mean for Scotland, which was 52°.7. RAINFALL.—This element has at last become conspicuous, for with such falls in the week as 3.29 inches at Leicester, 3.01 inches at Sheffield, 2.23 inches at Nottingham, &c., England takes a decided lead of the more northern country, where 2.55 inches at Greenock was by far the largest amount recorded at any of the stations. The

are the characteristics of the author displayed in the work we have alluded to. Learning lightened with wit, knowledge seasoned with fun, appreciation quickened with humour, add to these an honest contempt for snobbery, quackery, and unrighteous dealings, and a disposition to respect the man rather than the coat he wears—these are the qualities which come to the surface in the author's pages. But Mr. Hole does not confine himself to writing books; he not only sympathises with workmen, but he works himself, and one may be sure, from the many practical demonstrations of the fact that we have had, that he works with a will, and that his geniality of disposition, no less than his energy, render his co-operation most effective and valuable. Though known for many years as an enthusiastic rosarian, as the founder of the first Rose show *pur et simple*, as judge or *amicus curiæ* at almost every rosy conflict of any consequence, his love for his favourite flower, so far from satiating itself, seems but to increase. What though winter checks his ardour for a season, it is to him truly "As though a Rose should shut and be a bud again." For let but the season roll round, and we find our friend, to the front, "eagerly," as he himself tells us, "as a carrier-pigeon," to his native dovecot." This devotion to gardening—*tantus amor florum*—seems only equalled by his devotion to gardeners, whose interests and welfare he is at all times so ready to promote by word of mouth or stroke of pen, that on his next prize cup might fitly be inscribed,—"Hortulanus sum hortulanus nihil a me alienum puto."

It would be foreign to our purpose to say aught of Mr. Hole, save as a gardener and a lover of his kind. Suffice it, then, in conclusion, to add that he is, and we trust long will be, vicar of Cauntton.

E. J. LOWE,
F.R.S.

THE subject of this notice, who comes before us in the capacity of local secretary for the Nottingham Exhibition of the Royal Horticultural Society, is well known to a wide circle of scientific men as a most indefatigable worker, more especially in relation to meteorology, natural history, and horticulture. The notes of observations taken at the Highfield House Observatory, and which have been kept up regularly for over 30 years, are always looked for with interest. In relation to this subject we may mention that Mr. Lowe is now publishing a work entitled "Natural Phenomena and Chronology of the Seasons," which consists of a chronological account of remarkable frosts, droughts, storms, gales, floods, &c., which have occurred in the British Isles since A.D. 220. Mr. Lowe accompanied the Admiralty eclipse expedition to Spain, in 1860, in order to take charge of the meteorological observations at Santander. He has also published numerous papers on this branch of science in the "Proceedings" of the Royal Society, the British Association, and the Meteorological Society, of which latter Mr. Lowe was one of the founders, in 1850, in conjunction with the late Dr. Lee, of Hartwell, and Messrs. Glaisher, Drew, Fasel, King, Lowndes, Reade, Rutter, and Whitbread, which ten persons were the original members, and on the first Council.

Mr. Lowe's claim to a place in our series of portraits is, however, to be sought rather in his relations with natural history and horticulture, in which he has been for many years an active observer and experimenter. As the author of "Ferns British and Exotic," of which two volumes of coloured figures were issued, and of "Native Ferns," the two volumes of which are profusely illustrated with woodcuts of the varieties of

British Ferns, Mr. Lowe has done much to extend the knowledge of these charming plants amongst the masses. As an experimentalist he has been wonderfully successful in raising from the spores new varieties of Ferns, and as a proof of his success in this department, it may be recorded that he has won over one hundred first-class certificates at the meetings of the Royal Horticultural and Royal Botanic Societies for new varieties of British Ferns, a large proportion of which were of his own raising. Mr. Lowe has submitted papers as to his experiments on this subject to the British Association, both at Dundee and Liverpool, and the gist of his experience is that by sowing mixed spores intermediate forms are originated. At Liverpool 50 illustrations of these experiments were submitted as the result of the following experiments (see "Brit. Assoc. Rep." 1870, 120):—

"Spores were sown from a normal frond, and every plant raised was normal."

"Spores were sown from a normal frond, in the same

Lowe staged, at one of the great shows of the Royal Botanic Society, a stand of 23 seedling Pansies, which, though competing against named kinds, were of sufficient merit to win the first prize.

As an observing naturalist Mr. Lowe has to be credited with the discovery of a new English worm, *Megascotex rigida*, of which an account was given at p. 478 of our present volume. He is also the discoverer of a new slug, a variety of *Limax levis*, while he has found new English localities for several rare British shells, as *Helix revelata*, *Clausilia biplicata*, *Achatina acicula*, *Unio margariferus*, and *Arion flavus*. While on the Spanish expedition, botanising against the spurs of the Pyrenees, he found *Woodwardia radicans* near Reimsa.

Mr. Lowe was one of the local secretaries at the Nottingham meeting of the British Association, and the secretary of the floral *fiête* held at the same time. He is at the present time a county magistrate, a commissioner of income-tax, assessed taxes, and sewers; a visiting justice of the county prison, and a vice-president of the Nottingham Philosophical Society, and the Nottingham Mechanics' Institution; a fellow of the Royal, Royal Astronomical, Linnean, Meteorological, and of several other learned societies, English and Foreign; and a member of Council of the Royal Horticultural Society. His father, the late Alfred Lowe, Esq., J.P., of Highfield House, devoted much of his life to horticultural pursuits, and as a landscape gardener was excelled by but few country gentlemen.

ROSES, ETC.

THE "latest out" on the subject of Roses is a delightful volume by the Rev. S. Reynolds Hole, entitled "A Book about Roses," bringing down the information about New Roses to the month of August, 1870. When I had finished reading this racy book, full of wit and humour, and done in flowery language, as becometh the subject, I found myself roused up to action, as when the war-horse hears the trumpet, not only on my own account, but also on that of my "brothers in the trade," the gardeners whose business and duty it is to grow Roses.

The learned author begins by stating that whoever would grow Roses must first have "Roses in his heart," and love them. This is quite a new doctrine. The older authors, no doubt, sighed, as Edwin, "but never

talked of love." The volume abounds in scraps of Greek and Latin, as well as French, and allusion is made to "siller," "hac," as a compliment to North Britain, which I take with thankfulness, and raise my hat. These phrases from foreign tongues are not meant for gardeners, nor, indeed, for any one else, but just to maintain a certain dignity in dealing with the queen of flowers, that it be done in courtly language. Character is here delineated with a few master strokes of the pen worthy of Thackeray. Mrs. Brown at the Rose show, and the disappointed exhibitor, are drawn to the life. The author's Brierman is quite a pillar of the Church, and never missed attendance in the season when Briers should be planted. The author hits home on the score of making everybody pleased with themselves first, which is putting a very high polish upon flattery. The ladies are "daughters of the gods," not as Burns has made the Jolly Beggar say, "I like the jades for a'that;" the baby such a darling "duck;" and the beau is set to show, by his jealousy of the babe being praised by his fair one, how madly he is in love—they got married. The youths were manly in their tastes for following the hounds on fast nags—not as Mr. Weller did, in a



EDWARD JOSEPH LOWE, F.R.S.

seed-pan, and in equal proportions with spores from an abnormal frond, and the result was that 90 per cent. of the plants were abnormal.

"Spores were sown in separate pans from remarkably-formed fronds, the result being plants like the parent."

"Spores were sown from most singular-looking fronds, a dozen varieties sown together, the result being a large number of remarkable varieties."

"Spores were taken from a dozen of these most remarkable seedling forms, and they were mixed together, the result being even more extraordinary. In this experiment 4000 plants were raised, of which no two were precisely alike, and not one was of the normal form."

Mr. Lowe's conclusion from these experiments is, that spores sown mixed together produce different varieties from those sown separately. In this way he has been successfully working on *Scopolendrium*, *Athyrium*, male Ferns, *Adiantum*, and *Asplenium marinum*. But Mr. Lowe's attention has not been wholly confined to Ferns; he was the raiser of Imperial Blue Pansy, and we learn that he has now a new breed of Zonal Pelargoniums, to be exhibited at the Nottingham show, and which are the result of "a cross between the blue field Geranium and the Pelargonium Madame Vaucher and Sprite." Some four years since, Mr.

call the central flower 1, then the relation it bears to the two next will be like this, 2, 1, 2—that is, flower No. 1 is the terminal flower to the main stalk, and the oldest flowers 2—2 are terminal flowers to the side stalks formed after No. 1, and both of the same age. Below flowers 2, 2, may perchance spring other flowers in the same way, 3, 3—3, 3, and in this manner we may get a series of forkings. Growth in any particular direction is soon arrested or defined, and if the growth is repeated the original course is not followed, but one at an angle to the preceding one. All this takes a good many words to describe, but may be seen in a moment, by looking at the inflorescence of an *Hypericum*, or a Mouse-ear Chickweed (*Cerastium*), and many other plants. The calyx of the *Hypericum* is made of five free sepals, often studded with black dots, which are again reservoirs for oily matter. Within the sepals are five yellow petals, generally a little lop-sided, or *oblique*—D, fig. 168, and then we come to the stamens, which are very numerous, and spring from below the ovary—*hypogynous*, having no adhesion, either real or apparent, to the calyx, or the sides of the ovary, but combined among themselves into three parcels, as may be seen best in young flowers or newly opened buds—c, fig. 168. Where stamens are thus united together, Linnaeus used to call the several parcels *brotherhoods*—*adelphoi*; thus, in the Mallow, where they are all apparently in one parcel, the term *monadelphous* was used, meaning one brotherhood. Here in the *Hypericum* the stamens are *triadelphous*. These terms, however, do not express the whole truth. The fact is, that in most of these cases the stamens correspond to compound leaves (see p. 676). Thus, each of the three parcels is a *compound stamen*—a branched stamen, if you will; and instead of there being a great number of stamens, there are in the *Hypericum* only three, but each one divided into a number of subdivisions. Note, then, that the anther, which is usually considered to correspond to the blade of an ordinary leaf, does not always represent a simple or entire leaf, but sometimes, at any rate, only a portion of one.

Within the stamens is the ovary—E, fig. 168, made up of three carpels, as may be seen by cutting it across—B, fig. 168, when its three cavities may be seen, or by counting the three widely spreading styles, which equally indicate the ternary character of the pistil. The inner angles of the carpels bear numerous tiny ovules, and as these ovule-bearing angles or *placentas* meet in the centre, the *placentas* or portions of the ovary bearing the ovules meet in the centre or axis of the ovary, and produce what is termed an *axile placentation*—B, fig. 168. These carpels as they ripen become dry and woody, so that ultimately a *capsule* is formed, which splits into three pieces or valves, to allow the ripe seeds to fall out. The main structural features, then, of the *Hypericum* are the opposite, entire, exstipulate, and dotted leaves, the definite inflorescence, the lop-sided petals, the three compound stamens, the three carpels, and the capsular fruit. It is as well to notice also the want of numerical correspondence between the calyx and corolla, which are both five-parted and the stamens and pistil, which are both ternary. In a truly regular flower all the parts are numerically similar, all in fives, or threes, as the case may be; but, as we have seen, the *Hypericum* constitutes an exception to this regularity of number, or rather some *Hypericums* do, for there are others in which the parts of the flowers are throughout in fives. H. calycium is not only one of the handsomest of hardy low growing shrubs, but it has the rare faculty of growing in the shade of trees where scarcely anything else will grow. Some of the *Hypericums* have been used medicinally, on account of their resinous properties, and we have painful remembrances of an application that was made to a cut finger in our childhood, and which application consisted of the leaves of some *Hypericum* steeped in rum or some other spirit. The application did no harm beyond the infliction of unnecessary pain, and it might have done good had a stimulant application been really needed. We didn't know then—and if we had known, the knowledge would have been useless—that in most cases Nature heals a wound after her own fashion better than any one else can do for her, even though the "vulnerary" consist of St. John's Wort.

Home Correspondence.

Grapes from Aged Vines.—Connected with the prize offered at the Nottingham Show of the Royal Horticultural Society by Mr. Forman for Grapes from Vines not less than 25 years old, a rather singular question has arisen. One of our most distinguished fruit growers has applied to know whether he will be allowed to show the new kinds of Grapes for the prize, and the answer would naturally be, "No, certainly not." But these new kinds are grafted upon

stocks of the required age, and as it is the age of the Vine that is specified, not the kind or kinds of Grapes, of course there can be no objection to new varieties of Grapes from Vines of that age. As, however, it might lead to some misunderstanding on the day of exhibition, and as I am the person mainly responsible for the prizes being given, I know you will allow me to intimate that Grapes of any kind may be shown, so long as the *bona fides* of the object are complied with, and the Vines from which they are gathered are not less than 25 years old. Another question has also been mooted: How shall we be certain that the Vines are



FIG. 167.—SPRAY OF *HYPERICUM PERFORATUM*.
A, "Dotted" leaf.

of the required age? Personally, I should be content to rely upon the good faith of the exhibitor; but, to prevent all cavilling, perhaps it will be best that each exhibitor shall, if required, produce a guarantee from his employer, or some other responsible party, that the Vines from which the Grapes have been cut are of the specified age. It will further be very interesting to know whether the Vines have been, and are now, treated upon the "extension" or "restrictive" systems of cultivation. *Wm. P. Ayres, June 19.*

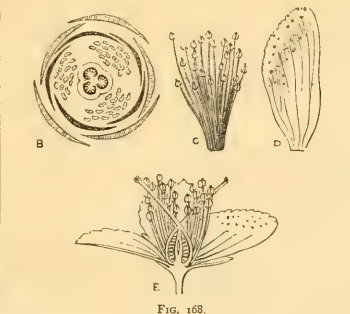


FIG. 168.

B, Diagram showing the arrangement and relative position of the parts of the flower; C, A compound stamen; D, A petal oblique in form, and sprinkled with black dots, or glands; E, Vertical section through a flower.

Gentiana germanica.—Mr. Hinchliff, in the "Alpine Journal" (see p. 739), contrasts the gigantic growth of *Gentiana campestris*, in the neighbourhood of Tring, with its much more humble stature in Switzerland. It strikes me that my friend must have gathered the closely allied but much more beautiful *Gentiana germanica*, whose head-quarters, and I believe only British quarters, are in this neighbourhood. I know of nothing more beautiful than the appearance of this plant, after a wet summer. It grows sometimes nearly 14 foot high, in shape precisely resembling a pyramid *Pear tree*, whilst every leaf is hidden by its dense mass of large delicately fringed flowers. It prefers the most arid

spots on the chalk down slopes underneath the Beech woods. I have frequently tried to grow it in the garden, but always without success. I have shown it to several of our most eminent botanists at home and abroad, and all have pronounced it to be the true *Gentiana germanica*. *H. Harpur-Crewe, The Rectory, Drayton Beauchamp, Tring.* [Please send us a scrap. EDS.]

Flowering of the Japanese Honeysuckle.—With this note I send a slip of Japanese Honeysuckle in flower, which is to me a novelty, and I shall be glad to hear whether it has been flowered before in this country. The plant from which it is taken is trained on the house wall, facing east, but the situation is extremely warm, on the slope of a hill facing the south, on gravelly soil, and in an atmosphere which is generally damp and forcing. Another plant on the west side of the house is also in blossom, and both are about four years old. *J. J. Cater, Southgate.* It has flowered frequently. EDS.]

Early Peas.—On February 16 my gardener sowed Carter's First Crop and Laxton's Supreme Peas in trenches, as if for Celery, with plenty of manure dug into the bottom of each trench. The result of the first picking was, on June 7, a good-sized vegetable dish of Peas, and we have continued picking since. The Laxton's Supreme are now in pod, so will make a good succession to Carter's First Crop. I have found the trenches of great service this trying season, as, when watering the Peas, the moisture gets down to the roots, instead of running away, as I have always found to be the case when Peas are earthed-up. *Early Peas, Hants.*

Raising Vines from Cuttings.—I have forwarded you a faggot of Vines from cuttings, which pruning time were laid into the ground, not with a view to be propagated, but with many more similar bundles, lest any one might ask for some cuttings. The cuttings were bundled up irrespective of which were tops or which tails; and the result as seen when clearing them away the other day is what I have sent you—a splendid strike of roots and a correspondingly healthy growth at top, amongst which I think you will find some bunches in embryo. My object in sending you the live faggot above alluded to, is to show how very easy a plant the Vine is either to make strike root, or afterwards to cultivate, and I should not have done this only that lately we have been told so much about the raising of Vines and Peas on turf. If the latter were to be accepted as fossil ideas, surely then the wholesale system of striking Vines by thousands in tied up faggots may be accepted as equally new. I deprecate altogether the necessity of root pruning young Vines with a view to their being coaxed to throw out more roots; this, together with the disputed method of raising Vines on turf is more a fancy than a reality. The strongest Vine I have, now planted nine years, is, at a foot from the ground, exactly 34 inches in circumference. Before this Vine was planted out it was for several years confined to a flower-pot, and frequently cut down. The Vine is grown on a sort of extending system, and bears enormously every year. I have said before that the Vine is one of the easiest plants to cultivate under the sun, and, when a gardener gives up gardening generally for the cultivation of the Vine alone, it resembles very much the case of a member of Parliament who resigns his seat and accepts the Stewardship of the Chiltern Hundreds; both by that time, it would appear, can do either with or without their offices. *Wm. Miller, Combe Abbey Gardens.* [The specimens exhibited abundant roots, healthy young shoots, and many embryo bunches, exactly as Mr. Miller describes. EDS.]

Green Seakale Shoots.—As a set-off to such subjects as Clocks, Cow Parsnip, Dog and Magog, as it is facetiously termed by my employer—fit for human food, allow me, though somewhat late in the season, to draw attention to the merits of unblanching flowering shoots of Seakale as a most delicious esculent—a fact not generally known. But for the comparative backward state of our spring Cabbage, I might not now have the privilege of advocating its claims; as it is, however, it has proved a most useful and excellent link between the season of the aforesaid and the various Kale—to all of which, in my humble opinion, as well as that of others, its flavour and texture is much superior, and infinitely so to that of inferior blanching Seakale. I may add, that in future, as far as I am concerned, whether other reasonable vegetables may be at a discount or not, I shall not fail to afford green flowering Seakale shoots the full recognition they deserve, and to, as heretofore, unceremoniously consign them to the pigs. *Wm. Gardner, Gr., Lower Easington Park, Stratford-on-Avon.*

The Season and the Crops.—Since Sunday last we have had here (Farnham) thunder several times, with

Austro-Hungarian Government to the International Exhibition of 1871. Mr. G. F. Wilson, who exhibited an interesting series of cat blooms of Lilies, made some comments upon several of the more remarkable varieties, and stated, in relation to the culture, out-of-doors, that he found from experience that the best way was to plant them in deep beds of peat, amongst dwarf Rhododendrons. The latter plants afford them a suitable amount of protection, and they grow much more vigorously in this situation than they do under glass.

Mr. Chairman, after alluding to the unavoidable absence of the Rev. M. J. Berkeley; to the deficiency of the objects of interest, which he supposed were kept back for the great show at Nottingham next week; and to concerning examples of *Araucaria imbricata* from the States, he more fully explained, and stated, that they had not seen anything lately from that most successful of Orchid growers, Mr. Anderson, of Meadow Bank, but he was glad to see, from the magnificent cut spikes which he sent on this occasion, that he was not asleep. Concerning the examples in question, Mr. Anderson writes as follows:—

"The Raceme of *Odontoglossum Alexandrie* was taken from a plant among the very healthiest in our collection at Meadow Bank. The pseudobulb bearing it sent up two racemes: the best one to be exhibited having 53 flowers, the one uncut having nine flowers. In respect of numbers this is the largest I have seen, but in respect of flowers I have never up to this time seen one bearing equal to it. The one which we bloomed bearing 56 flowers on a branching raceme was not specifically distinct from the one exhibited, only the flowers were much smaller, still not smaller, namely, than the ordinary run of the racemes of *Waltia Odontoglossum*. The pseudobulb bearing the 56 flowers was not so large as the one that has carried through the inflorescence of the 22 flowers; so that it would seem that it requires a much larger sustaining and co-operative power to furnish the necessary support for enlarging the pseudobulb, or enlarging the number of flowers. The raceme is a little past its best, having opened its first flower on May 20; so that by the time it is exhibited it will have been a full calendar month in bloom. It will be observed that one of the flowers has been fertilised, and another is in the process of being so. It is the work of a humble-bee. We have great difficulty in keeping out these intruders, and have killed many before they committed their devastating work. As is well known, the moment the flower becomes fertilised so soon as to begin to set seed, the pollen is so sticky that it necessarily occur when the pollinia have been extracted, as will be seen from at least four others of the flowers down the stem. These pollinia have been stolen unwittingly by the humble-bees who fly about loaded with loads of pollen-masses, which they have not been permitted to encroach upon the ground, further, the flowers that are upon the plant would have been readily fruited. The plant from which the raceme was taken has been grown in quite a cool temperature, in fact, in the same medium from which I took and tabulated the minimum temperature for the last year. This is the *Gardeners' Chronicle* some months ago. Since that time I have kept the house at a correspondingly low temperature, considering the advancing temperature of the season; and, as I have said before, I do much more for the south wall than I do for the pits and houses in which these alpine Orchids are grown cool enough during our summers, taking 1868, and even last season, as examples, than I do in successfully wintering them. I can appreciate, therefore, the difficulty which many of us will experience in keeping the house at a temperature to such I would say, transfer them to cool frames in a position shaded from the sun. More light will be gained in this way without being exposed to the trying effects of Sol's influence, as persons so doing won't require to assist with camellias, and the seeds of the house, the *Aerides Lobbi*, which has been grown in tropical heat. The plant from which it was taken has 30 leaves, and is in magnificent health. It is treated like all other tropical plants, with abundance of atmospheric moisture and plenty of heat during the growing season, and has a quiet time in winter, the moisture being reduced to as low an ebb as a minimum of 60°, and a mean of 67° for at least three of the darkest months of the season, suggest to a practical observer. Any higher temperature than this is never allowed, and yet health and inflorescence, I always think, free and better, and more powerful, if I might use the word, summer temperatures, and copious supplies of moisture applied, to be used up by the proper articles at the proper time. *Jas. Anderson.*"

"The Masters alluded to other instances of change of sex in ordinarily unisexual trees, and adverted to the remarkable evidences of alternations of sex, in different seasons, observed in certain Palms by Mr. Spruce. Mr. Hogg then read the following communication from the Rev. W. Kingsley, relating to the fruiting of seedling trees:—

"Everyone knows how very long is the time between sowing the seed of a fruit tree and getting fruit from it, so that 10 or 20 years of age are necessary to get seedling propagate seedlings. I believe the time may be shortened most materially, and that a very few words will explain the correct way of growing seedling fruit trees. I have been led to the idea by the difficulty I have had in getting some grafted seedlings to fruit, and by observing that precisely the same sort of growth occurred in some trees that had originated in suckers from old ungrafted trees. In almost all these cases, whether Apple, Pear, Plum, Peach, or Orange, the wood was thorny; and though I cut back, and used the scions for scions, all had the same thorny and fruitless character.

"However, in experimenting upon a set of seedling Peaches, some were allowed to grow wild, some steadily pinched-in, some cut-in closely and pinched, and some cut as single rods; all these four different modes of the shoot got beyond the thorny part of the stem, and it occurred to me that it was only necessary to get beyond this part of the growth as quickly as possible. This is done by encouraging the growth of the young seedling to a single upright shoot, and then using the point of that shoot as a scion on a strong stock; then the shoot from this scion is to be again trained at full length, and its point again used as a scion. In this way a shoot may be got having buds 20 feet or more from the root in a couple of years. The old seedling trees may thus be grafted with a scion that is itself a scion, and it is not necessary to have them in their third year with a scion taken from an intermediate grafted tree. It may be necessary to stop the leader to be used as a scion by the end of August, to ensure its ripening, but this will not seriously affect its nature."

"I can speak from experience of the success of the process in the case of Peaches and Oranges, and some Plums; Pears and Apples I have not yet tried. But I may also mention that I have in this way got over the difficulty of the shoot from the old tree being too small. The trees that I could not get to fruit had been grafted with scions taken off too near the root, the sorts being new ones. By selecting the scion near the root, or far from it, a grafted tree would be produced that would bear only a longer interval or quickly according to the gardener's will. At any rate, what has been said shows the importance of choosing the points of leading shoots as the scions for forming dwarf trees.

"I should very much prefer having some independent experiments tried, trusting entirely to my own experience, than to have some one else's word. The Horticultural Society will take the matter up; and in the meantime any discussion this statement may provoke will be of service to horticultural science. *W. Kingsley.*"

It was suggested that the Society should undertake experiments on this subject, on the plan suggested by Mr. Kingsley.

Dr. Welwitsch communicated an interesting paper on the Lorantheaceæ of Angola, and which gave rise to an animated discussion; and a great desire was evinced that horticultural science should endeavour to cultivate a new field in endeavouring to cultivate these showy plants in this country, to which end the observations of Mr. Scott, of the Calcutta Botanic Garden, already alluded to at p. 737, might be profitably consulted. Dr. Welwitsch's communication will appear in full in our next issue.

Floral Committee.—John Fraser, Esq., in the chair. Special Certificates were voted to G. F. Wilson, Esq., for a fine group of Liliums, which included the handsome *L. longifolium*, *L. candidum*, *L. candidum*, *L. candidum*, *L. croceum*, and six varieties of *L. Thunbergianum*; and to Mr. Anderson, gr. to T. Dawson, Esq., Meadow Bank, for some very fine cut spikes of Orchids. First-class Certificates were awarded to Mr. Parker, Tooting, for a fine group of Liliums, which included the handsome *L. longifolium*, *L. candidum*, *L. candidum*, *L. candidum*, *L. croceum*, and six varieties of *L. Thunbergianum*; and to Mr. Anderson, gr. to T. Dawson, Esq., Meadow Bank, for some very fine cut spikes of Orchids. First-class Certificates were awarded to Mr. Parker, Tooting, for a fine group of Liliums, which included the handsome *L. longifolium*, *L. candidum*, *L. candidum*, *L. candidum*, *L. croceum*, and six varieties of *L. Thunbergianum*; and to Mr. Anderson, gr. to T. 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Bensonæ, with three handsome spikes of white flowers, with orange lips; some capital Catleaves, *Aerides*, *Saccolabiums*, *Vanda Batemanii*, a grand plant; *Lycaste*, *Deppel*, and *Lælia*, *Macdonaldii*, &c. The Bull was well stocked with some good specimens, including such fine kinds as *Lælia purpurata*, *Aerides Lobbi* and odoratum, *Thunia Bensonæ*, &c. Messrs. Lee, of Hammersmith, also sent a fine group of well-grown foliage and flowering plants. Messrs. E. G. Carter and Son had a group of *Tricallis*, *Belatensis*, bedding *Funaria*, &c.; and from Mr. W. Paul came a very showy collection of new *Zalpagonium* plants. Messrs. Carter & Co. had a basket of old but very pretty *Trichium Manglii*; and Mr. Mackintosh sent a very good collection of *Antirrhinum*s. Messrs. Dick Radcliffe & Co. exhibited a very effective Fern case, sent to great advantage by being placed at the entrance to the tent.

Fruit Committee.—G. F. Wilson, Esq., F.R.S., in the chair. This was a very quiet meeting. Mr. Douglas, gr. to F. Whitbourn, Esq., Loxford Hall, Hford, sent a fine dish of President Wilder Strawberries, for which he received a Special Certificate. The fruit was of fine size and high colour, but a little wanting in flavour, which may be accounted for by the fact that they had been ripe for some time. The quality of the late keeping quality that Mr. Douglas sent them. He also sent very promising seedling white-fleshed Melon, not quite ripe, which the Committee requested to see again. A Special Certificate was also given to Mr. J. Plumridge, gr. to H. Vallance, Esq., Farnham Royal, Bucks, for a handsome basket of *St. Paxton* Strawberries. Mr. Tillery, Welbeck, sent dishes of Dr. Hogg and Lucas; and from Mr. Murray, gr. to the Hon. Mrs. Finch, came fine examples of *Reinette Blanche d'Espagne*, an excellent late-keeping culinary Apple. Messrs. Barr and Sugden exhibited a collection of several varieties of Cabbage Lettuces, including *The Cloche*, the earliest, as well as the variety most grown under the *cloche* in the market gardens near Paris; *Victoria*, the second earliest variety; *Red-edged Lettuce*, a large and very useful variety, frequently sold under the name of Grand *Victoria*, &c., and very largely grown in the Fulham market gardens; *White Dutch*, a very good sort; *Covent Garden Long Standard*, a large and very serviceable variety; *William Robinson*, said to be one of the best of the winter section; *Tom Thumb*, *St. Louis*, *Tennishall*. These two, we believe, are regarded by M. Vilmorin as identical, though this does not appear to be the case from the examples shown here, *Stone Tennishall* being the largest of the two, which would favour the supposition that Tom Thumb is a selection from that variety.

Notices of Books.

Contributions to Botany, Iconographic and Descriptive. By John Miers, F.R.S., F.L.S. Vol. III., containing a Complete Monograph of Menispermaceæ. 4to, pp. 402, tab. 67. Williams & Norgate.

Mr. Miers has for many years been distinguished as one of our most conscientious, painstaking, and talented botanists. His investigations into points of structure have been specially valuable. Differing from him in opinion, as we may sometimes do, as to the limits of generic or specific groups, we can but express unqualified admiration of his careful and accurate observations, illustrated as they have been in so many beautiful engravings. His conscientiousness and details, whose faithfulness has commanded the approbation of all botanists.

The present volume forms another of the series of remarkable publications for which its author is renowned. It is devoted specially to the Menispermaceæ, a group to which Mr. Miers' attention has been devoted for many years, and of which presents peculiar difficulties, on account of the great variability of certain of its members, and the unisexual condition of its flowers, rendering the matching of the sexes, not always an easy task. The work is marked by all the characteristics we have above alluded to, and will be duly appreciated by all working botanists. The author's tracings and sketches are, we learn, to be deposited in the British Museum.

Professor Hoffmann, of Giessen, has published a *catalogue raisonné* of the next work relating to Fungi, which will be of great value to all students of this department of Botany, and must be added to all libraries. The title runs *Mykologische Berichte; übersicht der Neuesten Arbeiten auf dem Gebiete der Pilzkunde*; and the work may be had at the cost of half-a-crown, from Messrs. Williams and Norgate.

Garden Memoranda.

NOTTINGHAM GARDENS.—[Those horticulturists who wend their way to Nottingham at the coming exhibition of the Royal Horticultural Society, will naturally inquire, What places of interest are there in the neighbourhood worthy a visit?—and with a view of giving something to satisfy this inquiry, we publish the following notes from "our Special Correspondent,"

Wollaton Hall, the Nottinghamshire seat of Lord Middleton, and now the temporary residence of Henry Akroyd, Esq., can well head the list. It is a very short distance from Nottingham, and can be reached by the Derby road, passing through New and Old Lenton on the way; or by means of the Ilkeston road, through New and Old Radford, the latter being well known to many florists as the residence of the

Rev. Samuel Creswell, vicar of Radford, of Tulip renown. The first is the principal entrance, by means of the Lenton Lodge, a commanding stone erection in keeping with the magnificent edifice within the grounds; but the Radford road gives the readiest access to the gardens. The Hall is situated in a park of 700 acres, finely wooded, and possessing a spacious sheet of water; it occupies a commanding position, was built about 200 years ago, and is regarded as a famous specimen of English domestic architecture. This noble edifice had a narrow escape from destruction by fire from the hands of the same mob that fired the castle.

From the Lenton Lodge to the Hall the distance is about $\frac{1}{4}$ mile. First comes an avenue of Wellingtonia planted in the length, and the plants are 4 to 6 feet in height, and are doing well. Then follows a noble avenue of Limes, the lines of trees being on either side of the carriage drive, and forming a leafy arch over it. Between the lines, or, rather, on either side of the way, a very pleasant walk is obtained. This avenue of Limes is nearly three-quarters of a mile in length. Wollaton is finely wooded, and those who enjoy the rich natural beauty of grand trees, can here revel to their heart's content amid magnificent specimens.

Entering from the Radford road, the gardens are seen on the left hand, and as the visitor passes on indirectly towards the Hall, the park is seen stretching away up to the principal entrance on the north side, and up to its very walls on the west. Passing along by the west side, between the Hall and the stables, a sunken way through and underneath overhanging shrubs, leads to the large conservatory at the south-west corner of the Hall, with the flower garden falling away towards the distant lake on a gentle declivity. The lake is 30 acres in extent, enclosed by woods, except towards the Hall. On the right of the lake is a plantation of about 2 acres of *Rhododendrons*, mainly of *R. ponticum*, with some of the showy forms of *R. catawbiense*; across it is the boathouse, looking in the distance like a bridge turned on arches. The conservatory is of considerable extent, mainly planted with *Camellias*, in capital condition. Following the walk in front of the conservatory, the fine garden is seen on the right, falling away towards a broad valley, and on the left, under the upper terrace wall, is a grand bank of *Rhododendron ponticum*, mingled with high-coloured *R. catawbiense*, and dotted here and there with standard plants of *Acer Negundo* variegatum. From this point can be seen avenues of Limes and Elms radiating in several directions, giving the park an exceedingly well-furnished and charmingly picturesque appearance.

The spot in front of the bank of *Rhododendrons* was once the site of the old kitchen garden, and lines of old Yews look like the remains of hedges in time past. A magnificent Stone Pine can be seen towering aloft, above Yews and evergreen Oak, and the noble stem of this gigantic tree comes out finely against the dark background of the evergreens. Ascending to the upper terrace, the fine architectural features of the palatial Hall come boldly into view; above, and between the walls, the landscape is seen in the circle, do not yet inconveniently crowd the Hall, can be got fine glimpses of the surrounding country. On the north-east side, and at a distance of some three miles, is Nottingham, with Belvoir Castle lying up against the horizon; and yet so excellently have the trees about the Hall been disposed on this side, that scarcely a part of Nottingham comes into view, while the high eminence on which the Hall stands preserves it from an unpleasant taint of the smoke rising up from the tall shafts of the numerous factories. A magnificent Purple Beech, growing with almost unworked luxuriance, will here challenge attention; and away in the park, on the eastern side, can be seen a group of Coniferous plants, each of which was planted by a member of the Middleton family. Leaving this spot, and passing on to the south side of the Hall once more, the visitor will pass a grand old evergreen Oak, planted it is supposed some 300 years ago. Cedars of Lebanon are also to be seen in the landscape; some of a fine sombre tint, others dashed with a lively green, like gold. Fine timber is seen everywhere; Oaks, in particular, are very fine. By the gardener's residence is a charming piece of pleasure ground, in which is growing a good specimen of what Mr. Gadd terms the *Nepaulæ* Nut.

The kitchen garden and plant-houses will well repay inspection. There are five apricot walls, the trees well laden with fruit; the lampy pines, some of the boards resting on brackets at the top of the wall, after the French system. Pear walls are a prime feature also; on one can be seen a marvellous tree of the *Jargonelle* Pear, on another a huge specimen of the old *Yorkshire Bergamot*, both of which are supposed to have been planted 200 years; despite its age, the last is a very productive tree. Mr. Gadd having gathered in one season as many as 18 pecks of fruit, each 18 lb. The vine is in the fruit-house, some of the bunches keeping with the excellent way in which the place is kept. The plant-houses have many interesting features; in one of them is a huge example of *Marchal Niel* Rose, that last year gave Mr. Gadd something like 1000 flowers. The grounds of Wollaton Hall will be open to the inspection of visitors during the week of the show, and all who wend their way thither will

find a genial welcome at the hands of Mr. Gadd. The present tenant of the hall, Mr. Henry Akroyd, is a generous supporter of horticulture, and has lent substantial aid to the Royal Horticultural Society's exhibition.

The visitor leaving Wollaton Hall, by the upper lodge on the Beeston road, will reach on the left hand, first *Lenton Hall*, the seat of H. Smith Wright, Esq., the treasurer of the local committee; and then, further on, and at a somewhat higher elevation,

Highfield House, the residence of E. J. Lowe, Esq., F.R.S., secretary to the local committee. The road is very charming, as umbrageous trees line it on either side. Highfield House occupies a fine and commanding position; standing at a considerable elevation above the valley of the Trent, the view obtained is one of the most extensive in the vicinity. To the south-west Brecon Bulwarks and church are plainly visible, together with the wooded eminence in Donnington Park, whilst, more to the south, the long black range of Charnwood Forest forms a striking feature in the landscape; beyond Clifton Grove, the woods in Bunny Park appear, backed by the Willoughby Wolds, and by the far distant Leicestershire hills; and, to the east, the landscape stretches away beyond Belvoir Castle into Lincolnshire. Some idea of the extent of this prospect may be formed from the fact, that upon a clear day the steeples of more than 30 churches can be seen from the terrace walks in front of Highfield House.

The grounds about Highfield House are finely stocked with trees, and Beech, Limes, Wych Elm, Siberian Elm, Purple Beech, and others, flourish here with rich luxuriance. The park falls away to the valley, where lies a lake of some 7 to 8 acres around about this are pleasant, winding, semi-wild walks, with plantations of hardy Ferns filling up various nooks and corners where they are not occupied by a rich growth of underwood. From a rustic bridge, with Ivy-covered balustrades, one looks down on rugged Fern dell, that to all appearance might be miles away from an inhabited district. The position of Highfield, with its surroundings, constitute one prime feature in this charming place; its almost unrivalled collection of Ferns is another. The fact that Mr. Lowe could spend whole days at Highfield, noting their diversified forms, and elegant and beautiful proportions; and at almost every step would stumble on something new. Plantations of Ferns meet you wherever you go. Pleasant walks under leafy trees bring them into view, in the shape of artificially constructed bits of rocky banks, looking quite natural because set down in such appropriate places; or they appear in groups, set down about shrubby borders, where nothing else will grow, and where they seem quite at home; and again in the kitchen garden, in long lines beneath orchard trees, and in all kinds of places. In curious, grotesque, and eccentric forms of *Athyrium*s, *Polystichum*s, *Scolopendrium*s, &c., Mr. Lowe is particularly rich; abnormal forms of *Scolopendrium*s, as varied in form as they are numerous, crop up in divers places, painful to look upon because of the apparently excruciating contortions in which they exhibit themselves; and some, crumpled, twisted, and attenuated, and some blasting influence had arrested their development. And yet they are full of interest for the botanist and the naturalist, and compel admiration despite their uncouth appearance. Let no one interested in the varying examples of plant life lose the chance of seeing the collection of Ferns at Highfield, especially if he can but secure Mr. Lowe's guidance as he walks about and examines these botanical treasures.

The grounds further on, in the open air are placed on a subsoil of clay, which keeps them moist and cool, and over the roots about 4 inches of decaying leaves is placed. In this way Mr. Lowe copies Nature to a great extent, and his Ferns flourish well, and from them he obtains forms that in point of elegant and handsome development are likely to prove serious rivals to the choicest exotic species.

Nor does Mr. Lowe confine himself exclusively to hardy Ferns. In his plant-houses he can show hybrid *Polystichum*s, *Gymnogramma*s, handsomely coloured forms of *Pteris serrulata*, and many others; a golden *Gymnogramma* *Calomelanos*, and a silver *G. ochracea*, are evidences of what he is achieving with these. He has also many curious and interesting plants about his houses worthy notice, among them a crimson-flowered *Ipomoea*, from Japan; and some at present quite unknown as to their genera, raised from imported seeds.

As a florist, Mr. Lowe is entitled to notice. At Highfield House, he has raised a fine specimen of *Blue Beard*, subsequently distributed by Messrs. Downie, Laird & Laing, under the name of *Imperial Blue*. Mr. Lowe is also attempting to obtain a blue *Zonal Pelargonium*, by crossing *Madame Vaucher* with the field *Geranium*, and not without a certain result. This attempt is to be still further pushed on towards the end in view.

Near the house is a capital specimen of *Cryptomeria japonica*, quite free from the rusty appearance, this Conifer too frequently assumes; a good *Cupressus Lawsoniana*; and a fine seedling *Golden Yew*, named *Victoria*, having a handsome pyramidal growth, and highly valuable as an ornamental tree. In the park towards the lake can be seen a specimen of the narrow-leaved Elm (*Ulmus angustifolia*), fully 110 feet in height, and of good proportions. Another half mile

further on, and the village of Beeston is reached, thickly populated, and prosperous. Beyond Beeston lies

Chilwell and The Nurseries of Messrs. F. R. & A. Pearson. These nurseries can be reached either by way of Wollaton Hall and Highfield House, or by going direct from Nottingham to Beeston Station by Midland Railway, from which place it is but a short walk to the Chilwell Nurseries.

The orchard-houses at Chilwell are well known for their size, for the fine development of the plants, and the excellent crops of fruit they bear. All horticulturalists visiting Nottingham, who are interested in orchard-houses, will be sure to call there without visiting Chilwell, for no one can go there without being well rewarded by the visit. Not less interesting are the vineries, in which can be seen growing examples of some of the leading Grapes in cultivation, as well as several seedling varieties of promise. Among these, Ferdinand de Lesseps, a variety raised by Mr. Pearson, and which last year received a First-class Certificate from the Fruit Committee as an early White Grape, will be sure to attract much attention.

A new house for the cultivation of Grapes has just been erected by Mr. Pearson. It is too feet in length, and the construction of the house, as well as the mode in which front and top ventilation is given, is well deserving inspection. A corresponding house, with its back against this, and having a north aspect, contains a great many of new seedling hybrid Nougay Felargoniums, that are very interesting. Such varieties as Amaranth, Mrs. Lowe, Conqueror, improved Lord Derby with large blue trusses, Mrs. Saunders, Mrs. Adams, Shakspeare, Rose Bradwardine, Lady Louisa Egerton, Mrs. Vincent, Rev. C. Peach, Mrs. Reynolds Hole—an improved Violet Hill Nougay with more magenta in the colour, Douglas Pearson, and William Thomson, show fine quality; and it is well known Mr. Pearson has sent out some good things in this way. Most of these are bedded out at the nursery, together with some vegetated kinds that will be in good condition at the Nottingham Show.

Vines in pots are a remarkable feature, and can be seen in the orchard-houses so arranged as that plenty of light and air can get among the canes. They are plunged in cocoa-nut fibre, but are not allowed to root into it. There are many other points of interest that will make a visit to the Chilwell Nurseries a few hours well spent. There are some fine old herbaceous plants yet remaining in what was formerly the herbaceous garden; and among Golden Hones, Coniferous plants, &c., on the grass plat by the dwelling-house.

Annesley Hall, Linby, the Residence of F. C. Musters, Esq., should be included in the places to visit about Nottingham. Apart from the special interest it has for horticulturists, it is also a spot having relation to events of historical significance, which are at once the heritage of all countries and all times. It was at Annesley that Byron, "Mary, his sweetest love, lived, and here the youthful poet was a frequent visitor, and here he wrote many of his poems. Here in his boyhood he conceived and cherished that deep and passionate first-love, "the romance of the most romantic period of his life"—a love, the effects of which we can trace through all his works, "coming up," as Washington Irving aptly observes, "every now and then, like some lurking theme which runs through a complicated piece of music, and thence it all is a pervading, chain of melody." Annesley is readily reached by the Maresfield branch of the Midland Railway, by getting out at Linby Station, and away on the left rises up the wood-crowned heights of Annesley. On the way there, Hucknall Torkard is passed, a populous village, lying to the left of the railway, and a glimpse of the church is caught, in the chance of which is the tomb containing the remains of Lord Byron, and those of his daughter Ada, Countess of Lovelace.

Annesley Hall occupies a good position in a spacious park, well-wooded, and finely undulated. As the Hall is approached, a large plantation of Larch is seen on the right hand, and beyond this, lying further back, is Diadem Hill, now crowned with a plantation of Scotch Fir, and the scene of Byron's parting with Mary Chaworth previous to her marriage. At this period Byron seems to have been in deep sorrow, and his indignation whose effects were to be so lasting. He himself, in a memorandum in one of his note-books, says:—"Our union would have healed feuds in which blood had been shed by our fathers; it would have joined lands broad and rich; it would have joined at least one heart, and two persons not ill-matched in years (she is two years my elder); and—and—and—what has been the result?"

The Hall is a very picturesque building, with the church almost adjoining it, and the high road runs close by the church. Some of the walls of the Hall and outbuildings are coated with a rich growth of Ivy. Its appearance suggests that the building has withstood the rude shocks of many years, and archeologists assign it an existence as remote as the Conquest. Near it the visitor passes under an avenue of Limes, once lining a highway. These are seen to have been kept cut-in at some time, but, on being suffered to grow, have thrown up several stout branches, reaching to a great height. Formerly, these Limes were kept clipped in the form of dogs and bears, and it is known in the locality as "Dog and Bear Lane." On the east and south sides of the Hall are the flower gardens; there are

handsome old stone terraces, along the top of which are trained, in the form of festoons, Ivy and other climbing plants, presenting a picturesque appearance as the Hall is reached. On the upper terrace can be seen an old oak door, leading to a kind of room or shed, pierced with bullet holes, shooting having been a favourite pastime with Lord Byron when at Annesley. From the upper terrace a fine view of Mapperly Plains is obtained, and on the right hand Nottingham, away over Hucknall Torkard; on the left the locality in which stands Diadem Hill is seen. On this terrace is a long flower border, carpeted with Oxalis corniculata rubra, inlaid with circles of yellow-foilage, and other plants, and an elegant garden path, clean, and which must be very effective during the summer.

A little lower down, in a southward direction, but very close to the Hall, once stood the village of Annesley (now a picturesque little spot, some distance away); and the line of the old village road is pointed out, with the village well, supplied by a spring, an old stone trough, reached by some descending rustic stone steps, and the site of the village stocks. On the east side of the village, the stone steps lead down to where it led to the cottages to which it formerly gave access; and the old Cherry and Pear trees of the cottage gardens still stand and flourish. Pleasant groups of trees, a piece of water, dense plantations of common and Portugal Laurels, kept quaintly trimmed, groups of Rhododendrons, walks through cuttings with stone walls on either side covered with suitable plants, and a nice picture containing some interesting specimens, now occupy the village grounds. From this point there is a broad grass walk leading to the kennels, with a line of 8 feet Yews on one side, and Coniferous plants on the other; and this road returns to the mansion, along a part of an old village road, now a veritable leafy tunnel, as the Hawthorn and trees have met overhead, and almost render passage dangerous. Fine trees abound on every hand, numerous in kind and handsome in outline. Sycamore, Beech, Elm, Elm Ash, and others, reach their heads to the sky, affording delicious shade beneath.

There is a good walled-in kitchen garden, a range of three fine lean-to vineries, in two of which the Royal Vineyard Grape was doing remarkably well, having set very freely; besides other houses, &c., incidental to such a place. Every part of the grounds bears evidence to the fine intelligence and careful foresight of Mr. Young, the gardener at Annesley, a worthy and hospitable member of the ancient craft of gardeners.

Newstead Abbey, the Residence of W. F. Webb, Esq., and formerly the property of, and abode of, Lord Byron, lies a short distance from Annesley, and any one driving from Annesley to Newstead will do well to return to Annesley, and, passing through Linby village, reach Newstead through the hamlet of Papplewick. Newstead is a private railway station at Newstead, but it is only used under certain restrictions. It is possible, however, that Mr. Webb will allow it to be used for the convenience of visitors to the Abbey during the week of the Nottingham show.

Newstead Abbey dates back to 1170, the priory having been founded by Henry II., soon after the death of Thomas A Becket. On the dissolution of the monasteries in the reign of Henry VIII. it was granted, by a royal grant, with the lands pertaining thereto, to the Byrons family. It is "one of the finest specimens of the existence of the quaint and romantic places, half castle half convent, which remain as monuments of the old times of England." It lies low, in the densely wooded flat of what appears to be a broad natural valley, and from the Abbey itself but little of the surrounding country can be seen. It is brimful of historical associations. On one side, but adjoining the mansion, a magnificent pile of ruins of the old Abbey, extremely picturesque, stands out against the background of umbrageous trees.

On passing through the lodge there is a capital avenue of fine young trees of the Wych Elm, with here and there a Lime intermingled. Unfortunately the avenue is very narrow, and the trees are planted so close together that they already interfere with each other's growth. The new kitchen garden is seen on the left hand, adjoining the pleasure grounds, and the rose walk is reached on the right hand, and the old garden is reached on the other side. There are several lakes—water and trees are abundant on every hand—two or three of the lakes being of considerable size. The kitchen garden has the usual complement of vineries, plant and forcing houses, &c., all well worthy an inspection, and kept in good order. The pleasure grounds and flower garden lie between the Abbey and kitchen garden on the one side, and the Abbey and the old garden on the other. The lake seen from the road by impounding the waters of the Leen, which rises in the neighbourhood; the lower lake is of considerable extent, and all are more or less well wooded on the banks, and generally connected by waterfalls. On the terrace in the east front of the mansion is seen the tomb erected over the remains of Lord Byron's dog Boatwain. The inscription runs thus:—"Not this spot is dearer to the remembrance of him who possessed beauty without vanity, strength without insolence, courage without ferocity, and all the virtues of man without his vices. This praise, which would be unmeaning flattery if inscribed over human ashes, is but a just tribute to the memory of Boatwain, a dog, who was born at Newfound-

land, May, 1803, and died at Newstead Abbey, November 18, 1808;" and then follows the exquisite poem written in relation to this event, published by Lord Byron's works. The vault beneath was intended as a family burying-place by his lordship, and it is thought to have been the site of the high altar when the Abbey was a prosperous religious house. A flight of five circular steps surrounds the urn, and under the influence of the shock of an earthquake which passed through this district a year or so since, the stones are seen to have been reft asunder, leaving openings between. A pair of Yews on the west and a Cedar of Lebanon on the east are the fitting accessories to this spot. Going southwards, we reach a small enclosed Italian garden, and looking over the stone balustrade the visitor sees before him the still pond, overhanging by the thick growth of Yews, in which the monks of old used to store their fish. It is a thoroughly romantic spot—the spirit of romance seems to pervade the place. Next to the grass plat containing the tomb comes a sunken pool, surrounded by a sloping turf bank studded with bell-shaped crocuses. A pleasant walk round it; and next this lies the Devil's Wood, a square piece of thickly planted shrubbery at the foot of tall trees, and having transverse walks. In one of these are groups of satyrs, from which the singular and unusual designation of the spot is derived. In the principal walk is seen the remains of the Birch tree on which Byron carved his and his sister Augusta's name on the occasion of his last visit to Newstead Abbey. A stump of some 4 feet in height alone remains; and as visitors to the grounds were found to be so addicted to carrying off pieces of the tree, Mr. Webb found it to be necessary to remove that part of the trunk bearing the inscription, to save the precious relic from certain destruction. A simple metal plate attached to the tree records the incident, and the reason of the removal of the inscription. Here he lingered amid the "damp and mossy tombs" of Newstead's "once resplendent dome," bemoaning a reluctant last farewell.

On the south side are some stone beds close to the Abbey, a large sweep of grass plat falling away to the lake, in the centre of which is Byron's Oak, planted by the poet himself; and from this point round out very pleasant secluded walks—in one instance leading to a fernery lying in a kind of hollow, with a group of Coniferous plants in the centre—a truly charming spot on a quiet summer eve, with singing birds around, and the flowery breeze breathing forth their rich scents on the evening breeze.

Such are, somewhat rudely sketched, a few of the leading features of Newstead. From the park there is a look out on the

"Hills of Annesley! bleak and barren;"

now, however, more furnished than in the poet's time, yet with a half wild barrenness that contrasts with the wealth of woodland around. Mr. Anderson, the gardener at Newstead, was unfortunately absent on the occasion of our visit, but the signs of his intelligent handiwork abounded.

Returning to Linby, the visitor should call at *Papplewick Hall, the Residence of Henry Walter, Esq.,* if only to see a remarkable ribbon border, about 130 yards in length, and of considerable age, along the top of one of the walls in the kitchen garden. The arrangement of this by Mr. Nesbitt, the gardener, is of such a character that any glaring hue of scarlet or yellow will be most effectually subdued by a judicious admixture of foliage plants, as well as flowering plants of soft hues. The margin to this border is a permanent one, formed of the variegated *Arabis albidia*; next this line as follows:—*Ageratum* Tom Thumb, variegated *Zonal* *Polemonium* Sunset, *Polemonium* ceruleum variegatum, and *Blue Lobelia*, alternately (such a line of the former as is seldom met with); *Amaranthus* melancholicus ruber, *Pyrethrum* Golden Feather, variegated *Felargonium* Flower of Spring, and *Blue Lobelia*, alternately; *Iresine* Lindeni, *Viola* comata, and at the back, *Centaurea candidissima*. It only remains to be added that Mr. Nesbitt will give a kindly welcome to any gardener who may find it convenient to call on him.

The village of Linby is worthy a passing notice. It consists mainly of a broad thoroughfare of no great length, with a watercourse running on either side of it; two butter crosses, one at each end of this thoroughfare, consisting of a rude stone cross set up on a broad pedestal; and close by the upper one, rearing its head to the sky, what is seldom met with now-a-days—a village maypole, like that at Hage, tall flagstaff. Then by Radford, the home of that well-known Tulip cultivator, the Rev. Samuel Cresswell, the vicar of Radford, so thoroughly respected in floricultural circles in the midland districts.

Another place within an easy distance of Nottingham is *Kingston Hall, Kegworth, the Seat of Lord Belper.* Kegworth is on the main line of the Midland Railway, about three miles from Trent, from which it is distant about three miles. Kingston Hall is about 1½ mile from the station, and on his way there the visitor passes through the village of Kingston-upon-Soar, quite a model village in its way. The Hall is situated on a considerable eminence, overlooking the village, and is of recent date, having been built and the grounds laid out about 30 years ago. It

is a handsome and commodious mansion, the front walls being covered with Roses and various creeping plants. The old Wittingham coach road once passed through the grounds, and now runs some distance northwards, outside the park boundary. Near here, and lying between Kingston and Nottingham, is Gotham, famous in nursery rhyme as the home of the three wise men who "went to sea in a bowl."

The kitchen garden is in two divisions; the smaller part, surrounded by walls, contains the vineries, Peach and Pear plant-houses, the larger portion is exposed and without walls. The range of vineries at Kingston is well known throughout the county; it is about 100 feet in length by 32 in width, the roof on the ridge-and-furrow system. The Vines are in good condition, in full bearing, and carrying good crops. There is a walk along the middle of the range, with pits on either side, which can be used as occasion requires. The Vine borders are external to the house, but are not actually heated as is supposed, though chambered. These vineries will well repay inspection. In the early vinery was growing the Muscat Muscade, supposed by some to be identical with Josling's St. Alban's, but which Mr. Cruickshank, the gardener at Kingston, thinks to be distinct from it. It is a good early White Grape, with a strong Muscat flavour, both bearing and setting very freely. There is also a fine Peach and Nectarine house, the varieties *Grosse Mignonne* and *Victoria* being the chief, the latter being a fine development, and furnished with fruit from top to bottom. There is a kind of curvilinear trellis in front, about 8 feet in height, against which Noblesse and Royal George Peaches are planted, the former very finely cropped. There are also two other Peach-houses, with Figs planted at the back.

The stove-house contains a goodly collection of flowering and foliated plants, Crotons being conspicuous for their free growth and fine colour, here and there *Dioscorea* (Dorox) also may be noticed for its bold leaves. Adjoining this is a Fern house, in which was a fine lot of *Adiantums* growing in clayey loam, and looking as robust as possible. In a smaller plant-house were some huge pots of *Tritonia aurea*, for blooming in August; and against a pillar, and thence on to the roof, could be seen Fortune's white Rose, doing well. In the outer kitchen garden were Pine pits, with Cucumbers at the back; an excellent lot of brick Asparagus being on the side walls on either side of the range, chambered at the top, so as to contain the heat rising up from the fermenting material employed. Shavings from a turner's lathe are used here instead of tan; it is much cleaner, retains the heat well, and lasts longer. Shavings of alder-wood are the best. Here, and also at Annesley, could be seen plantations of Keen's Seedling Strawberries, almost wholly blind, and this appears to be a frequent complaint among gardeners this season.

The south and west terraces, and their surroundings give flower gardens, with groups and belts of shrubberies and an abundance of trees. From both terraces very fine views of the opposite country can be obtained for a considerable distance. Cobtuke Church, the little and big Beacon Hills, Charnwood Forest in Leicestershire, with the hills rising beyond, go to form a grand natural panorama. Standing on the west terrace, a view of Derby can be had through an opening in the trees. A fine view of the country is also to be seen from a conservatory, containing Tree Ferns, Palms, and similar ornamental plants, with a corridor leading to the library. The pleasure grounds contain many charming walks, and altogether the place is one at which a very pleasant hour or two can be passed; and every year some new improvement is worked out. The grounds are well kept, and the general appearance of the house, &c., testified to the ability of Mr. Cruickshanks, who may well be said to be the most formerly lived gardener at Langleybury, near Watford, Herts.

As there are not many trains running from Kegworth to Nottingham, it may be stated that it is a most enjoyable walk back to Trent, through the village of Ratcliffe-upon-Soar, crossing the Trent at a ferry at no great distance from the junction. The way lies mainly through fields and by-ways, and along the side of the river, and a ferry-boat is always at hand to pass the car on the way. From Trent plenty of trains run to Nottingham.

Colston Bassett Hall, Bingham, the Residence of G. T. Davy, Esq.—To reach this place, a trip by rail must be taken, on the branch line of the Great Northern Railway from Nottingham to Grantham, getting out at Bingham Station, about 10 miles from Nottingham. Bingham is a small market town of considerable antiquity, lying in the vale of Belvoir, and Colston Bassett lies about six miles south of it from it. A conveyance can be obtained at the Chesterfield Arms, and for a considerable distance the road rises, and splendid views of the country, especially on the Lincolnshire side, come into view. On yonder wood-crowned height can be seen the turrets of Belvoir Castle, overlooking the magnificent fertile valley below. Belvoir can be reached by this line of rail, from Bottesford Station, a few miles beyond Bingham. On the left, towards Belvoir, is Wiverton Hall, also a residence of the proprietors of Annesley Hall, into whose family it came by marriage, between an ancestor and Mary Chaworth.

The church of St. Mary, at Colston Bassett, first comes into view; and near it is the Hall, a noble

mansion, standing in a finely wooded park of some 30 acres. The gardens and pleasure grounds were designed by and laid out under the superintendence of the late Mr. James Veitch, of Chelsea. This was, in all probability, formerly the site of some religious house, as there are not wanting indications that such was the case.

There is an abundance of glass at Colston Bassett, comprising plant and Orchid-houses, vineries, orchard and Peach-houses, &c., and the collections of plants are both varied and extensive. Some nice low span-roofed houses were noticeable. In one was the beginning of a good collection of Orchids, in thriving condition, and among those in flower were a handsome form of *Odontoglossum Pescatorei*, with a finely spotted lip; the rose-coloured variety of *Dendrobium crataecium*, and a very finely coloured and rare variety of *Trichopilia crispata*. In a companion house was growing some vigorous plants of the Chinese Cucumber, *Sooly Qua*, one of which bore two very fine fruits, fully 4 feet in length, and correspondingly thick. The Chinese are said to use this monstrous representative of the Cucurbitaceæ stewed with rice. In this and other houses were growing many plants of unknown character, raised from seeds obtained from China and elsewhere, among them a large deep-coloured *Capsicum*, from South America; another was a *Celosia*, bearing purplish red and white flowers, in growth something resembling an *Alternanthera* and variegated *Amaranthus*—a fine plant for subtropical work, if it will stand exposure. In a low span-roofed house, containing various stove plants, &c., could be seen two fine plants of the handsome *Adiantum farleyense*. Here, too, were some Melons from Afghanistan, various other Indian plants, and a yellow flowered *Poinciana* from South America.

In an early vinery were some capital Black Hambroghs in pots, and succeeding this a range of five houses, three vineries, with Peach-houses at each end. In one of the vineries *Duchess of Buccleuch* Grape appeared very promising indeed. This range of houses and their contents cannot fail to interest visitors. Next comes the *Lapageria*-house, a lofty conservatory, with the plant-houses at each end. The *Lapagerias* flourish grandly, trained up pillars and on to the roof. *Camellias* were in fine condition, and making vigorous growth. Mr. Lamb and I succeeded in getting a few, for and especially last year, the leaves were much burnt. In the large conservatory, where the plants had not been shaded, large brown spots had been burnt on the leaves. In the plant-houses on either side can be seen a large and varied collection of plants, stove and greenhouse, inclusive of New Holland plants and Orchids. A magnificent example of *Calanthe Dominicana* had 21 spikes of flower; and a spike of *Blanfordia nobilis* was particularly attractive.

In the basin of fountain in the centre of the Rose garden could be seen that useful aquatic, *Aponogeton distachyon*, where it flowers all the winter when the water is free from ice.

The Orchard-houses at Colston are of large size and contain many trees of corresponding dimensions. Between the two is a lofty orangery, in which *Maréchal Niel* Rose was doing well on the roof; and *Tropæolum tricolorum* and *azurum* were seen trained to work up the sides of the roof.

Quite a new feature could be seen here—that of planting *Lapageria rosea* in the open ground. Notwithstanding that the severe winter cut the plants down to the ground, they are pushing up strong growth, and so far does the experiment prove assuring, that it is Mr. Davy's intention to plant 100 examples of this fine climber.

A spot in a clump of shrubs, by the side of the trunk of a tree, is that selected, as in its native habitat it has been found in such positions, running up the trunk, and attaching itself to the branches. On the east side of the Hall is a handsome stone flower garden, at a lower elevation than the ground floor of the building; near this is a fine standard snowy *Mespilus*. At the north-east corner of the Hall is a large conservatory of massive proportions, and joined to it another house kept at a higher temperature, for Tree Ferns, &c. In the latter could be seen *Trichopilia argyrea*, attaching itself to the wall with its shade cast by the huge fronds of the Tree Ferns, and growing as freely as the *Watercress*. At one side of the conservatory, planted out in an exposed border, can be seen some scarce examples of the rarer Japanese plants that stood the rigour of last winter well, and near them a lump of quicksilver from Peru in the form of ore.

About the grounds are fine Elm trees, of great height and grandly furnished; some fine old Yews are on the north side of the house, forming an avenue with a broad gravel walk between them. It is computed these were planted quite 600 years ago. On the lawn is a capital specimen of *Picea bracteata*, from 7 to 8 feet in height, with not a sign of injury upon it, and the young growth having quite a golden tint.

The kitchen garden has recently been much enlarged, and here also could be seen plantations of Keen's Seedling Strawberries, completely lined. Mr. Lamb, the gardener, will be happy to see visitors during the show week, and any one making a journey to Colston will be much pleased with what they will see there.

Cauntton Manor, Newark, the Residence of the Rev. S. Reynolds *Major*, can hardly fail to be an object of

interest to all horticulturists intending to visit Nottingham, and doubtless many a floral courtier will seek to wend his way to that spot where Queen Rosa holds her court under such happy circumstances. Cauntton lies some 6 miles north-west of Newark, and possibly Mr. Hole will make some arrangements by which those anxious to pay him a visit shall not fail of their object.

It is a grand ride from Newark to Cauntton, passing through a rich agricultural country by Kibworth Hall, the seat of G. H. M. Sutton, Esq., with the silvery Trent lying close under the terrace wall, and on till the highest point is reached, where the eye can scan a broad sweep of country, magnificent in outline, and crowded with detail, and where in the far east can be described, rising up against the horizon, the time honoured summits of Lincoln Minster. Then the road falls away again, till the village of Cauntton comes into view, with the Manor House in the foreground, and the church lying just behind it, with cottage residences forming a background. A pleasant little estate, comprising a bit of park, some pleasure ground, with its attendant flower garden, luxuriant shady trees; a residence the walls of which are covered with Ivy and Roses, an oblong Rose garden parted in two by a Yew hedge, with a nice little nook or corner here and there, planted with Ferns, succulents, and a few hardy plants, flourishing under Mrs. Hole's loving care; a fine garden, with its blocks of kitchen garden, or Rose plantation, with a further bit of garden, in which stands the plant-houses; and thus the disposition of the grounds may be roughly sketched. In the still, calm repose of this village, with trees and flowers and singing birds, with waving grass at one's feet, and God's boundless heaven overhead—a way from the busy haunts of men, one could walk, amid Roses, clustering fruits, and fine examples of the plant life of these climates, in peace and convenience within were easy, be at peace with all the world.

The cold weather, and drying north-easterly winds, have very much retarded the growth of Roses, and Mr. Hole was very doubtful if he would be able to exhibit at Nottingham, so backward did they seem; nevertheless, there was the promise of fine blooms. The plantations were thickly mulched with manure, and though unsightly, Mr. Hole feels it to be indispensable to the production of good Roses, and advocates mulching accordingly. On one side of the house, what remains of what must have been a magnificent example of *Rose Devoniensis*, almost entirely destroyed by the frost of last winter.

Of glass structures there is a span-roofed house, used as a vinery and a plant-house also; three or four plant-houses, one charmingly gay with flowering plants; some frames, &c. Stove and greenhouse and foliated plants are exceedingly well grown at Cauntton. Mr. Rock, Mr. Hole's gardener, was for some time with Mr. Baines, and the influence of the teacher is seen in the finished works of the pupil. A capital specimen of *Alocasia Jenningsii* was finely marked in the leaves, much better than is generally seen; *Marantas Veitchii*, *vittata*, *roseo-picta*, and *Van den Heckeii*, were in fine character, with large, clean, distinctly marked leaves of rare beauty. Of flowering plants could be seen *Dipladenia grandiflora*, *Alamanda cathartica*, *A. Hendersoni*, *Conoclinium*, *Conoclinium*, *Barnesi*, like-wise an excellent condition of *Palisota Thrinax*, *Agavans* and *Caryota urens* were finely developed. In a lean-to plant-house were capital young specimens of *Darwinia tulipifera*, *Leschenaultia biloba major*, *Tetratheca verticillata*, *Phenocoma prolifera* var. *Barnesi*, *Boronia pinnata*, and *B. serrulata*. The fine condition of the *Boronias* Mr. Rock attributed to the occasional use of Standen's manure.

In a cool frame could be seen some capital *Ericas*, nice specimens, and well-flowered, comprising *profusa*, *alba*, and *magnifica*, varieties of *E. ventricosa*, *Massoni* major, *ampullacea*, *obovata*, *eximia*, *superba*, *Parmentieriana rosea*, and *austriaca*. In the vinery was a good specimen of *Ixora coccinea*, and also one of *Dendrobium chrysanthum*.

The renovation of the interior and reopening of the church recently made necessitated the demolition of the chancel in part, a good portion of which was left standing with a view to the raising of the Dismal. The dimensions of the trunk of this Rose, which suffered very much during the course of the repairs, were like those of a young Oak sapling. Happily, there is abundant reason to hope, from the indications of growth, that the plant will by-and-by recover its wonted dimensions.

That all horticulturists receive a generous welcome at Cauntton is as widely known as the genial, kindly host himself. No one who goes any way, or a mile to Cauntton may be set down as one of the red letter days in a florist's life.

Not very far from the show ground at Nottingham, there is, in the Leicester road, a small enclosed garden belonging to Thomas Forman, Esq., of the *Nottinghamshire Guardian* office. It falls away to the valley of the Trent, in the form of three or four terraces, and is under the management of Mr. F. W. Burbridge, formerly assistant at Chiswick. Though small this place is nicely compact, and is well worth looking into. There are several houses, and in them can be seen some nice and healthy quarter and half specimen plants of subjects rarely met with in these days, such as *Sollya Drummondii* and *S. linearis*; *Zichya coccinea*, *Boronia Drummondii*, *Burtonia conferta*, *Tobacchinemontana coronaria* fl.-pl.;

Clerodendron splendens, a capital Bougainvillea, of large size and finely grown in a 15-inch pot; good plants of *Draena Cooperi*, &c. A select but capital collection of *Ericas* will well bear inspection. Among them are *E. elegans*, thought to be one of the finest specimens in cultivation; *E. mirabilis*, and *E. vesita* coccinea. A large plant of *Aceris odoratum* was blooming well, which had been wintered for some time in a temperature of 45°. A plant of Mr. Pearson's new Grape, Ferdinand de Lesseps, was growing in a pot and fruiting nicely. It is very early indeed, and combines with this precocity an excellent flavour. *R. D.*

THE WEATHER.

TEMPERATURE OF THE AIR AND FALL OF RAIN AT DIFFERENT STATIONS, DURING THE WEEK ENDING SATURDAY, JUNE 17, 1871.

NAMES OF STATIONS.	TEMPERATURE OF THE AIR.							FALL OF RAIN.
	Highest.	Lowest.	Range of Week.	Mean of all Highest.	Mean of all Lowest.	Mean Daily Range.	Mean.	
Portsmouth ..	72.2	43.2	29.0	56.5	49.3	28.3	57.5	1.47
Blackburn ..	72.0	40.0	32.0	56.0	47.0	29.0	56.5	1.05
Bristol ..	68.1	..	..	..	..	..	..	..
Birmingham ..	68.1	42.0	26.1	55.0	46.0	29.0	55.5	0.99
Wolverhampton ..	70.0	44.8	25.2	56.5	49.0	27.5	56.0	1.05
Leicester ..	75.0	47.3	27.7	61.0	51.0	30.0	61.0	2.29
Sheffield ..	79.0	47.3	31.7	63.0	51.0	32.0	63.0	3.23
Nottingham ..	77.0	43.9	33.1	60.4	51.6	28.8	57.5	2.39
Sheffield ..	76.0	43.9	32.1	60.4	51.6	28.8	57.5	2.39
Liverpool ..	72.0	47.3	24.7	59.8	51.1	28.7	59.8	3.01
Manchester ..	74.0	48.5	25.5	61.3	51.5	29.8	60.8	0.99
Salford ..	74.0	47.3	26.7	60.8	51.7	29.1	60.9	0.99
Bradford ..	70.5	43.9	26.6	57.2	51.9	25.3	58.0	1.18
Leeds ..	70.0	43.0	27.0	56.5	51.6	24.9	57.3	1.75
Leith ..	73.0	46.0	27.0	59.3	51.9	27.4	59.0	1.31
Newcastle ..	66.0	40.0	26.0	53.0	49.7	3.3	53.5	1.27
Edinburgh ..	67.0	42.0	25.0	..	..	..	51.4	1.00
Glasgow ..	65.0	43.2	21.8	..	..	..	55.0	1.01
Dundee ..	65.0	40.0	25.0	..	..	..	54.4	1.25
Aberdeen ..	65.0	43.2	21.8	..	..	..	55.0	0.86
Greenock ..	65.0	40.0	25.0	..	..	..	54.4	1.25
Leith ..	67.5	48.0	19.5	..	..	..	58.0	2.55
Perth ..	65.0	40.0	25.0	..	..	..	54.4	1.59
Dublin ..	73.9	42.8	31.1	..	..	..	57.0	0.12

STATE OF THE WEATHER AT BLACKHEATH, LONDON, FOR THE WEEK ENDING WEDNESDAY, JUNE 21, 1871.

1871. MONTH AND DAY.	At 9 A.M.									
	Reading of Hygrometric Deduction from Glaisher's Tables, 5th edition					At 3 P.M.				
June.	Barometer reduced to 32° Fahr.	Dry Thermometer.	Wet Thermometer.	W. Ther. monom.	Dew Point.	Degree of Humidity.	Weight of Vapour in a Cubic Foot of Air.	Gr.	Gr.	Gr.
15 Thurs.	29.85	68.0	56.0	56.0	56.0	85	68	5.4	5.4	5.4
16 Friday.	29.85	68.0	56.0	56.0	56.0	85	68	5.4	5.4	5.4
17 Satur.	29.85	68.0	56.0	56.0	56.0	85	68	5.4	5.4	5.4
18 Sunday.	29.85	68.0	56.0	56.0	56.0	85	68	5.4	5.4	5.4
19 Monday.	29.85	68.0	56.0	56.0	56.0	85	68	5.4	5.4	5.4
20 Tues.	29.85	68.0	56.0	56.0	56.0	85	68	5.4	5.4	5.4
21 Wednes.	29.85	68.0	56.0	56.0	56.0	85	68	5.4	5.4	5.4

June 15—Generally overcast. Rain fell frequently, and at times heavy. Lightning seen occasionally. 16—Variable in the morning: overcast after 3 P.M. Rain in the early morning and again in the evening. 17—Overcast throughout. Rain fell heavily after 3 P.M. 18—Heavy rain in early morning and occasional showers during the day and at night. Clouds very variable in amount. 19—Large amounts of cloud generally prevalent. Thunderstorm in the afternoon. Very heavy rain between 6 and 7 P.M. 20—Generally overcast till night; then variable. A heavy thunderstorm prevailed during the afternoon. 21—Generally cloudy. Rain fell between 7 and 8 A.M., and very heavily between 4 and 5 P.M.

Miscellaneous.

It is very interesting to look into WORKS ON SCIENTIFIC MATTERS of 100 years or more ago, and to compare the knowledge and the assurance of their belief on certain subjects in those days with our own. We now know that the cochineal of commerce are small hemipterous insects who feed on several species of Opuntia; but here is a description of the insect published in 1690, in a little work which in those days appears to have been of some authority—"Cochineille is a fine little berry, breaking in a very dark red powder, greyish coloured without; in shape like that insect called lady bird, but something less, and therefore by many believed to be a File (or an insect), which cannot be, that any such rich colour can be in any such creature. The trust account I ever could learn, is that some flies and insects, fastening

upon the leaves (which are sharp as needles) of a certain shrub, on which your West India Shoakbeers do grow, causes a kind of a blister, turning very red at first, and greyish the outside. After the Indians do rub all the other part of the leaf when dry, and thus the cochineille is produced. Others think it only the blossom of a tender herb, taken off before it flowers. 'Tis of an excellent colour, of which all the finest scarlet and purple are dyed. Brought from New Spain and Mexico."

The "BUNCH GRASS" (*Festuca scabrella*) constitutes the most important vegetable production of various parts of California, and is exceedingly nutritious. It grows in bunches, as its name implies, and in that dry climate, being converted into hay as it stands, forms a valuable food, highly relished by cattle and horses, even when it appears worthless. Another grass which is conspicuous among Californian vegetation is the *Elymus arenarius*, which grows in all parts where there are deserted Indian lodges, and is therefore called by the inhabitants "Indian grass." These sometimes attain the height of eight feet; the seed is threshed out and eaten by the Digger Indians.

JUNE.

MAY lives no more—the merry tune Of all her birds we wish in vain. Lo, June is come, with gentle rain To mourn her death! Green-mantled June! June, when far sheep-bells sound with day, And scythes; and many a tiny wing Low music makes, while evening Tints all the amber air with gray. June, on whose lap her perfumed stores The purple Bean, the Clover throws; Hers swarms of hay, and swelling Rose, And hanging blossoms of Sycamores. Month of fair sights, but known too well Of sham of May, of June, and July. Of Mullen, touch'd with faintest glow Of Lych and pale Pimpernel. The broad sun, by the water side, On beds of golden Flagflowers smiles, And Lily leaves, green floating lilies Rock'd by the rippling of the tide.

Bronzed brown boles, his twinkling shine Falls on the Alder's silver bow, And day alike of June and July. Star'd Bittersweet and waste Woodbine. Would all were good and fair! Alas, With Mallows mix'd foul Foxglove gleams, Cold porch of death the Poppy dreams Midst grass, and corn the greater grass. Where midges vex, as wild vain winds In swarthy swarms, blue dragons swing Their gories; hurtless beetles sing Where venom'd gladness goads the herds. No pleasure in this world may be Without some bitter test of pain: No rills, no rivers, and no rain. Can take the saltiness from the sea.

James Mew, in "Belgravia."

Garden Operations.

(FOR THE ENSUING WEEK.)

PLANT HOUSES.

We have now a change in the weather, and with it a kindly, salubrious atmosphere, which may be admitted with much benefit to plant-houses generally, to the great benefit of the inmates. Disperse, therefore, with fires as much as possible, and allow the temperature to range higher, if caused through natural tendencies only. A little air should also be given to stoves, Orchid-houses, &c., by night. Give it always at the apex of either structure, upon mild nights only, and in quantity according to the density of the humidity within the house at closing time. It should be understood, however, by the uninitiated in these matters, that "night air" is not given until the evening. The houses are closed, and thoroughly syringed at about 4 P.M., and air should be given in moderation at or about 6 or 7 P.M. Some Orchids, and especially such as grow in baskets, or upon roots, &c., will now have pushed young roots or rootlets, which will, in some instances, protrude into mid-air. It is often advisable, therefore, to place a little sphagnum moss over, or around them, to prevent them from being injured by any excess of heat or dryness. During very drying weather atmospheric humidity must be sustained by frequently damping the house. Some of the larger specimen plants may now be removed from the stove into a properly shaded and ventilated conservatory or greenhouse. Draughts should, however, be very strenuously guarded against. I refer to such plants as *Clerodendron Balfourianum*, *C. Thompsoni*, *Gentiana*, *Strophelia*, *Hibiscus*, *Alamandrea*, &c. Young plants of *Thunbergia* *Horraria*, *T. fragrans*, *Thyracanthus Schomburgkianus* (*T. rudis*), and the elegant basket plants, *Torenia*, should now be induced to grow vigorously. It is according to the manner in which they succeed at this season, that future success is obtained. *Tydeses* should also now be started into growth, if a proper season of rest has been allowed them. By starting a batch now, and others in succession, some nice blooming plants may subsequently be had at the most

dreary time of year. There are many very distinct and desirable varieties, some, indeed, being more perfectly evergreen than others, as *T. Countess of Licheter*, *T. Vesuvius*, *T. Beauty*, and *T. Adonis*, the former being a very handsome one. Give a little guano-water to such fast growing, free-blooming plants as *Bougainvillea*, *Ipomoea Learii*, *Passiflora edulis* setting a crop of fruit, and such other strong growing subjects as are planted out into, and confined spaces. *Sarcocolla Palarquinia*, intended for early autumn flowering in pots, for which they are very desirable, should now receive their last shift into a good, lasting, rich fibrous loam, being careful not to pot them too deep. *Ericas* should have the old blooms picked off immediately they are past their best, as they quickly lose all beauty when that stage is reached; besides, to maintain them in this stage longer than is absolutely necessary, is to fritter away the latent resources of each plant, as well as to limit unnecessarily its future growing period. Do not hesitate at this time to pinch back *Chrysanthemums* frequently, where bushy plants are a desideratum. Stake those which need this aid, and look carefully after earwigs and other insect pests in connection therewith.

FORCING HOUSES.

At this time *Vineries*, started at the ordinary season, will be carrying crops busily engaged in the hard-taxed process of stoning. The better to ease them over this trying period, keep the structure at a more moderate temperature for a little time previously, and so allow the roots to fetch up any arrears of supply demanded. If for too long a time a hurried stoning process becomes the precursor of future decrepitude, causing in some degree the horrid shanking malady so much to be dreaded in all instances where the roots of the Vines are not under the most perfect control of the cultivator. At such a period root water should be given freely if the border be within doors. Give air to all Grapes now colouring with tolerable freedom by night when the weather is mild. Continue to shift successively forward the successional *Pines*, as in this position lies the groundwork of a future constant successional supply of fruit. Encourage all *Pines* to make a rapid growth now, as the sun's warmth and light will conduce to the formation of finely-developed fibre. Endeavour at this season not to overcrowd them; but, by allowing each abundance of room, endeavour to attain to a stiff, sturdy framework. Though *Cherries* will now have produced all their crop, it is not judicious to cease watering them too quickly; rather afford abundance to the roots, for the purposes of root and bud formation. In many instances *Melons* will now be ripening their fruit. Gather them before they become too ripe; as by leaving them too long afterwards the flavour is lost, and full maturity of the fruit hastened, which involves earlier decay. Attend carefully to the root-watering of *Figs* on which are fruit in a young state. If in any instance red spiders be gained a lodgment, and on *Nectarine* houses during the last stages of the fruit's ripening, have resort immediately the fruit is all gathered to heavy fumigations; for though the crop has been gathered for the current season, the house has yet to be, as it were, the laboratory for perfecting the wood for the next season's crop. Even the roots, it is possible, in some instances, may need watering.

HARDY FRUIT GARDEN.

Proceed with the layering of *Strawberry plants*, placing them on to the surface of small pots previously filled with rich soil in all instances where practicable. Plant out forced plants into properly prepared beds as soon as these are ready. Be careful, however, when planting them into this previously deep dug or trenched and manured ground, not to plant their crowns too deeply. Proceed with the nailing-in of all young shoots which continue to form upon *Wall Trees*. Pinch the lateral shoots off those strong ones which were stopped back in the spring, in instances where they are not required to furnish any particular space. Nail up especially young growths upon *Out-door Vines*, pinching the young shoots back to about 10 inches beyond the first dividing joint, which is an excellent carrying in intended, and the shoots are not needed to furnish further space.

HARDY FLOWER GARDEN.

Hollyhocks, &c., previously mulched, may now be manured lightly with one or two applications of strong manure-water. Take up all bulbs of *Tulips* from the beds as soon as practicable. Lay the choicer kinds on to dry surfaces in an open and somewhat shady shed, and so afford them time to ripen off leisurely. Do not at this time remove the old leaves, nor divide the bulbs, or in any way cause a wound to exist on any. All this might be done at a future time, and when they are completely at rest. Many kinds of *Herbaceous Plants* may now be increased by dibbling cuttings under north walls, or in other similar shady and moderately moist situations. Remove all old flowers and seed vessels from *Rhododendrons*—these tend to decrease the vigour of the plants greatly. Use the syringe freely upon *Roses*, and any other kinds of blooming plants which are at this time attacked by the many kinds of insects. Finish dividing and transplanting *Violets*, if not brought to a close. Where *Ranunculus* are showing symptoms of red ripening off, let them be taken up carefully

POTATOS.—*Southwark, June 19.*
During the past week the weather has been very warm and the consumption of old Potatos daily getting less. In a few days will finish the season of the old Potatos.

MILLER AND JOHNSON
(INCORPORATED IN 1855)
Manufacture the highest quality of
ARTIFICIAL MANURES for ROOT, CORN, and
GRASS CROPS
36, Mark Lane, London.

REES AND CO.'S BIPHOSPHATED PERUVIAN GUANO (Registered Trade Mark, Flying Albatross), is now ready for delivery in quantity and in fine condition. It is believed to be the best Artificial Manure yet used in the Peruvian Government Guano; it contains 31 per cent. of Soluble Phosphates, and 70 per cent. of Ammonia. See reports of Dr. Voelcker, Dr. Anderson, Professor Way, Mr. Ogston, and Mr. Sibson. Delivered in cwt. bags, each of which is secured by a leaden seal, bearing the Company's Trade Mark. The analysis is guaranteed so long as the seals remain unbroken.

REES AND CO. (Limited), 39, King William Street, London, E.C.

REPORT AND ANALYSIS BY DR. A. VOELCKER.
Consulting Chemist to the Royal Agricultural Society of England.
"Analytical Laboratory, 1, Salisbury Street, London, E.C.
"London, January 15, 1870.

"Sir,—Enclosed you will find the results of a careful analysis of a sample of your Biphosphated Peruvian Guano. These results speak for themselves. I need therefore hardly add anything in commendation of the high fertilising character of this valuable Artificial Manure. The samples examined by me contained only 10 per cent. of moisture, and the percentage of soluble and indissoluble phosphates which I understand you guarantee to furnish, was in a line state of preparation. The more generally this Manure will become known to agriculturists, the more it will be appreciated by them.

—Believe me, Sir, yours respectfully,
"AUGUSTUS VOELCKER.
"The Secretary, REES AND CO. (Limited), 39, King William Street, London, E.C."

ODAM'S NITRO-PHOSPHATE or BLOOD MANURE.
ODAM'S SUPERPHOSPHATE OF LIME.
ODAM'S NITRO BI-PHOSPHATE (or prepared) GUANO.

MANUFACTURED BY THE

PATENT NITRO-PHOSPHATE or BLOOD MANURE COMPANY (INCORPORATED IN 1865), consisting of Tenant-Farmers occupying upwards of 80,000 Acres of Land.

Chief Offices—100, Fenchurch Street, London, E.C.
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Chairman—John Clayton, Littlebury, Essex.
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Edward Bell, 40, Westmoreland Street, Dublin.
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Roger Leeds, Wicken House, Brandon, Norfolk.
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This Company was originally formed by, and is under the direction of

Agriculturists, consisting of the best and most experienced, viz.,

"THE TENANT-FARMERS' MANURE COMPANY."

Several Hundred Thousand Tons of the Manures have been supplied

to the Agricultural Field, and the increasing demand which exists for them is the best proof of the appreciation in which they are held.

Particulars will be forwarded on application to the Secretary, or may be had of the local Agents.

Local Offices—100, Fenchurch Street, London, E.C.
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THE LONDON MANURE COMPANY

(ESTABLISHED 1846) have now ready for delivery, in fine drying condition—

PURE DISSOLVED BONES.
CONCENTRATED AMMONIACAL MANURE, for Top-Dressing.

PURSEBORN BONE TURNIP MANURE.
PERFECTLY PURIFIED GUANO.

NITRO-PHOSPHATE.
MANGLED HOP and POTATO MANURES. Also

PERUVIAN GUANO (as imported by Messrs. Odam, Bonar & Co.), NITRATE of SODA, SULPHATE of AMMONIA, &c., &c., Fenchurch Street, London, E.C.
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The Cheapest and Best Tobacco.

DUTY-FREE TOBACCO.

By HER MAJESTY'S ROYAL LETTERS PATENT, and by PERMISSION of the HON. BOARD OF CUSTOMS.

POOLEY'S TOBACCO POWDER, for the Prevention

and Destruction of Blight and other Diseases in Plants.

Sold by Nurserymen, Seedsmen, and Florists.

In Tins, at 1s. 6d. and 3s. 6d. each.

Powder Distributors, 25, 6d. and 3s. 6d. each.

"I find it exceedingly useful for killing the Aphides on Roses and other plants."—Geo. EVES, Superintendent, Royal Horticultural Gardens, South Kensington. May 7, 1868.

T. A. POOLEY, Bonded Warehouse, Sussex Wharf, Wapping, E.

T O B A C C O T I S S U E

FOR FUMIGATING GREENHOUSES.—Will destroy all the

Insects, and not injure the Plants, and burns without the assistance of fuel. Price 3s. 6d. per lb., carriage free. A reduction in price for large quantities.

To be had of Messrs. R. ROBERTS AND SONS, 12, St. John Street, Clerkenwell, London, E.C.; and of all Seedsmen and Nurserymen.

REWARD.—STOLEN, from the Romford Poultry

Shed, on FRIDAY, June 16, a BLACK COCK CARRIER

FIGHT, heavily laden with EGGS. Whoever will give information leading to the apprehension and conviction of the Thief and the recovery of the Bird, shall receive the above reward on application to Mr. ALFRED HARVEY, Romford.

MR. JAMES FRASER (of the late Firm, of Messrs. J. & F. Fraser, Lea Bridge Road), undertakes HORTICULTURAL VALUATIONS of every description, SALES by Auction, &c.—Maylands Farm, Romford, Essex, E.

NURSERY BUSINESS to be DISPOSED OF, with

Within miles of Covent Garden. Five Greenhouses, Fls, Frames, &c., and 3 acres of Land.

A. B. Post Office, New Cross, S.E.

TO Nurserymen, Florists, and Others.

TO BE LET, on LEASE, with immediate possession,

for 8 years unexpired, an ELEGANT PROPERTY, consisting of an excellent Eight-roomed House and Three Acres of Land, well

equipped with Fruit Trees, and Shrubs, &c., with about 1000 feet

of Hothouses, all of which have been refitted with Hot-Water Boilers, on the most improved principles. Situated within 10 miles of

London, the Stock Trade, Green, and Horse Yard, can be had on a moderate valuation.

Apply by letter to Y. Z. M. Lawford, 1, Spring Grove Terrace, Spring Grove, Kingston, Surrey.

SALES BY AUCTION.

Pine-apple Place, Maidia Vale, Edgware Road.
MR. J. C. STEVENS begs to announce that he has received instructions to offer for SALE, by Private Contract, and well known to the PUBLIC, the business of the late JOHN C. STEVENS & CO., who have been established upwards of a century. Full particulars may be obtained of Mr. J. C. STEVENS, Auctioneer, and Valuer, 31, King Street, Covent Garden, London, W.

Leyton, Essex.

TO MARKED, AND RESERVE, AND OTHERS.

A large WATERCRESS BED, 100 TONS of GRASSLAND in

Leiton Common Marsh, a NURSERY GROUND, and valuable

watercress beds, all of which are situated in the parish of

MESSRS. DRIVER are directed to offer to

AUCTION, at the Mart, Tokenhouse Yard, on TUESDAY,

June 27, at 10 o'clock, the above PROPERTY, and other

TIES. One portion comprises about 23½ acres of Building Land, situated in the village of Leyton, with about 30 acres of

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Agricultural Land Improvements.
DRAINAGE, SEWAGE IRRIGATION, FARM BUILDINGS, LABOURERS' COTTAGES, &c.
THE GENERAL LAND DRAINAGE AND IMPROVEMENT COMPANY.
(Incorporated by Act of Parliament in 1849.)
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Agricultural Improvements, and Sewage Irrigation, can be executed by the Company, or the outlay thereon paid to Landowners who prefer to carry out the works by their own hands and are created by the

Tenant Farmers may, also, by agreement with their Landlords, procure the execution of such Improvements.

Special arrangements will be made for the benefit of Health, Sewer Authorities, and others, for undertaking Works of Sewage Irrigation, together with all Works incidental thereto. The outlay in respect thereof may be repaid either by sum in gross, or by a terminable yearly payment, discharging in a fixed period the principal amount with interest thereon.

No investigation of title necessary, and no legal expenses incurred.

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Special arrangements will be made for the benefit of Health, Sewer Authorities, and others, for undertaking Works of Sewage Irrigation, together with all Works incidental thereto. The outlay in respect thereof may be repaid either by sum in gross, or by a terminable yearly payment, discharging in a fixed period the principal amount with interest thereon.

Application to be made to ARTHUR MILMAN, Esq., the Secretary, at the Offices of the Company, 22, Whitehall Place, S.W.

THE LANDS IMPROVEMENT COMPANY.

(Incorporated by Special Act of Parliament in 1845.)
Drainage, Reclamation, Farm Buildings, Labourers' Cottages, &c.
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The Company advances money, unlimited in amount, for all purposes of Agricultural Improvement, including the purchase of Cottages and Farm Buildings, to the Owners of settled and other Estates, and to the Company may, with the consent of their Landlords, execute the necessary Improvements upon the Farms which they occupy, charging the same on the Farms.

UTILISATION OF SEWAGE.—The Company also advances money, unlimited in amount, for all purposes of Agricultural Improvement, including the purchase of Cottages and Farm Buildings, to the Owners of settled and other Estates, and to the Company may, with the consent of their Landlords, execute the necessary Improvements upon the Farms which they occupy, charging the same on the Farms.

The whole outlay and expenses are liquidated by a rent-charge on the land, redeeming principle and interest, over 35 years.

No investigation of title necessary, and no legal expenses incurred.

For Forms and further information, apply to GRANVILLE R. RYDER, Esq., Secretary, at the Offices of the Company, 22, Whitehall Place, S.W.

Storey's Gate, Westminster, S.W.

BEDFORDSHIRE AGRICULTURAL SOCIETY

(embracing the adjoining Counties)—The SEVENTEENTH SHOW of STOCK will be held at Bedford, on THURSDAY, July 27.

A HORTICULTURAL and FLORAL EXHIBITION, in which are included the following classes:—Flowers, Fruit, and Vegetables.

The Show will be held on the same day, in adjoining grounds. The Band of the Coldstream Guards will attend.

LAST DAY OF THE STOCK and POULTRY, July 4; and for the HORTICULTURAL SHOW, July 12.

The Dinner of the Society will be held on the ground, at 4 o'clock. The Committee hope to be favoured with the attendance of Ladies.

Lists of Prizes and Forms of Entry can be obtained from the Secretary, Mr. J. H. Green, Bedford.

THOS. LESTER.

MANCHESTER and LIVERPOOL AGRICULTURAL SOCIETY.

PRIZE-Lists for the Show at Liverpool in SEPTEMBER 1871 may be obtained of the Secretary.

Upwards of THREE THOUSAND PRIZES are offered in PRIZES, including £100 for the best Horse, £50 for the best Bull, £25 for the best Cow, £10 for the best Pig, &c. &c. ENTRIES CLOSE AUGUST 1.

Winsford, Cheshire.

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

WOLVERHAMPTON MEETING, 1871.

SHOW OF HORSES, CATTLE, SHEEP, &c. To be held at Wolverhampton, on SATURDAY, 15th, to FRIDAY, July 14.

Admission—Saturday (Implement Yard only), 2s. 6d. Entrance Showyard—Monday, 1s. 6d. Tuesday, 1s. 6d. Wednesday, 1s. 6d. Thursday and Friday, 1s. 6d.

Season Tickets, price 10s. 6d., available for the whole of the Show, may be obtained of Messrs. SOLLIM and BARNETT, Wolverhampton.

H. M. JENKINS, Secretary, 12, Hanover Square, London, W.

Royal Horticultural Society, at Chesham.

NOTICE.—THE GARDENERS' CHRONICLE

and AGRICULTURAL GAZETTE for JULY 1 will contain a FULL REPORT of the SHOW with an INTERESTING and LARGELY ILLUSTRATED CATALOGUE.

May be procured in the Show Ground, and at Messrs. W. H. SMITH and SON'S Bookstore, Price 6d. free by post 5d.

Published by W. RICHARDS, 45, Wellington Street, Covent Garden, W.C.

The Agricultural Gazette.

SATURDAY, JUNE 24, 1871.

THE ROYAL AGRICULTURAL BENEVOLENT

INSTITUTION held its annual meeting last week, and 20 male pensioners at £26 a-year, 10 married pensioners at £40 a-year, and 30 female pensioners at £20 a-year, were elected on its roll. There has thus been created at once an additional charge of more than £1500 a-year upon the funds of the Society, and we cannot doubt that the necessity thus created, with the impression it produces that the Society is determined not to fund and hoard but to use its income, will result in a large increase of the means placed at its disposal. No one who takes any interest in the operation of the Institution can fail to realise the extent of the special fund of distress in which labourers, and of late years there have been so many additional causes of agricultural distress in operation, that the field is wider and fuller now than ever it has been.

It is astonishing that some English counties, which furnish as many histories of trouble and disaster as any others, are so indifferent to the claims of this Society on the agricultural world.

Important Sale of Short horns

At the PRINCIPAL CONSULTING VETERINARIAN HOME PARK.

MR. STRAFFORD has the honour to announce that he has received instructions to receive, on WEDNESDAY, July 12, at the Prince Consort's Farm, Windsor Park, a very superior

PURE-BRED SHORTHORNS, the property of Her Majesty's late superior

owner, amongst them will be found some fine specimens of the

Fawcett blood, including several descendants of the late Duke of

Alton, Coldstream, and Fawcett. First-class Bulls from the renowned

Windsor Park have been used in the breeding, viz., Prince Alfred

(13,494), British Cream (14,107), Flax Clarence (14,559), Lord Hopedale

(13,230), and England's Glory (13,880); the young stock are chiefly by

the latter bull. The sire now in service Royal Benedict (13,880),

from the same famous herd.

Catalogues, with Pedigrees, may be had on application to Mr. STRAFFORD, 13, Euston Square, London; or to Mr. TAIT, at the Prince Consort's Farm, Windsor.

Winterford, near Kidderminster.

IMPORTANT SALE OF SHORTHORNS.

MR.

which it benefits. We may illustrate our criticism by a case of distress, in which we have during the past spring been particularly interested—where a married candidate for election on the list of the Society's annuitants, presenting just the circumstances which the founders of this charity contemplated, failed last week, owing, we believe, entirely to the supine indifference to this charity of the county to which he belongs. Cheshire has suffered more than any other agricultural county of late years. The cattle plague has ruined many of its farmers, and many candidates for such relief as this Society can offer could have claimed and would have obtained the help they sought, had the landowners and farmers of that county done their duty as subscribers to its funds.

The gentleman to whom we refer, who has just unsuccessfully sought election, has for many years been a contributor to these columns, is well known in Cheshire and elsewhere as an agricultural writer, and as a good judge, practical farmer, referee, and man of business. Now nearly 80 years of age, he has by pleuropneumonia, drought, and cattle plague (which swept away all his stock before the date of the Act compelled the slaughter of infected animals but giving compensation), at length been reduced to want. He was, until no longer able, an unflinching subscriber to the funds of this Society, which we are certain never had a more worthy case upon the list of its candidates. He has failed, as we believe, simply because the rich county of Cheshire does virtually nothing for the Royal Agricultural Benevolent Society, so that the candidates from other counties have a prior claim upon its favour.

The instance to which we allude must, we should think, result in an access to the membership of the Society from Cheshire; and next year, no doubt, our friend, if he survives, will be elected. Meanwhile, it is a very lamentable case to which we have thus drawn attention.

We gave recently a note or two upon the USE of CONCRETE as a BUILDING MATERIAL in the construction of walls of farm buildings; we now offer a line or two upon its use for the formation of floors. Various materials other than this have been used in addition to the old and time-honoured material—stone, such as brick-on-edge, tile, asphalt, and lime floors; but to all of these objections have been made, for various reasons. In the use of stone, as generally employed, while there is no doubt that it is a lasting material, there is this objection to it—that, when laid in the shape of small blocks, there not only forms ultimately an uneven surface from the unequal settlement of the foundation on which they rest, but they offer in the intervals or spaces between the blocks places in which the dung and dirt lodges; all which, being difficult to remove, keep down the sweetness of the air which ought to exist in all stables. When these objections are attempted to be overcome by the use of stone in another form, as that of slabs of larger dimensions, while a floor of uniform surface is undoubtedly obtained, it is not one which affords a firm footing to the animals; is, moreover, expensive, and if not well laid, is apt to get out of order. The same objections which are found exist in concrete block or causeway floors, exist in the case of brick-on-edge floors, with this additional one, that the bricks at the points of juxtaposition are apt to crumble or disintegrate, this disintegration being often also found to exist over their whole surface. While, no doubt, this waste will depend much upon the quality of the bricks, still in the quality usually employed it is at once rapid and extensive. The same objections, to a greater or less extent, apply to the use of tiles, although those, being generally hard burnt, do not disintegrate or break easily. To asphalt floors, unusually well done, there are also objections, although if the constructors were to get into the way of laying it down as it is usually laid down on the Continent, many of the objections would be removed.

Taking every point into consideration, and judging it from a strictly practical stand-point, not merely from what our own experience in connection with it has shown us, but from what we have seen of it as put down by others, we have no hesitation in putting concrete in the front rank of flooring materials, if not, indeed, at the head of, or before all others. It is hard, durable, and capable of resisting all pressures likely to be put upon it, even if used in

places where there is heavy cart or carriage traffic, and it may be laid with a perfectly uniform surface over any extent, and without a single joint or break in its continuity. This last feature is of immense importance in apartments of farm buildings where it is essential that the flooring surface can be easily cleaned and kept clean. Further, while in the case of nearly every material employed in the formation of floors, the gutters in the case of apartments for live stock have to be formed out of special blocks, the joints of which, in contiguity to the other materials of which the floor is employed, are sources of endless trouble, which afford lodgments for filth, and which speedily become loose—in the case of concrete floors, gutters both large and small, and, indeed, any form of indentation on the surface required, can be formed with the greatest of ease, and at a very small portion of the cost of forming gutters in stone, or of earthenware. A concrete floor may indeed be termed a monolith,—a solid surface of stone, with no break or joint over the whole of it.

The materials used in the formation of concrete floors are obtainable everywhere. Clean, sharp sand, whether of river or sea, will make an excellent floor; or, if this cannot be obtained in sufficient quantity, broken bricks and the like, and "breeze" from the iron and colliery works may be used, being passed through a mill in order to crush them into the condition of very small gravel. The cement used is Portland cement, and the proportions are three of the base, as sand, broken brick, &c., to one of the cement. The whole of the materials should be well mixed together in their dry condition, and water then added in quantity sufficient to allow of the concrete being spread easily like mortar. So much of the materials should be mixed at a time as can be easily laid down while the mass remains in proper consistency. The more thoroughly the cement is incorporated with the base, as sand, &c., the better; and, if a large surface of flooring is to be laid down, it would be advisable to rig up a mixer, which could be done at no great expense. If a clay pug-mill be on the premises, this may be used as a mixer of the materials with advantage.

The only art required in the laying of the floor—if art it be, where carefulness alone is the requisite—is to make the junction between parts previously laid down and new parts, and this is not a difficult thing to do. If the joint happens to be a little rough—higher at one point than another, a brick may be used to smooth down the protuberant part, this being used while the concrete is moderately soft. A brick or part of a brick is also a capital thing to round and finish off the corners of gutters, &c.

An important part of a concrete floor is the "bottoming,"—the material upon which the concrete rests as a base. This bottoming is made of broken stones or bricks of size sufficient to go through a 2-inch or 1½-inch ring; they should be, of as uniform a size as possible, and hard road-metal forms a capital bottoming. The depth or thickness of the layer of stones, &c., should be, for floors 4, for roads at least 6 inches. The depth or thickness of the top layer of concrete forming the floor surface is 2 inches; thus making the depth of the excavated part below the line of floor surface 6 inches in all. This depth should be marked or gauged off all round the apartment to be floored, a chalk-line indicating the floor level all round.

The surface of the ground upon which the floor bottoming is to rest should be rammed over, to make it as firm and unyielding as possible. The stones should be carefully laid, and the depth kept quite uniform.

In laying the concrete, the work should be commenced at one end of the room, and gradually brought forward; this will allow the parts newly laid to be trodden upon. But should it be necessary, as it may be necessary in the case of a large room, or when the concrete laying has reached the centre of the room, to go over any of the newly laid surface, flat boards may be laid over the floor, upon which the workmen may walk. In cases where walking must be done, this is the best way to prevent marking of the surface; and care should be taken that the boards have no projecting points on their under surface.

As already said, the use of concrete as a flooring material permits of an easy formation of gutters, or any other form of depressed parts. Half-round gutters—that is, with semicircular bottoms—are very easily formed by using a

timber gauge, the under side of which is made semicircular, of the same size as the gutter is intended to be, and this gauge is run along the concrete surface, the concrete being worked up to the sides, and the bottom being worked smooth by moving the gauge to and fro longitudinally before taking it out. The edges of gutters should not be left with sharp corners, as these are soon broken off, but the corners should be rounded off. This may be done when the concrete is partly set, by rubbing with a brick, but the corners may be formed rounded in the concrete itself by forming the underside of the gauge like an ogee moulding, the return concaves of which at the sides of the gauge will, of course, form rounded edges to the gutter. Where one gutter joins another gutter at right angles, one junction should be curved at the upper edges. This will be most quickly done by brick rubbing.

If the whole surface of the floor is desired to be laid out with diamond-shaped indentations or in parallel grooves, these can be very easily formed by timber gauges, made out of half-inch stiff stuff. The roughing of a floor in this way is not necessary in order to give the animals passing over it a good foothold, as the natural surface of the concrete gives this readily enough. There is, however, one advantage in forming parallel grooves over the surface of the floor, as these form small drains by which the water used for cleaning purposes can run easily to the centre gutter.

The floor should not, in the case of apartments used for stock, as stables and cow-houses, be uniformly level, but should be made with its two sides inclined towards the centre gutter. Thus the floor of the stables should slope gently from the head or manger to the front gutter; the dunging passage sloping the contrary way, from the outer wall to the central gutter. This part will be all the better if laid with parallel grooves, running from the outer wall to the central gutter. The depth of these grooves should not exceed half an inch, and the breadth the same; and the distance between the grooves from 4 to 6 inches.

— On Monday, at Mark Lane, there was a short supply of English Wheat, and a moderate amount of business at a decline of 1s. on the previous Monday's prices. On Wednesday, for all qualities, there was a slow demand, and prices had a downward tendency.

—At the Metropolitan Cattle Market, on Monday, prices improved for all kinds; on Thursday English beasts commanded high rates, and there was also an advance in the quotations for sheep.

— We may as well at once publish the substance of the programme which has been forwarded to us of the ensuing GREAT ANNUAL MEETING of the ROYAL AGRICULTURAL SOCIETY at Wolverhampton. Governors and members of the Society who have paid the subscription for the year will be invited to attend the showyard and trial-fields, during the time they are open to the public, by non-transferable tickets issued by the secretary. Application for these tickets must be made either by post or personally, at 12, Hanover Square, not later than Wednesday, July 5. Half-guinea non-transferable tickets, admitting non-members to the showyard once only on every day of the show, may also be obtained of the secretary, at 12, Hanover Square. We have a trial of steam-cultivating machinery, and a trial of a portable steam engine, &c., will take place at The Barnham, near Wolverhampton; and the final trials of steam-ploughs and cultivators will take place at Hopton, near Stafford, between Monday, June 26, and Saturday, July 8, unless sooner concluded. The implement yard will be open from 9 A.M. till 6 P.M. on July 8; admission 2s. 6d. each person. The entire showyard will be open from 8 in the morning, at which hour the judges will commence inspecting the live stock and making their awards. On Monday, July 10, admission 5s. each person. The admission will be 2s. 6d. each person on Tuesday and Wednesday, and the general meeting of the members in the showyard will take place on Tuesday, at 2 o'clock. On Thursday and Friday the admission will be 1s. each person. The exhibition of cattle in the rings will take place at 10, and of the horses at 12 noon, each day after Monday. The following are the officers of the Society during this meeting:—President: Lord Vernon. Stewards of departments:—Live stock: Mr. Jacob Wilson, Sir Watkin W. Wynn, Bart., M.P.; and Mr. R. Milward. Implements: Lieut.-Col. F. M. Wilson, Mr. C. Wren Hoskyns, M.P.; Mr. W. J. Edmonds, and Mr. T. C. Booth (steward elect). Finance and showyard receipts: Major-General Viscount Bridport, Colonel Kingscote, M.P.; Mr. D. R. Davies, Mr. Randall, Mr. Torr. Forage: Mr. R. H. Masfen. General arrangement of show: Mr. B. T. Brandreth Gibbs.

— In his recent report to the Royal Agricultural Improvement Society of Ireland, Dr. JAMES AFJOHN

thus refers to the important subject of MANURE VALUATION founded on composition. He says:—

"The multipliers which I have long been in the habit of using (applying to the percentage of the various ingredients in a manure) at one time correctly gave the money values; but, in consequence of the substitution at present generally made of coprolites and mineral phosphates for bones, &c., the percentage of time necessary for making superphosphates has been greatly reduced, and, as a consequence, the former method of estimation give results for money values much higher than the prices at which the superphosphates can be purchased. I have now maturely reconsidered the question, and have arrived at simple rules, which I shall give, without attempting to explain the processes by which they were obtained. They will, I think, be found very easy of application, and are at present perfectly correct: that is, they give the prices at which manures should be sold by respectable manufacturers. The manure market, too, has become very steady, and I do not think that the rules will, for a considerable time, require to undergo any alteration.

RULES FOR ESTIMATING MONEY VALUES OF PHOSPHATIC MANURES.—Let us suppose that a superphosphate on analysis is found to contain 10 lb. per cent. of soluble phosphate of lime: B lb. per cent. of biphosphate; and C lb. per cent. of ammonia; then the money value of such manures will be, in shillings, given by the following rules:

Rule 1. $A \text{ by } .25$ is the value of the insoluble phosphate in a ton.
 " 2. $B \text{ by } 6.56$ is the value of the biphosphate in a ton.
 " 3. $C \text{ by } 2.12$ is the value of the ammonia in a ton.
 And hence the money value of one ton of manure is $A \text{ by } .25 + B \text{ by } 6.56 + C \text{ by } 2.12$.

Example.
 Insoluble phosphate of lime .. 12 .. These quantities of phosphate, biphosphate, and ammonia are .. 17 .. contained in a phosphatic manure.
 Ammonia .. 17 ..

Rule 1. $12 \text{ by } .25 = 3.00$, $17 \text{ by } 6.56 = 111.52$, $17 \text{ by } 2.12 = 35.84$
 " 2. $17 \text{ by } 6.56 = 111.52$, $17 \text{ by } 2.12 = 35.84$
 " 3. $17 \text{ by } 2.12 = 35.84$, $17 \text{ by } 6.56 = 111.52$

Money value of a ton .. £3 15 2

"I may mention that if the insoluble phosphate of lime is composed of coprolites of mineral phosphates, it is considered to be ineffective; for, although phosphate of lime is present, from its insolubility it can scarcely exercise any fertilising influence. If, however, the insoluble phosphate be bone earth, or the phosphate of lime which is found in a guano, it should be valued by rule 1, above given."

— Mr. MECHI writes to the *Times* describing a recent visit to Mr. HOPE'S BRETONS FARM, near Hornchurch, 3½ miles from Romford, from which town all its sewage flows through an 18-inch iron pipe. Mr. HOPE paying to the town 2s. per head, or £600 per annum, for 6000 inhabitants using closets. The cost to the town of raising all the sewage 25 feet at Mr. HOPE'S farm is, including coats, engine-driver's wages, and interest and wear and tear of engine, about £300 per annum. Mr. MECHI says:—

"My last visit to this farm, as recorded in your columns, was in September. Ever since then, in all weathers, the sewage has flowed constantly on the land, which consists of 120 acres of poor gravelly and sandy soil with occasional very fertile spots. I saw the engine-driver and farm men looking as healthy as new, although he and the four sewage regulators are for ten hours a day in almost immediate contact with the sewage. There was the black sewage flowing over the land, and passing through it to the drains, five and six feet deep, coming out clear the finest spring water. The day was very warm, so we all had a hearty draught of it, without any inconvenient result. Mr. HOPE uses it over again mixed with the sewage, except when there is heavy rain. It thus appears that, in his case, the flood or rain water mixed with the town sewage does not over-dilute it, although the question is arising whether the sewage and flood water of towns and cities should not be separated. I presume that would depend upon the nature of the soil to which it is to be applied, and also to the amount of town water supply. At present the farm was looking the picture of healthy and abundant growth, and it was wonderful to see French Beans growing on a portion of the land that was almost pure gravel. The temperature of the sewage during frost being many degrees above freezing, the irrigating water at night melts the ice in the ground and enters the soil. Onions, Carrots, Cabbages, Potatoes, Strawberries, &c., were all promising, and a second cut of Italian Rye-grass, two feet to three feet long, gave unmistakable evidence of the value of town sewage as a productive manure. I saw a lineal descendant of *Mass Rose* by EMERSON (1874) and *Gairland* by HECTOR (4000). Scattered through the

list are no fewer than six heifers and three bulls of the fashionable "Charmers" tribe, all by first-rate bulls. Knightley blood is also well represented by three "Fawleys," descended from *Cathleen* by CALIPH (1774), *Candytuft* by JANIZARY (8157), and *Copiedict* by DUKE OF CAMBRIDGE (12,742). *London Pride* by JANIZARY is represented by a group of four heifers by JANIZARY, a heifer and two young bulls, and *Fansley* by LITTLE JOHN (4232), is represented by *Fansley 11th* by LORD OXFORD 2D (20,215). The well known Tortworth "Chaff" family contributes two heifers, both by 15TH GRAND DUKE (21,852); *Lady Gwynne* by 15TH GRAND DUKE traces back to the times of FAVOURITE, PHENOMENON, and LAYTON; and the remaining animals have pedigree almost as taking. Among the bulls must mention GRAND DUKE OF GENEVA 2D, calved 30 recently as the 5th inst. He is by GRAND DUKE 15TH, and from 7th *Duchess of Geneva* out of 3d *Duchess of Geneva*, a grand-daughter of *Duchess 71st* by DUKE OF GLOSTER (12,961). Fully half the stock is by 15TH GRAND DUKE, others are by the pure Bates sire LORD OXFORD 2D (20,215), and several of the bulls are by SIR CHARLES KNIGHTLEY (27,456), a son of *Knightsbridge* (22,051), and *Chorus 2d* by LORD OXFORD 2D (20,215). A few of the heifers are served by GRAND DUKE OF KENT (26,289), and GRAND DUKE OF OXFORD by 15TH GRAND DUKE and 7th *Maid of Oxford*. These and other animals which we have not space to mention will be disposed of by Mr. Stratford on July 5, at Waterbury. The sale commences at 2 o'clock precisely.

"A Practical Farmer" makes some rather wild statements in the *Irish Farmers' Gazette* of last week, regarding the value of Shorthorns. He is especially virulent in his attack upon Bates cattle, and informs us that the most "fashionable and high priced cattle in England (Bates' Dukes and Duchesses) are splendidly deficient in the points deemed all essential in this cattle the Channel (Ireland). Then follows a list of failings in carcass, and in milking and grazing properties, and lastly, he wishes to know why these cattle, if they really are so excellent, have not met with fuller recognition from the judges at the English shows? "Why have these vaunted cattle been almost invariably beaten by the Booth and Towneley strains, and yet, at the same time, how is it they have attained to so high a pecuniary value? Judging from the evidence of the letter just noticed, I penned, a stranger would be inclined to believe that the rival breeds were as distinct from each other as Herefords and West Highlanders. He would indeed be astonished to find that they are the same breed, of similar colour, size, qualities, and pedigree, the difference being, indeed, all but imaginary; that up to the period of Collings' sale in 1810 the two were undivided, that since that time the two sections have arisen; that it is not easy to find pedigrees of Booth and Bates cattle which do not show close relationship; and that even the now famous SOVEREIGN, the boast of Irish Shorthorn breeders, has GRAND DUKE blood in his veins. Further, it might be urged that no one could be with any certainty (except in cases where a strong family likeness exists) say to which of the two rival sections any particular animal belongs. As to milking and grazing qualities, we have no hesitation in saying that individuals of equal value in both particulars might be found with equal readiness either among Booth or Bates herds. We also cannot think that the Booth parties in the *Irish Farmers' Gazette* is well informed with regard to prices. Booth and Bates cattle have been very equal in the competition for public favour, and the high sum of 2000 gs. has been offered and refused for a single animal on either side. With regard to prize taking we would suggest that the Bates breeders do not show so frequently as the Booth breeders, and they have (and we here speak under correction) shown less willingness to feed their heifers up to the necessary standard of fatness for competition at our agricultural shows. There are fewer pure-bred Bates than Booth cattle, and this has, no doubt, exerted an influence in raising their market value. We have always been anxious to deprecate anything like a false value in the market, and we have no objection to the value being raised or lowered from intrinsic merit. This, however, is a fault due to the abundance of wealth and the course of fashion, and applies equally to the Booth and to Bates cattle. The preference, or even strong partiality, exhibited by breeders for their own particular sort, is natural enough; but, to hold up Booth above Bates in the extravagant style adopted by "A Practical Farmer," is simply absurd.

— TELEMACHUS (27,603), the 1st prize bull at the Warwickshire Agricultural Society's show at Rugby, and the winner at Romford of Mr. D. McIntosh's challenge cup for the best pure-bred Shorthorn, open for competition to all England, Ireland, and Scotland, was bred, and is the property of the Marquis of Exeter, Burghley Park. He is roan in colour, and was calved April 13, 1868; got by the Marquis of Exeter's NESTOR (24,648), of the "Gwynne" tribe, and from *Louisa 9th* by the thorough-bred Bates bull PRINCE ALBERT (18,579). His grand-dam was a daughter of *Prince Albert* (18,579), whose name reveals his origin, and his great-grand-dam was by 3D DUKE OF YORK (10,166). Surely this ought to satisfy "A Practical Farmer" in the *Irish*

Farmers' Gazette that Bates cattle do occasionally meet with approbation from English judges, the more so as it appears that the contest was between the above-named bull and *Charmers 13th*, the property of Mr. McIntosh, and a singularly pure bred Bates heifer.

SHEEP.

On Wednesday, the 14th inst., Mr. T. Ensor submitted the Langton and Hinton Southdown flocks to public auction. These sheep had long been carefully bred by the late Mr. Farquharson, who exercised great judgment in selecting from such celebrated flocks as those of the Duke of Richmond, Lord Walsingham, the late Mr. J. Bates, Mr. Ellman, Mr. H. Boys, Mr. H. Fookes, and Mr. Goringe. The sheep were offered in lots of 20 each. The results of the sale were as follows:—6-tenth ewes, 41s.; 5-tenth, 45s., to 47s.; old ewes, 60s. to 63s.; culler hogs, 45s. to 49s.; wethers, 50s.; fat ewes, 59s.; culler lambs, 21s. to 26s. The Langton flock realised £2765; the Hinton flock, between £1800 and £1900.

PIGS.

At the Essex show at Romford, Mr. Swanwick, of the College Farm, Cirencester, showed some excellent Berkshires, and took two prizes in each class open to all England. "Sambo 2d," which, as a young boar 13 months old, stood 2d to Mr. Griggs' boar "Prince" at Oxford, this time beat him, taking the 2d place, a large white boar standing 1st. In the large sow class, open to all England, Mr. Swanwick's sow was placed equal with Mr. Duckering's large white sow, and divides the honours of 1st prize with her. It is difficult to account for the omission in the Essex papers, and subsequently in some of the principal agricultural journals, of the honours taken by Mr. Swanwick in the pig classes of this show. The fact, however, remains, that in all the reports we have yet seen Mr. Swanwick's Berkshires are ignored. They are also incorrectly mentioned in the prize list.

SMALL FARM MANAGEMENT.

(Mr. Thomas Baldwin, Superintendent of the Agricultural Department of National Education, supplies the annexed valuable and important paper on small farm management to the *Weekly Freeman and Irish Agriculturalist*.)

THE climate of Ireland unsuitable for tillage! After having seen tillage successfully raised in the most extensive parts of the West Riding of Cork, in the South, in the uplands of Down, in the wilds of Donegal, and other places unfavourably situated, the notion to me seems ludicrous.

One of the largest and most intelligent farmers of my acquaintance settled in the West of Ireland; but he was not carried away by the statements of those who believed that the climate of Ireland was unsuited for tillage. He established a Northumberland first course rotation on the greater part of his farm, which contains close on 1000 acres. One of the best managed pieces of land under my inspection is situated in the midst of a tract of upland bog in Tyrone, and is known as Loughash Farm. It contains some 80 statute acres, chiefly reclaimed mountain bog. The tenant makes upwards of £200 a year on it after paying a fair rent. The climate is moist and moist; yet the tenant, who is one of the most intelligent and experienced agriculturists in the county, pursues the six-course rotation. Had he put this land into grass he could not support his family; by a judicious system of rotation he has acquired an independence. It is unnecessary to multiply examples. Most of the persons who have been urging that tillage farming is not profitable in Ireland have been carried away by the circumstance that the low range of summer heat and the drooping climate are unfavourable to the production of Wheat. I have already assigned to Wheat its proper place in the rotation. But we can have tillage without Wheat. We can have the rotation of crops without Wheat or even Barley. On the Loughash farm I have never seen Wheat or Barley; neither is raised on general farms under my direction, including the small farm at Glasnevin. Wheat would pay better there than Oats after roots; but as I am bound to exhibit a system of cropping which may be found on a Donegal or Kerry, the crops in the rotation are Potatoes, roots, Oats, and artificial grass, which can be grown everywhere.

The Oat crop delights in a humid climate like ours. Nature would appear to have fitted its drooping branches for a drooping atmosphere; and certainly Nature does not offer any impediment to the successful growth of the Oat crop on seven or eight millions of acres of the surface of Ireland. At the present moment the Oat crop has partially failed in many parts of the country. Several farmers of my acquaintance have suffered severely from the wireworm and other pests. I have seen several fields of grass corn ploughed up; the farmers in all those cases which have come under my observation are to blame because they did not take proper precaution to prevent or mitigate the effects of these pests. In several places the ground was badly ploughed, and there was not the necessary degree of tillage in the seed-bed. The lea Oats on the large farm at Glasnevin received a check, but only a check. It would, in all likelihood, have suffered like Oats in several parts of the country, were it not for the precautions taken. These were 1. The use of the Crosskill

OUR LIVE STOCK.

CATTLE.

THE Waterbury catalogue, announcing the sale of 45 head of Mr. Leney's best cattle, is at once attractive and varied. Many families are represented, and, without exception, all are popular, while the individuals representing them are well got and young. *Lady Louisa's Duchess 2d* is a 3-year-old heifer, got by CAMBRIDGE DUKE 3D (23,503), and traces back through a long line of excellent crosses to *Luna* by HELICON (2107), *Lavender* by MATCHEN (2281), *Coro* by ALEXANDER (591), &c. Lot 2 is *Thorsdale Garland* and 12TH DUKE OF THORNTON (26,000), and a lineal descendant of *Mass Rose* by EMERSON (1874) and *Gairland* by HECTOR (4000). Scattered through the

immediately after sowing, and a top-dressing to those parts of the land which were not sufficiently rich to push on the young plants rapidly. The climate of Ireland must not be exclusively taxed with the casualty that has befallen the Oat crop this season; for English grasses of fared rather worse in this respect. All admit the fitness of the climate of Ireland for the production of grass. Many of them would appear not to know that Ireland can produce the artificial grasses of tillage just as well as the permanent grasses of pasture. The grasses of tillage are called artificial, kinds of pasture are called natural. The two principal kinds of artificial grasses are red Clover and Rye-grass. The Clover plant grows luxuriantly in Ireland; but when repeated several times at short intervals the land becomes Clover sick, as we say, and refuses to grow it. This Clover sickness is quite as prevalent in England as in Ireland. Rye-grass is more certain, especially in a humid climate. In the east and south of England the Clover gives a heavier crop, unless the land is Clover sick, and the explanation of this is, that in those parts of England the climate is so warm that a plant like Rye-grass, which feeds principally in the surface soil, does not find there the necessary quantity of moisture; whereas the red Clover, which is a deep-rooted plant, strikes into the heart of the soil, and is more independent of surface moisture.

In Irish small farm management there is quite too little artificial grass. I should regard the extension of this family of crops as one of the first steps towards improving the condition of our small farmers. The return from Italian Rye, when raised on land well prepared for it, is enormous. It is a certain plant in our climate. The heaviest crops of it are produced in the wettest parts of districts which are said to be least fit for tillage. This year I have seen fields of it fit for cutting in the first week of April in the most humid part of Ireland. The plants were 2 feet high at the time, and the yield of this the first crop or cutting was fully to tons of grass per statute acre. It will give this year another crop equally productive, and a third nearly as heavy, besides the aftergrass. And yet this is a tillage crop; and what I have stated occurred with a small farmer living in the wettest part of Ireland, who began to grow the crop at my suggestion six years ago. The value of this crop to small farmers is best made manifest by the statement that on the 54 acre farm at Glasnevin three cows are maintained during the summer half year on the produce of 5 roods (statute) of this crop. Before this piece of land was converted into an independent farm, it was in permanent pasture, and used as a paddock, and in this state it did not produce more than one-third of what is yielded by the four or five which is now in artificial grass every year. I have more than once expressed the opinion that there is now in Ireland a considerable breadth of pasture land which would pay far better under a proper system of tillage.

The proportion of the surface of Ireland under grass is in excess of that in any country in Europe with which it could be compared. In my travelling bag happens to be a Blue Book just issued by Mr. Fonblanque, of the Board of Trade, and from this document I culled the following figures:—

Total area of Country.	Total of that area under permanent grasses in pasture and meadow.	
	Acre.	Acre.
Ireland (1870)	20,324,641	9,999,093
Great Britain (1870) ..	26,284,456	12,972,856
Sweden (1868)	57,051,106	4,811,297
Denmark (1866)	8,367,720	897,313
Holland (1868)	8,118,943	2,536,107
France (1865)	108,651,000	28,571,575

This Table is not as accurate as I should like to make it. For instance, I should like to eliminate in all cases the part of each country under water and waste. In the cases of Sweden and Norway, lakes and rivers are excluded; in Denmark and Ireland, the same is done, neither the one nor the other, which this makes the stronger so far as those countries are concerned. One-half the surface of Ireland is in permanent grass, and if we exclude water and waste the grass occupies three-fourths of the surface of the country. I hold that this proportion is excessive, and ought to be reduced; and I hold that under the influence of wise laws and of a just administration of them, it will be reduced. It appears to me that the agricultural economy of Ireland has been deranged, more or less, by the action of some of the public departments. I have, in another place, made a slight reference to one of these; in this place I take leave to indicate, with the same delicacy, another. I refer to the local taxation of Ireland, which is based on what is popularly known as the general valuation of Ireland. I do not intend to consider the mode in which the valuation is made. I am dealing with this as a public question. I have no wish to make any information as to the working of this department, which is not available to everybody. My argument is based on the Acts of Parliament and on the Book of Instructions issued to valuers, and if I were to judge by the recent Blue Books on the subject, I should be disposed to say, the principle on which the land of Ireland has been valued is, to use Lord Londonderry's words, one of those things which no fellow can understand. According to the Act of Parliament, the valuation has been

based principally on a scale of prices of agricultural produce such as, quoting from memory—Wheat, 7s. 6d. per cwt.; Oats, 4s. 6d. per cwt.; Barley, 5s. 6d. per cwt.; Butter, 65s. per cwt.; Beef, 54s. per cwt., &c.

It is manifest that, owing to the enormous rise in the price of butter, beef, and mutton, the dairy and fatteners' lands are undervalued and under-taxed. I know a farm valued for purposes of taxes at 38s. 6d., which was last year at £4. The taxes are 3s. in the £1, which amounts to a fraction over 6s. 5d. an acre in the difference between the present valuation and present rent. The rent of tillage land has not increased in anything like the same degree as that of dairy and fattening land. Tillage farmers are, therefore, in many places not only paying their own full share of local taxes, but part of the impost which, under a proper fiscal arrangement, would be borne by the graziers.

COMPARATIVE WEIGHTS OF RIVAL CATTLE BREEDS.

MORTON'S ALMANAC FOR 1871.

The relative merits of the Shorthorn, Devon, Sussex, and Hereford breeds have long formed matter of controversy, and it is noteworthy that while the advocates of the first named breed have proclaimed its merits far and wide, those who pin their faith to the latter breeds have generally been content to let them speak for themselves, acting doubtless on the principle that just as "good wine needs no bush," so the Devon, Sussex, and Hereford cattle require no recommendation. This course the partisans of the three breeds referred to have not continued to follow with advantage, were it not that the bias of those with whom they "agree to differ" has led to the publication, in "Morton's Almanac" for 1871, of a series of sophistical inferences, which cannot be dignified by the title of arguments, for the argumentative faculty is too evidently not possessed by the "Morton" writer, who has done his best to extol the excellencies of the Shorthorns, at the expense of the Devons, Sussex, and Herefords.

One of the "standpoints" of "Morton" writer is purely an arithmetical one—a circumstance which shows he is alive to the fact that figures can be made to prove anything. The stubbornness of facts, however, seems to have altogether escaped his notice. He proceeds upon the assumption "that the merit of the Shorthorn is equally prominent, whether it is attested by a comparison of the prize animals at the Islington show of 1870, of the same age and class, or as now, by the whole aggregate age of all the animals of each breed exhibited." Taking the estimated carcass weight of animals exhibited at the Agricultural Hall in December, 1869, the "Morton" writer asserts, that in the result the Shorthorns are invariably heavier than Devons or Herefords. Strangely enough no mention of the Sussex is made, probably for the reason that the carcass weight of the animals of that breed is too close to that of the be-praised Shorthorns. In fact, it has not suited the writer's purpose to enter into the details concerning the Sussex animals, further than to assert that "the average weight of the Shorthorn oxen at Islington was 18 cwt. 0 q. 24 lb.," while that of the Sussex oxen was 17 cwt. 2 cwt. 10 lb. It is convenient to the writer to forget that some Sussex oxen weigh on an average 120 stones, while others exceed 200 stones. The top weight of the Shorthorns cited in the "Almanac" is 108 stones 8 lb. I have no intention of following the "Morton" writer through the cloud of complicated figures that he has called in to his aid, nor shall I take his assertions *seriatim*; I prefer to deal with them in the aggregate, confident in being able to disprove the majority of them. The writer in the "Almanac" says:—"It is as plain from a single year's experience at the metropolitan show as it is from the average agricultural experiences of the country during the past generation of farmers, that the Shorthorn is the dominant breed of cattle in the island." It may be well to take a brief retrospective glance at the various breeds alluded to, partly for the instruction of the writer in the "Almanac," and partly for that of the general reader, premising that weight is not the only thing to be studied.

The highest authorities on agriculture agree that few oxen equal the Devons in the promptitude with which they fatten. It is quite true, and I have no wish to attempt to disguise the fact, or to endeavour to warp the reader's judgment, that the Devons do not attain to the weight of the larger breeds; it would be singular, indeed, if they did. But it is an indisputable fact that they lay on flesh rapidly, and with a small proportionate consumption of food. Can this be said of the Shorthorns?

Again, the meat of the Devon oxen is absolutely first-rate in quality, fine grained and beautifully fat, and the milk is extremely rich and produces a more than ordinary proportion of cheese and butter. The pure North Devon cows, which are kept chiefly for breeding purposes, are superior to any others as nurses, and the calves thrive rapidly on their rich milk. The Devon cows, when dried, rapidly acquire flesh, and make fair grass-fed beef in three or four months. As a matter of detail, it may be observed that the ribs of the Devon cows are well arched, thus giving greater internal room than might at first be sup-

posed,—a point which breeders will understand and value.

If one were to be guided by the article in "Morton," there would not seem to be two opinions respecting the qualities of the vaunted Shorthorns and the Devons, and Herefords. But the fact is, that the history of the Shorthorn breed of cattle is one of constant change: new varieties are ever arising, and fresh inter-crossings are taking place every day. Despite the fact that they have been greatly improved, it must be remembered that they eat more food in proportion than any of the other breeds, a point altogether omitted by the writer in the Almanac.

The "Morton" writer, in his anxiety to exalt the Shorthorn breed and to depreciate the Hereford, Sussex, and Devon breeds, has for the first time presented the estimated carcass weight of the Sussex cattle. He probably knew very well that if he had inserted a fair comparison of the breeds, his case would have been materially weakened—the carcass weight of the Sussex approaching too nearly that of the Shorthorns. In point of fact, the article in the "Almanac," short as it is, abounds not only in misrepresentations, but in sins of omission, which, in this instance, are as grave as sins of commission. Why did the writer present an item with the ratio of increase of weight of Shorthorns, Herefords, and Devons, in classes 3, 8, and 13, above the age of three years and three months? Why, too, did he not compare the average ages and weights of Shorthorn cows and heifers with the ages and weights of Sussex cows and heifers? In both cases, probably, the writer in the "Almanac" is well aware that the latter breed were so nearly, if not quite, equal to the former, as to render the difference of no practical importance. In this way, *i.e.*, by understating the quality of the Devons, Herefords, and Sussex, and overstating those of the Shorthorns, the writer in the "Almanac" has made out what appears to be a very good case, until it is examined and subjected to the convincing logic of facts; then it is that the animus of the writer is seen. In fine, the prejudice of the advocate is too transparent not to strike the most superficial observer. Unfortunately, however, it happens that the most well-informed and easy-going people who are ready to believe in, and accept anything they see or hear. It may tend to convince those of the utter fallacy of the statement in the "Almanac," if we cite from the official catalogues of the Islington show the respective weights of the Shorthorns and the Herefords. Taking six Shorthorns from the list we find that their weight is an average one of 18 cwt. 1 q. 23 lb. The average weight of six Herefords is 18 cwt. 1 q. 7 lb., leaving a difference in the two breeds of only 16 lb. in the weight of half a dozen animals.

When, then, the "Morton" writer asks, "Who shall dispute the claim of the Shorthorn to its position as the dominant breed?" my natural reply is, that amongst others I take the liberty of denying the supremacy of that breed over the Devon, Sussex, and Hereford breeds; and I think I have shown to any candid mind, that there is absolutely no fair ground for arriving at such a conclusion. I leave the writer in the "Morton's Almanac." Wm. Taylor, Westminster, June 15.

THE TENURE OF LAND IN EUROPE.

THE TABLE on the adjoining page is taken from a paper on the present state of the land question, in the *Fortnightly Review*, No. 52, by C. Wren Hoskins, Esq., M.P. It is compiled from a report of H. R. Mendenhall, presented in 1870, and has some very valuable and abridged it so that it get into the space of our pages. The following extract from Mr. Hoskins's paper will fitly introduce it:—

"It is as singular as it is unfortunate that, in a country which offers an example of practical freedom not yet attained by some whose political forms pretend to a more theoretically popular basis, we should be found the last of the European farmers to have arrived at arriving at a state in which the land question still almost hopelessly presents; hopelessly, not from its intrinsic difficulty, for it has been solved successfully during the last 20 years, as the Table accompanying these pages exhibits, in countries where the difficulties were more serious, and where the ground was there existing under our constitution. Surrounded as we are by a Continental system based upon the principle of the diffusion of landed wealth, and in the face of statistical returns which prove that more than half the farms in England and Wales are now in the hands of small tenants, we are yet to be found the last of the European farmers to have arrived at arriving at a state in which the land question still almost hopelessly presents; hopelessly, not from its intrinsic difficulty, for it has been solved successfully during the last 20 years, as the Table accompanying these pages exhibits, in countries where the difficulties were more serious, and where the ground was there existing under our constitution. 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ABSTRACTS FROM THE "REPORTS OF H.M. REPRESENTATIVES," PRESENTED 1870.

Name of Country and Population.	Area, in square miles.	Modes of Land Tenure.	Transfer of Land, Mortgage, &c.	Testamentary Law.	Law in case of Intestacy.	Entails, &c.
AUSTRIA (36,000,000) . (<i>Mr. Lytton</i>).	227,234	In 1848 the feudal system was completely abolished throughout the empire. Previously the peasants were serfs. By the law of 1848 the peasant was invested with free and unconditional ownership of the land. Since which the value of land has risen 100 per cent. In the Tyrol, Styria, &c., the average size of peasant properties is 30 to 40 acres.	By public registers, in which all immovable property is inscribed; and the legal title, claims, mortgage, &c., can only be so secured.	The law divides property in equal portions amongst the children.	No preference is accorded to the eldest.	An exception exists in the case of <i>majorats</i> special entails, but they require express legislative power.
BAVARIA (5,000,000) .. (<i>Mr. Fenton</i>).	29,347	Held almost universally by proprietary occupation, the great mass being small proprietors. A mere fractional portion of the land in tenancy. About 40 to 50 Bavarian acres are a minimum, 200 a maximum holding.	By notarial act exhibited to the civil tribunal. Certified copies are given to the parties, and all is closed.	Testator must leave one moiety to his children, if five; one-third if four or less. No distinction of real and personal property, except in cases of " <i>fidei commissum</i> ," or entailed properties of nobles, under special laws.	The law of 1848 abolished every limited tenure, and introduced a general system of freeholds.	
BELGIUM (5,000,000) .. (<i>Consul Curry</i>).	11,267	Properties much divided, many small proprietors cultivating their own land. Where land is let, leases from 9 to 12 years. Acreage usually held, 1 to 10 hectares (2½ to 25 acres). In 1856, total productive land, 1,820,576 hectares, of which 1,202,224 were held by tenants, 618,351 by proprietors.	By deed before a notary. Non-registration entails double tax. It is transcribed in public registry. The same with mortgages.	The <i>Code Civil</i> regulates the right of succession.	Real and personal properties are both divided in equal shares.	The division of land is not obligatory, where parties can make their own arrangements. Public opinion asks for no change.
DENMARK (1,783,565) (<i>Mr. Strachey</i>).	14,553	Constitution of 1849 forbids fresh entails, and promises conversion of those existing into free property. By a late law tenemental entailed lands may be converted into trust moneys. No estate can be parcelled without leave from Minister of State.	By register, with place in the public cadastre. The register is three-fold. Purchaser or mortgagee is completely protected.	Testator may dispose of one-third, real and personal.	Division amongst natural heirs, male and female alike.	The conversion of tenures has contributed to the general improvement. Culture on a large scale is the more advanced.
FRANCE, before late war (38,000,000) (<i>Mr. West</i>).	207,480	Chiefly occupied by small proprietors. The prevalent opinion is, that the cultivation by small proprietors is advantageous to production, and tends to the improvement of the condition of the agricultural population. "To the small proprietors may be attributed the agricultural progress of France, so remarkable between 1815 and 1847."	By notarial deed and register. Registration fees, 2 per cent. Legal charges, 1 to 2 per cent., which much impedes sales of land.	Testator may dispose of half if he has one child, one-third if two, one-fourth if three.	Regulated by the Code Napoléon. Equal division, without regard to age or sex.	Laverne says that the mortgage debt of France is less than that of England.
GREECE, with Ionian Islands (1,325,479) (<i>Mr. Gould</i>).	19,941	Barely one-seventh of area under cultivation, though containing large plains very fertile. The lands owned by the State occupy three-fourths of the whole extent fit for cultivation.	By register, in public office. The same in case of mortgage.	Testator can only will a share equal to that of each child.	....	(No return.)
HANSE TOWNS.—1. Bremen, 2. Hamburg, 3. Lubec, 4. Schleswig - Holstein (1,443,366)	12,440	1. "Small proprietors, who live in their own houses and cultivate their own soil." No instances of farms let to tenants, except State domains. 2. "The whole is the property of the cultivators; 3,220 distinct proprietors." 3. Three-fourths owned by occupiers, one-fourth by the State.	By register of sales and mortgages. No legal right if the estate is not on the register.	Owner can appoint his executor.	Eldest son takes at valuation, paying shares, to other children.	(No return.)
HESSE (823,128) .. (<i>Mr. Morier</i>).	2,866	"The creation of freeholds has been enforced by the legislature." Assistance has been given by law to tenants to become proprietors." "The one ruling idea has been to extirpate tenancy, and substitute full rights of proprietary possession."	Land passes by register in two courts, local and district. See admirable system of cadastral register.	General power of will, except of <i>pars legitima</i> , to children, viz., one-third where four or less, half where more.	In Rhine provinces, Code Napoléon. Elsewhere, to children equally.	"A country of small proprietors. An 'able-bodied pauper' a thing unknown."
HOLLAND (3,735,682) (<i>Mr. Loeck</i>).	13,464	Proprietor cultivators. Average holding 50 to 125 acres. A very prevalent desire exists to avoid subdivision.	"By deed in public registry."	By will, only one-fourth to one-half can be disposed of.	Equally divided amongst children of both sexes.	A very prevalent desire exists to avoid subdivision. No entails allowed.
ITALY, Total (24,773,778)	107,961					
ITALY, NORTH (18,273,778) (<i>Consul Colnaghi</i>).	18,152	<i>Piedmont</i> .—Proprietors, large and small, according to soil and crop, forming 19 per cent. of the population. <i>Lombardy</i> .—Small mountain freeholds, always cultivated by proprietors. "An owner alone would give the loving labour requisite to render the rocky mountain slopes productive."	"By public notarial act."	By will one-half can be disposed of, the rest goes to the children equally.	Equal division without reference to sex.	(No return.)
ITALY, SOUTH (6,000,000) (<i>Consul-Gen. Bonham</i>).	8,839	(S.) Chiefly tenants under proprietors. To less extent, small proprietors.				
PORTUGAL (4,000,000) (<i>Consul Brackenbury</i>).	4,173	Proprietary holdings very small in the north. In the south, large properties are the rule. More than 10 per cent. are proprietors—about three times as many as the tenant-farmers.	By registry, which transfers legal possession. Fees very moderate.	One-third can be left by will, two-thirds go to the "lawful heirs."	"To children in equal shares."	The laws in force tend to compel dispersion of land.
PRUSSIA (24,000,000) .. (<i>Mr. Harris-Grevel</i>).	137,056	Large and small proprietors prevail. Large, as 1 to 20 or 15. "There are no tenant-farmers; lands let on lease are held by peasant proprietors." Holdings very small: average, 11 acres. Nearly all day-labourers are also proprietors.	By registry, which is very simple. "All title will soon be indefeasible."	One-third can be willed: the rest goes to the family.	To family and widow, without respect to age or sex.	Entails abolished in 1863. Public opinion in favour of small proprietorship.
RUSSIA, part under report (47,931,627) (<i>Mr. Mitchell</i>).	87,289	One-third of the cultivable land is still held by the State: one-fifth by the peasantry, who are gradually all obtaining freeholds.	"By register of deeds in local civil courts. Afterwards the court returns it to seller, who delivers to purchaser."	"In the absence of testamentary disposal descends to male issue in equal shares, with proportion to daughters, who in failure of sons divide equally."		No law of primogeniture; but a few special estates entailed to great families.
SAXE-COBURG-GOTHA (169,000) (<i>Mr. Barnard</i>).	816	About nine-tenths of the land belongs to small proprietors: one-tenth to tenants (of the Ducal House or the Church). "Smallest property about 34 (Eng.) acres; the average 45."	"Must be entered in the public register. Usual cost, little above 1 per cent. of value."	"No particular laws of descent on death of owner. Land divided amongst heirs according to their claims, when not too small for cultivation."		Property much detached by outlying fiefs. Landowners opposed to the wish of Government to consolidate the holdings.
SWEDEN (4,173,080) .. (<i>Mr. Tooley</i>).	168,042	"The greater part of Swedish soil is the property of the peasants. Few large properties are held by individuals. There are 500,000 landowners. The large majority cultivate their own land. Public opinion is favourable to the present system of tenure."	Deed of conveyance entered in special registry before the county court, and published by notification and by proclamation. Sale, gift, or exchange very cheap."	"Landed property inherited in same manner as personal, and divided equally between heirs, male and female, the males taking first choice."		"Some entailed estates exist, but no new entails can be created." Land much mortgaged. Rate 6 per cent.
SWITZERLAND (2,500,000) (<i>Consul Mackenzie</i>).	15,233	"Small proprietors; and a few tenants under proprietors, in what exact proportion unknown." "Quantity usually held, from 6 to 25 acres." "Tenants near towns, from 10 to 20; further off, 30 to 50 acres; very few over 60."	By authentic act, registered and inscribed on cadastre. Mortgages the same.	"The law favours dispersion of land, by allowing its division in equal parts amongst the children of deceased owner."		"Public opinion favourable to the existing system."
TURKEY, in Europe (15,500,000) Constantinople and Danubian Provinces (4,700,000) (<i>Mr. Moore</i>).	207,438	"Land is held by small proprietors, the large being limited in number." It is classed under five heads: freehold, Crown, Church, common, waste.	Class 1 (freehold). "Sale effected in presence of trustee." Deed registered delivered to purchaser. Duty, 1½, 2, and 3 per cent.	"On death divided amongst children, males taking two shares, females one." <i>Bakori</i> /land in equal proportions.		(No return.)
UNITED STATES (38,273,112) (<i>Mr. Ford, and others</i>).	2,819,811	"May be described as by small proprietors, the practice being for every man to own his land. Every provident man may own land in fee." "Before the abolition of slavery the land in the Southern States was held by large proprietors; since the war it has been gradually subdivided."	By simple deed of registry (with Government stamp since war) in the county court.	Entire freedom of will.	Equal division amongst children, male and female, with dowry to widow.	No power of entail beyond settlement on two existing lives.

(as formed) taken up by the plants." You see he supports me, for I advocate the use of these manures at p. 725; but then he says that "in the case of applying nitrate of soda or salts of ammonia after the great bulk of the winter rains have fallen, there is small danger of any appreciable quantity being carried away in the drains, as the rainfall during the summer months for the most part passes away not by drainage but by evaporation." Mr. Gray does not appear to know quite all about water passing through the land in the summer months, for it is clear that he overlooks the fact that vast quantities of water that fall in the summer months pass a long way below the drains, therefore may take waste nitrogen with them, for drains never run till the earth is full to the bung, according to the depth of drainage, for the drain is the tap for the excess of water to flow from after the earth is full to that point. But I must leave these matters to our learned professors to tell us how and in what way this costly stuff does get away. They have told us that it does get away, and they are now trying to find out how and when, and it is of no use for Mr. Gray to tell us that Cabbages or Mangels can eat it all up, for I cannot believe him after what our professors have told us, but will leave it to them to tell us all about waste, &c.

Since writing the preceding I have read, at p. 790, the report on the Hampshire agriculturists' visit to Kilmannstock, and find a point in it bearing upon nitrogen cutting away deeply into the earth. Here it is:—"A valuable discovery in connection with the application of nitrate of soda is that by repeating heavy doses yearly it washes into the soil and fertilises it to a great depth." We are not told how deep—that must depend upon circumstances, but on very much land it may "wash" very deeply. Through my clay hill it might go 70 or 80 feet, to the deep water level; on my fat land it could not pass deeper than 6 or 8 feet, for then it would meet with the water level. Then we are told that "The roots of grass following the fertiliser get beyond the depth affected by drought, and produce a heavier crop in a dry season." This is evidence that they do wash down deeply, but we are not shown that none of it goes deeper than these deep-rooted grasses can penetrate to fetch it back again. The following evidence will show that much of it passes beyond fetching back:—"In 1870 nitrates produced nearly 3 tons (grass) per acre, while other manures had comparatively a very slight effect. Indeed, in a dry season the cause of top-dressings failing is that they encourage the growth of surface roots which cannot endure a long drought." This is quite conclusive that nothing but a deep rooting plant can fetch nitrogen back again, be the water level deep or shallow. We must leave it to our learned professors to seek and give us further evidence upon the point. *William Smith, Woolston, June 17.*

LABOURERS' COTTAGES.

The accompanying woodcuts (figs. 169 and 170) represent the second of a series of illustrations of cottages, which, as we stated in a previous number of this journal (see p. 624), we were prepared to give as examples of improved labourers' dwellings now being erected in various parts of the country.

The rules and regulations of the Inclosure Commissioners have been observed in the design and construction of the present example, and in plan and appearance the cottages, when erected, have been approved by the landowners, and their arrangements have given satisfaction to the labouring tenants.

The elevation shown in the woodcut (fig. 169) is that which would, under ordinary circumstances, face the village street or public road, and is capable of much picturesque treatment at but trifling additional cost.

The front doors, protected, as they always should be, by small hoods or lean-to roofs, open into porches, from whence both the living-rooms and sculleries may be entered. Large closets for fuel are provided under the stairs.

The cubical space contained within one of the cottages is as follows:—Living-room, 1248 feet; scullery, 576 feet; pantry, 112 feet; porch, 128 feet; staircase, passage, and fuel store, 577 feet; 1st bedroom, 880 feet; 2d bedroom, 585 feet; 3d bedroom, 438 feet; which, together, make a total of 4475 feet cube.

The cost of these cottages, exclusive of any out-buildings, has varied from £252 to £285 the pair, according to the districts and varying circumstances under which they were built. They were designed by Mr. Bailey Denton, Jun., of the firm of Messrs. Bailey Denton, Son & North, of 22, Whitehall Place, Westminster, and have been erected on estates in various parts of England; amongst others, on the Wilton Hall Estate in Yorkshire, the Sheriffs Lench Estate in Worcestershire, the Ramsey Estate in Essex, and the Henlow Grange Estate in Bedfordshire.

PAUPERISM.

In a recent letter I referred to the contrast, so noticeable in modern society, between rich and poor, reminding one of the threatening presence of two opposite and opposing forces that may presently come into collision, as when two thunder clouds draw near together, and another moment may bring the roar of their explosion; or as when two powerful armies face each other. The good temper and peaceable disposition of our race, and the large-heartedness that has always characterised it, have hitherto prevented a hostile collision. There can be no doubt what the result of such a position of the social forces would have been in France; but happily violent revolutions are not our custom; and in all probability tact and justice—a little tardy—will stave off our dangers, and terminate the extravagance which must grow out of such contrasts as immense wealth and luxury with unparalleled poverty and pauperism, united as they are with gross ignorance, and surrounded as they must be by circumstances that surely deprave the moral character. How to improve the condition of the poor is the great problem of modern society; and its solution becomes more and more urgent, in proportion as their numbers increase, and the competition of foreign countries presses upon the trades on which they rely. Widespread pauperism is one of those maladies of the body politic which must be cured, or it will find relief in violence. Hitherto the country has done much to alleviate the miseries of pauperism, but it has not

To compare great things and small, I remember an aged and most respectable flockmaster who had lost several hundred pounds by an outbreak of lameness among his sheep, which his shepherds could not cure; nevertheless, he was highly offended with a friend who offered to lend him a shepherd who knew how to cure the disease, and who, I have no doubt, would have cured it, and would have saved the worthy gentleman further loss, if dignity, &c., were not concerned. The public has not noticed this branch of political economy; but perhaps it is wrong to say nothing has been done to cut the spring of pauperism, since the working classes have themselves done something in this direction, more or less wisely; and much as they have been blamed for certain organisations of labour, there is no doubt that the principle of self-defence, and the fear and hatred inspired by the sight of wide-spread pauperism, will lead to further combinations, and further attempts, more or less wise, to share the gains of labour, and to lessen the wide contrast between extreme wealth and extreme poverty.

In the present letter, however, I do not propose to enter on the subject of prevention, but to consider the effects of pauperism when closely penned up in our great towns. Under such circumstances alleviation, in any adequate degree, is impossible; nothing can counteract the evil, or mitigate to any great extent the debasing influence of extreme poverty.

We are told that a rich man, seduced by the pride of life, cannot "enter into the kingdom of heaven"; but a poor wretch, whose body is pinched by starvation, is, if possible, in a worse plight, being unfitted even for the labours of the present life. Pauperism was not wide-spread when the divine words were spoken; it is a modern evil, and, therefore, not the subject of inspired utterances, so that we are left to our unaided human intelligence in regard to it. It is clear that a luxuriant moral nature cannot flourish by the side of a gutter, and that if every public-house were a church, and every publican an earnest teacher of the beauty of holiness, though their number would be almost superabundant in most of our towns, they would be comparatively useless amongst the class of whom I write. It is useless to preach to penury, which must be sustained with food before it has any mind for spiritual relief. Moral precepts, and even the consolations of religion, are a mockery when offered to those whose whole life, hitherto, has been a struggle, not always successful, with absolute want.

It has been said that "every mortal has a problem of existence set before him," which he doubtless endeavours, with more or less persistency, to work out. Stephenson's problem, at one time, was the draining of Chat Moss; King Alfred's problem, all his life, was how best to leave his memory to his descendants in good works. And both the hero king and the engineer were unceasing in their efforts to solve out each his own problem. So we ought all to be, whether our object be the making of laws, or railways, or of cheeses, or whatever work of humbler labour may fall to our lot. But what sort of problem can the little starveling of the street set before him? Born in a hotbed of vice, what can he learn but mischief, and how can he help being an enemy to society and to himself? There are hundreds of thousands, amongst the pauper classes, whose irrevocable condition in life puts them beyond the reach of any of its blessings; and it is the disgrace, and the danger, too, of an age of progress, that an unprecedented number of persons are born into the world without hope. The "problem of existence" set before them must be in connection with evil instead of good; their expectation of change cannot be well grounded; hope of improvement, or better life here or to come, and their ideas of "progress," if they have any, must necessarily be "illegal," since they can never hope to win anything for themselves, and can only aim at taking from others. These ideas are subversive. In fact a pauper, if he have mind enough to be vicious, must be a dangerous revolutionist, and it is easy to see that popular education—which ought, and no doubt will, be a great blessing—must be accompanied by a radical endeavour to prevent or reduce pauperism.

In ordinary times we manage to keep the evil within bounds; it has long been a burden, but it has not hitherto been looked upon as a danger to society. But the number of the ill-fed, ill-cared, ill-housed, poor, who are dangerous, however innocently, is constantly increasing; and the nation, which is so prudent and practical—though only has been led to an unready race has begun to care, and to care too soon, to consider its relations with its poorer members.

It is an unwelcome fact, which repels inquirers by forcing itself on their attention at the very outset of their investigation on this subject, that the absence of the poor in society surely indicates the absence of opulence and prosperity. It is true that in rural districts classes are more level than in towns, and the



FIG. 169.—ELEVATION OF LABOURERS' COTTAGES.



FIG. 170.—PLAN OF GROUND AND CHAMBER FLOORS.

A, Living-room; B, Scullery; C, Pantry; D, Fuel; E, F, G, Bedrooms.

attempted to prevent or reduce it. Unfortunately, poorhouses and public schemes of relief and private charity, which are so praiseworthy and so characteristic of the practical benevolent character of the nation, can never prevent, and can only reduce, the flood of pauperism for a moment. We are all unwilling to hear the word "impossible" applied to any of our plans. Perhaps we have inherited some share of the spirit of a redoubtable hero of our Northern forefathers, who at a drinking match attempted to drain the horn of Utgard. He failed; even at the third draught the liquor was only a little lower, for one end of the horn reached the sea, and the only effect of Thor's mighty draughts was to cause the ebb and flow of the tide. Our efforts to drain from above the overflowing cup of poverty will be equally futile. The task is impossible; it cannot be done that way.

The only method of reducing pauperism to manageable and harmless limits, is to control its source; and in this direction nothing has been attempted by the legislature, because no instructions have been issued by the public. When the command is given it will be obeyed, for no servants were ever more obedient to their masters than our public servants, and it might be added that none are more unwilling (perhaps unable) to do more than they have been told to do.

At present public opinion is unfurnished on this subject, and probably a hint from any person that pauperism could perhaps to some appreciable extent be prevented without cost, instead of having to be relieved at an enormous outlay, would raise suspicion, and even dislike, for none of us are fond of people who are looked upon as mad, very Utopian, or revolutionary.

sufferings of real want are seldom experienced; it is only in our great cities, where we find extreme wealth, that we can make sure of finding extreme distress among the able-bodied poor. It is this which is so appalling at first sight, for we are said to have resolved ourselves "into a preponderating city population," and our great cities continue to grow larger. London, according to Cobbett, was a "wen" on the neck of the nation, forty years ago; what is it now? Some persons seem to consider the condition of the poor in our great cities as an awkward circumstance in society which cannot be dealt with, and which it is useless and even unpatriotic to mention publicly. I am not so despairing. I believe our pauperism may be grappled with and deprived of its danger, if not of all its misery; and sure I am that if it cannot be controlled and reduced to more reasonable limits, it will endanger the country in some period of trial or reverse, or whenever its complicated system of industry is disturbed, whether from outward or internal causes. *Handcraft.*

Home Correspondence.

"A Dripping June brings all Things in Tune" is an old saying, verified this year; for the crops just released from the icy grip of an unusually cold time have bounded into comparative luxuriance during the last three or four warm and wet days, and Peas, Beans, and pastures have improved. Cereals, retaining their healthy colour, Mangels, Kohl Rabi, &c., grow so fast that it is difficult to get them thinned in proper time. A great breadth of Trifolium and Tares and some pasture grass are taking heart, having been cut some time; but, altogether, enormous benefits are resulting to our food prospects from the timely change of weather. Garden produce also promises abundantly, including Potatoes. The rush of vegetation has been extraordinary during the last few days, and the sun's rays are brilliant and sunny, with shine and brisk drying wind. For these blessings let us be thankful. I have not yet cut either my Tares, Clover, or grass for hay. It rains again to-day. *J. F. Mechi, Tiptree, June 19.*

Technical Agricultural Education: Phospho-Guano.—The following correspondence, arising out of Mr. Little's paper on this subject, has been sent to us for publication.

(1.) To *W. Little, Esq.*

"Phospho-Guano Company (Limited),

"20, Budge Row, Cannon Street, E.C.

May 27, 1871.

"Sir—I am instructed by the directors of the Phospho-Guano Company (Limited) to call upon you for your explanation of your letter to the members of the Lincolnshire Farmers' Association and other agricultural associations in Great Britain, published at your request in the *Mark Lane Express and Agricultural Journal* of the 22d instant, in which the attention of the directors of the Company has been called to the fact that the Phospho-Guano Company, as you are doubtless aware, was established last year for the purchase of that part of Messrs. Peter Lawson & Son's business, which was carried on by them with great success for many years as the 'Phospho-Guano Company,' with the exclusive right of the sole disposition for their manure, and the business has continued to meet with similar success and support since it has been carried on by the Company.

"Your letter is calculated to induce the Company's customers and the public to believe that the phospho-guano, the product of the manufacturers and sold from their works at Seacombe, near Liverpool, is an imposture, and that the Company have been in the habit of 'purchasing the article from a manufacturer more than 100 miles distant from the Company's works at £6 per ton; and after sending it to Liverpool, and charging the phospho-guano, have returned it to the neighbourhood in which it was manufactured, and have sold it for £12 per ton.'

"That the phospho-guano manufactured by Messrs. Lawson and by the Company is a highly-efficient and valuable manure was certified by the eminent chemists, Liebig and Voelcker, after careful analysis. It is also conclusively proved to be so by the success which has invariably attended the use of it, and by the large and increasing demand for it. That proof, indeed, is the best refutation of the imposture alleged or insinuated in your letter.

"The directors also indignantly deny that the Company has ever purchased any manure from another manufacturer, or resold it to anyone. The Company have never purchased manure was certified by the eminent chemists, Liebig and Voelcker, after careful analysis. It is also conclusively proved to be so by the success which has invariably attended the use of it, and by the large and increasing demand for it. That proof, indeed, is the best refutation of the imposture alleged or insinuated in your letter.

"I am therefore desired by the directors to request you to state immediately.

"1st. Whether you meant to refer to the Company's manure (which is the only genuine phospho-guano) in your letter, where you make use of the word 'imposture'?

"2d. Whether you meant to say that the manure you referred to as having been purchased from a manufacturer, and resold after being sent to Liverpool and christened phospho-guano, was so purchased and sold by this Company? And

"3d. In that event, to state the name and address of your informant.

"I am further to add that, unless I receive a satisfactory reply from you by Wednesday next, the matter will be placed in the hands of the Company's solicitors, with instructions to take legal proceedings against you for the fullest redress which the law affords in such cases.

"R. M. CUNNINGHAM."

(2.) To *Mr. R. M. Cunningham, May 20, 1871.*

"Sir,—I hasten without delay to reply to your letter, because I must be very sorry indeed to injure, by any observation of mine, so respectable a firm as Messrs. Peter Lawson & Son.

"I certainly in no degree meant to refer to 'Lawson's Phospho-Guano.' I am under the impression that 'phospho-guano' is a term commonly applied by numerous mixers of manure to certain proportions of sulphate of ammonia and phosphate of lime; and I beg further to assure you that I was not aware that a company existed for the manufacture of a manure under the particular title. I have only one purpose to serve, and that is the interest of farmers, and am at all times too glad to support what is honourable and respectable. If there is anything more I can say to remove a wrong impression, I shall be happy to do so.

"W. LITTLE."

(3.) To *W. Little, Esq.*

"Phospho-Guano Company (Limited),
20, Budge Row, Cannon Street, E.C.

May 31, 1871.

"Sir,—I have received and have submitted to my directors your very frank and satisfactory letter of the 29th instant, in reply to mine of the 27th instant. I am very much pleased to be informed that there are no spurious imitations of the Company's phospho-guano in the market, and they have under consideration what steps it may be necessary to take in order to put a stop to the fraud. However, none of the imitations are sold on a guarantee of uniform quality, as the Company's genuine manure manufactured and sold by the Company.

"For your information I have the pleasure of enclosing a copy of the analysis made by Dr. Voelcker, from which you will perceive that it is a manure of a high standard.

"I am, however, very happy to furnish you with the text of the article, and to assure you any information you may desire on the subject.

"For our mutual satisfaction I shall send your letter and this reply to the Editor of the *Mark Lane Express*, and I am sure that any reader of the valuable journal, for the purpose of the article, will be glad to know that the Company's manure was pointed at in your letter, which appeared in the impression of that paper of the 22d instant, will be as well satisfied with your frank explanation as my directors are.

"R. M. CUNNINGHAM, Esq."

Horse Feeding: Writers on the Diseases of Animals.—Your issue of June 3 contained an article upon a lecture which I recently delivered before the members of the Kingscote Agricultural Association, in which your critic has censured my conduct, and misrepresented my statements. In all honest criticism it is customary to point out errors either of omission or commission, and so in this case I give facts as they are written, statements. In this case it is all the more desirable, as it might be instructive to your agricultural readers to show up both sides of the question. But in this instance, while there is much irrelevant matter introduced, there is not one fact advanced to disprove the statements which appear in my pamphlet. The critic's strictures remind me of the following quotation—

"His speech was like a tangled chain; nothing impaired, but all so mingled, that it was difficult to follow exactly what he does mean. It appears quite evident that your correspondent has not carefully read the pamphlet, or that he has not sufficient physiological knowledge to understand the important natural facts advanced against cooked food for horses; or, perhaps, a more charitable view would be to suppose that his preconceived opinions have caused an obliquity of his understanding. As a proof of this I might point to the following strange comments on the practice of chaffing straw, which is denounced as cruel, absurd, and pernicious; and as the cause of intestinal disorders and broken wind."

"This is an erroneous representation, and is simply nonsense. How could 'chaffing straw' be cruel, absurd, or pernicious? How could 'chaffing straw' produce intestinal disorders and broken wind? What I did say, was that 'chaffing horses' was cruel, &c., not that chaffing straw was so. He complains of my treating 'my subject with some degree of levity.' I am content to leave it to your readers to discover the levity, as I fail to do so. 'In all agricultural books bearing upon the feeding of horses we find that cooked food is highly recommended.' I made no statement about the writers of agricultural books. I have nothing to say about them; but I think it is a duty I owe to the owners of horses to show the effects of pernicious customs in the feeding of their animals, based as they are upon a mistaken idea of the notions of the practitioners of the day, even though these customs are backed by the authority of agricultural writers. He laments that I have not given a definition of cooking. If he had read the pamphlet carefully, he would have seen that I referred to boiled food, as I said, 'the increase in weight is correctly represented by the number of buckets of water your stableman has put into the boiler minus that which escapes as vapour.' It is simply absurd to talk of 'chaffing, baking, steaming, and toasting food for horses.' Imagine our critic with a toasting-fork in hand preparing food for a hungry team! He draws the attention of your readers to the fact that 'that it has been observed that horses are fond of bread; and accordingly a rough sort of bread adapted for horses has been devised.' Such an important discovery! It is cheaper and better adapted for horses than good oats and hay? This he does not tell us. Again, he says, 'that he cannot believe that Potatoes will suffer from steaming.' I can assure him that I did

not say they would; but the horses that eat a full meal of them would, in all probability, be the sufferers, and which entitles alter the case. Perhaps he is not aware of the fact that Potatoes contain about 17 per cent. of starch, and when boiled and masticated in this condition are not incorporated with the saliva, as moist food does not excite the salivary secretion, which is a loss to the animal. It is well-known to veterinarians that cooked Potatoes is one of the most prevalent causes of colic in horses. The statement about the London Omnibus Company, with 6000 horses, is quite beside the question, as he does not say that they are 'chaffed,' as I have described that operation as practised in this part of the country. I hope he will excuse my giving him a little advice, as it is not meant rudely but kindly. If he would pin his faith less to agricultural writers, and by the aid of the little science he may be the possessor of, study dame Nature's lessons thoroughly, he would be in a better position to criticise one of the fundamental divisions of organic science. However, should he be inclined to discuss this subject, with your kind permission, Mr. Editor, I shall be only too glad to enter into it more fully than the *Mark Lane Express* and its readers and their noble helpers—horses. *John A. McBride, Lecturer on Veterinary Medicine and Surgery in the Royal Agricultural College, Cirencester.*

To Keep Cabbages.—In your issue of June 17, after giving an account of my doings in the 6-acre Cabbage field, you put forth an opinion that the Company of our readers discovered a plan for keeping Cabbages? I cannot say I have discovered a plan, but I think I have hit on one that deserves an experiment, the same as I tried last year, and the results of which I give you with pleasure. When travelling in New York State about 12 years ago I was told that Cabbages were preserved by drawing them and planting them, roots uppermost, well covered with earth. Acting on what I had heard, on November 28 last I took up every hearted Cabbage (say about 300) I had in my garden. I placed them roots uppermost in a row, with the loose leaves tucked under, at a distance of two or three inches between each Cabbage. I then cut a trench on either side of my Cabbages, and with the soil out of the trenches covered the whole of the Cabbage and stalk up to the roots, beating the earth firm around them. For doing this my Hogshead neighbours pronounced "gone in the heart," and I did not give me much concern, as long as my Cabbages did not go in the heart. Now for the result. I opened my row on March 1—the row was north and south. The southern-most Cabbage was partly rotted on the south side. This was evidently from insufficient protection. The earth was not thrown over the end in sufficient quantity. All beyond this were good, and I revelled all March in sound, crisp, well-flavoured, full-hearted Cabbages. In the beginning of April I found I had rivals in Cabbage eating, in the shape of slugs; but the Cabbages were finished, there were more slugs than Cabbages. Such was the result. I am a considerable Cabbage grower; last year 7, this year 9 acres planted. In the Cabbage line I may say, *Militari non sine gloria*. If you wish for my experience I shall be happy to give it. Kindly render my *nom de plume*, "Khoda Bux," correctly, as one of your correspondents calls me the mistaken, an unpronounceable name, as he, as one high in the education in India (if I am not mistaken), ought to know the meaning of the name, it being one very common among the Mussulmans of India. *Khoda Bux.*

Foreign Correspondence.

QUEBEC: May.—Having received letters from England making further inquiries as to Canada and our farming, it may be serviceable to publish my reply to one of my correspondents, as it embraces generally the additional information which is desired—

Lennoxville, P. Quebec, May 18, 1871.—I hasten to reply to your note of the 27th ult., and to assure you of my willingness to give you any advice or assistance I can. You say your great difficulty is to determine where it would be best to start farming, for that you "have heard so many opinions from people in this country as to which is the best province." I have in my communication to the *Agricultural Gazette* that I desire to advocate what my observation tells me are the advantages of this portion of Canada; and I do so because, judging from personal experience of both provinces, I think this district is better suited to our English constitutions and associations. The general contour of the Upper Province (with some few exceptions) is very flat, and the rivers and streams comparatively sluggish, and there is, consequently, a great deal of ague and low fever, which is very trying and depressing, whilst here there is no such thing. The land in Ontario is very much higher in price (from three to four times), and no better intrinsically. There is some reason for this in the prevalence of French law here, which I need not now dwell upon, for it does not affect the agricultural value, and purchasers here can readily make themselves independent of it. Then this is a much better grazing country, and our local rates are lighter than in the other part of the country, are more uniform and endurable, and the summers are not so hot and dry. You then say—taking your letter

seriatim—you should like to get on a farm for a time to look about you and see the ways of the country; and you judge wisely. You will have no difficulty in doing this, and you may count on my assistance herein. As to "outfit," as the term generally implies, do not bother yourself with any such incumbrance. Bring your ordinary wardrobe, as if you were going to pay a month's visit at an English country-house, for all your wants can be supplied here. The only extra things worth bringing are boots and shoes, and hosiery, and, perhaps, blankets. We have but few pretensions to the enjoyable refinements of English country life, but I think your experience of the rough-and-ready will not be put to any very severe task. Unless you had fully made up your mind to settle here it is perhaps as well that you should precede your wife. One word, however, to that lady, who, I trust, both able and willing to give her personal attention to household matters. All ladies here have to do this, for we cannot boast of very efficient female servants, nor are they always to be had on the moment; and so, especially in the country, ladies must often depend on their own resources. Your available capital at present, you say, is £1000, equal in our currency to about 5000 dots. A prudent and experienced Canadian resident would appropriate this amount by two-fifths for purchase of farm; one-fifth for stock, implements, and furniture; one-fifth for working capital; and the remaining one-fifth put out on mortgage security at 8 to 10 per cent. until required, which can be readily done. You might, as you found it best on the continent, either purchase a desirable half lot (100 acres) in some good locality, at about 20 dots per acre; or you might see a whole lot which you preferred at about 15 dots, per acre, and pay 2000 dots down upon it, and take a year or two for the balance. But, of course, all this would greatly, if not entirely, depend on what you saw and had offered. With these means, and this extent of land, you will, of course, expect to make a fortune, and with prudent management you will make a living, if you are content to live quietly, making home duties and home pleasures the paramount object. We do not lose caste here by putting our shoulders to the wheel; on the contrary, with better heads and perhaps as stout arms as our neighbours, we secure that respectful regard from our fellows which gentlemen usually know how to command. The best time of year to come on is during the summer months; and I should recommend your coming by the Canadian line (Allen & Co.), from Liverpool to Quebec. From Quebec, six hours direct by the Grand Trunk Railway will set you down at Lennoxville or Sherbrooke. The rock which young fellows at this day seem most prone to spit upon, you quiz. I trust that, like all other sensible men, your maxim is to use and not abuse, for intemperate habits are the bane of too many here. I am no temperance advocate in the vulgar sense, for I "malt" both from taste and on principle. Pray exercise this freedom.

John H. Charnock.

Societies.

ESSEX.

ROMFORD.—A very successful show as regards both number and quality assembled to compete for the prizes of this county Society, which in this, its fifteenth year, collected 10,000 persons in Mr. McIntosh's park at Romford to look at about 250 horses, 200 cattle, 100 sheep and pigs, and something like 1000 poultry. The entries of Suffolks among the horses, and in the Shorthorn and Channel Island classes among the cattle, were the chief features of the show; and the greatest interest centred in the award of Mr. McIntosh's challenge cup for the best Shorthorn. For this prize cattle from many wide-apart localities competed. The offer of the prize was in the following terms:—

"The cup is to be open for competition to all England, Ireland, and Scotland. It is to be challenged until ultimately disposed of to the best bull or cow, the offering of the Essex Agricultural Society. It will become the property for one year of the exhibitor of the best pure-bred Shorthorn, male or female, of any age, in all the classes, having due regard to animals for breeding purposes. Should the cup be awarded to the best bull, the owner to produce satisfactory proof to the committee, by a certificate from the owner or owners of the cows that the bull had got to calves within 12 months preceding the show; or, if it be awarded to a cow or heifer in a breeding state, satisfactory evidence that she produced a live calf; or, if a dead calf, that she had gone her full time, prior to her always in each of the above cases that the animals are of sufficient age to admit of the condition being complied with. The holder of the cup to give security that it shall be forthcoming at the delivery up to the secretary ten days before the commencement of the next show. The cup to be won three years in succession by the same exhibitor before it becomes his *bona fide* property."

After a competition in which the Marquis of Exeter, Mr. McIntosh, Mr. Stratton, Mr. Garne, Mr. J. Clayden, and others took part, the prize was awarded to the Marquis of Exeter's *TELEMACHUS*, a winner last year at the Royal Agricultural Society's show, and winner in his class the day before at the Warwickshire Society's meeting at Rugby. The following is the greater portion of the prize list:—

HORSES.—FOR AGRICULTURAL PURPOSES.
Stallion—£40, E. Emson, Littlebury; £10, J. Ray, Great Petri's Farm, Romford.

Cart Stallion, open to all England.—£25, W. Wilson, Baylham Hall.
Stallion, open to all England.—£25, W. Wilson.
Entire 2-year-old Colt.—£15, G. D. Badham, Bulmer, Tye.
Entire 2-year-old Colt.—£15, G. D. Badham, Bulmer, Tye.
Entire 2-year-old Colt, open to all England.—£15, G. D. Badham (Emperor).
Cart Mare.—£25, G. Cant, Myland; £5, D. A. Green, Donyland Place.
Cart Mare, open to all England.—£10, R. Capon, Dennington.
Three-year-old Filly.—£45, J. Quilhampton, Goldhanger.
2-year-old Filly, open to all England.—£10, W. Thompson, jun., Thorpe, Colchester.
Gelding.—£5, W. Thompson, jun.
2-year-old Filly.—£25, W. Thompson, jun.; £5, J. Fenn, Ardleigh.
Yearling Filly.—£25, W. & H. Havers, Ingaveston.
Mare and Foal, open to all England.—£15, Executors of T. Capon, Dennington.
Foal.—£10, G. Cant, Myland; £5, D. A. Green.
Plough Mare.—£10, D. A. Green.
Plough Horses or Mares, open to all England.—£10, W. Thompson, jun.
Team of Four, open to all England.—£25, D. A. Green.

CATTLE.—SHORTHORNS.
Bull.—£60, W. Tupper, Roxwell; £10, J. Clayden, Littlebury. Bull, any age, open to all England.—£20, the Marquis of Exeter (*TELEMACHUS*).
Bull, two years.—£15, C. Sturgeon, South Oxendon Hall.
£10, J. Pegg, Boreham.
Yearling Bull.—£10, J. Uspon; £5, C. Sturgeon.
Yearling Bull, open to all England.—£15, R. Stratton.
Bull.—£10, R. H. Crabbe, £10, A. F. Clear, Maldon.
Shorthorn Cow.—£15, Lord Braybrooke; £10, J. Clayden.
Shorthorn Heifer.—£10, J. K. Chaplin, Ridelw.; £5, C. Barnard.
Yearling Shorthorn Heifer.—£7, D. McIntosh, Havering Park.
Shorthorn Heifer.—£10, J. K. Chaplin, Ridelw.; £5, C. Barnard.
Shorthorn Heifer.—£6, R. H. Crabbe; £4, C. Barnard.
Bull, cow, and calf, their offspring, open to all England.—£25.
Yearling Bull and pair of Yearling Heifers, open to all England.—£20, R. Stratton.
Havering Park Challenge Cup, best pure-bred Shorthorn.—£10, the Marquis of Exeter (*TELEMACHUS*).

CHANNEL ISLAND BREEDS.
Bull.—£5, W. J. Beadell, Springfield.
Bull.—£5, W. J. Beadell, Springfield.
Cow.—£5, C. J. H. Tower.
Heifer.—£5, W. J. Beadell, Springfield.
Yearling Heifer.—£4, Lord Braybrooke.
Bull, must have served cows.—£10, W. Gibby.
Cow, in milk or in calf.—£10, W. Gibby.
Heifer, in calf or in milk.—£10, W. J. Beadell.

SHEEP.
Southdown Ram.—£10, J. Clayden; £5, Lord Braybrooke.
Short-wooled Ram, open to all England.—£10, C. Boy.
Shearling Southdown Ram.—£10, Lord Braybrooke.
Shearling Short-wooled Ram.—£10, Messrs. Nockolds & King, Saffron Walden.
Five Shearling pure Down Ewes.—£7 and £5, J. Clayden.
Ram, Cotswold, Leicester, or Lincoln.—£7, J. Giblin.
Ram, Oxford or Shropshire.—£7, J. Giblin.
Long-wooled ram, open to all England.—£10, J. Giblin.
Five Shearling Ewes, Oxford or Shropshire.—£5 and £3, W. Thompson, jun.
Five Long-wooled Shearling Ewes.—£5, J. Giblin.
Five Ewes and Lambs.—£5, J. Giblin.

PIGS.
Boar, large breed.—£5 and £3, G. G. Griggs, Romford.
Boar, large breed, open to all England.—£10, Messrs. Duckering & Sons, £5, T. H. Everett, Bedford.
Boar, large breed.—£5, D. Robertson, Aveley Hall; £3, G. Griggs.
Boar, small breed.—£5, J. S. Lescher, Boyles Court, South Weald; £3, W. Bott, Bromfield.
Boar, small breed, open to all England.—£10, Messrs. Duckering & Sons, £5, G. N. Scott, Romford.
Boar, small breed, not exceeding 12 months.—£5, G. Griggs; £3, J. A. Williams, The Brownings.
Sow in pig.—£5 and £3, G. Griggs.
Sow, small breed, open to all England.—£4, Messrs. Duckering & Sons; £4, R. Swanwick, Royal Agricultural College, Cirencester.
Sow, small breed, open to all England.—£5, Messrs. Duckering & Sons; £3, Messrs. Wheeler & Sons.
Sow and Pigs.—£5 and £3, G. Griggs.
Three Sow Pigs of same litter.—£5, J. Clayden; £3, J. Pertwee.

ROYAL CORNWALL.

TRURO: *June 13, 14, and 15.*—Many have been the praises and congratulations heaped upon Truro's capital meeting of the Cornwall Society. The delightful weather, the extent, variety, and general excellence of the show, with the admirably neat arrangements of the different departments of the yard—each in turn was extolled; as also the pretty grounds, with the beautiful view of the town, dressed up in her holiday attire—gay flags and banners innumerable, and the triumphant arches, exhibiting words of welcome to all to join the pleasurable work of judging for themselves the issue of energy, industry, and perseverance applied in aiding Mother Nature to develop her resources for the benefit of mankind.

The competition in mowers was close betwixt Samuelson, Wood, Burgess & Key, and Picklesy, Sims & Co., though the chief merits of one or two of the other machines seemed to be heavy draught and plenty of noise, and leaving a good bite for sheep behind them. Samuelson carried off the prize. Messrs. Howards' mower made a good start, opening up its own piece in first-rate style, but in the next bout came on a thin piece of quartz, which so damaged the knife and fingers that they could not cut so well. Mowers by Lewis & Hoole, of Shrewsbury, and Mr. Oates, a native maker, were either too slow in motion or loosely fitted up, both failing to cut satisfactorily. In the trial of double-furrow ploughs there was but little interest, although it appeared to us that this improved implement is peculiarly adapted for cultivating this hilly country, as was practically shown by Messrs. Howards' man using only two horses, running the

plough up the hill empty and coming down with two furrows, which made easier work for the horses than ploughing across the hill and turning all the furrows down with the turn-wreid plough, which in these small inclosures has robbed the upper end of the fields of the soil they could not spare, and worked it to the bottom, where a superabundance had already been washed by the rains of ages.

Mr. Perkins, of Hitchen, competed with his improved Pirie plough, and did some good work. Mr. J. Davey, of Crafthole, Cornwall, competed, with the greatest novelty of the show—in fact, of the age, viz., a turnover or one-way double-furrow plough. This was a marvel of neatness, simplicity, and strength, and did capital work, giving the Howards a close run for the prize; in fact, it was to be regretted there was not more competition, as this novelty can hold its own close with the best of what we must now call the old style of double-furrow plough; for we look forward to the not far distant day when all the land will be cultivated without furrows, which impeded the progress of drills, mowers, reapers, and, in fact, all machines that have to wade through the soil.

These were the only implements worked; but prizes were awarded for the following, after careful scrutiny by the judges:—For the best harrows, J. & F. Howard; best haymaker, J. & F. Howard; best horse-rake, J. Davey; best chain-harrow, Mr. Cambridge; best light cultivator, J. Davey; best turn and manure drill, Mr. Brenton. To the Cornwall firm exhibiting the largest collection of implements, &c., &c., to wit, Messrs. J. & F. Davey.

The general show of implements was both numerous and excellent, all the principal firms either exhibiting for themselves or being well represented by their agents.

The number of cattle, sheep, pigs, and horses exhibited was the greatest ever shown at this spirited Society's show, and the excellence was such that we have seen worse animals take "Royal" honours.

The farm horses were a light, but very useful sort. The hack and harness classes were far superior to those shown at Guildford.

The poultry and pigeon show was very good, all indicating the rapid progress all branches of agriculture are making in this land of beautiful hills and dales. L. P. B.

EAST LOTHIAN.

Scottish System of Farm Letting.—At the last meeting of this Society, this subject came under discussion in connection with the paper by H. M. Jenkins, Esq., the subject in the English Agricultural Society's Journal.

Mr. SMITH, Whittingham, said: The article or paper I refer to is headed "Some Features of Scottish Agriculture." It appeared in the Journal of the Royal English Agricultural Society, and is reproduced in the *North British Agriculturist*, which I hold in my hand. It is from the pen of Mr. Jenkins, the Secretary of that great Society—a gentleman I had the pleasure of seeing in my own country. There is a freshness and intelligence about the article, and a keenness of observation, that makes it interesting; while its being the property of an official, and appearing in the Journal of a national Society makes it the more desirable that any mistake or mis-statements reflecting on Scotland should not be allowed to pass. And I do think there is such in the article—not that I for a moment could suppose Mr. Jenkins to be capable of knowingly making a misrepresentation—and if he has been the medium of any such error of broad generalization, I am sure, be it said to his credit, he has been led to look into the matter from having been applied to by parties at a distance to know if statements in the article were correct as regards this country, and as I had to give an opinion, I am anxious to test it before you, and with your permission I will do so shortly. What I take exception to is in regard to what Mr. Jenkins says as to the leasing of land in Scotland, and here I quote what he says:—

"Unfortunately the Scotch system of leases labours under the disadvantage of being based upon a number of important drawbacks. One of these is known as the 'Law of Hypothec,' analogous to our law of distraint; and the other is the custom of inviting tenders for farms, the leases of which are drawing to a close. In Scotland, the tenant, as a rule, when a farm is to be let, the highest bidder becomes the occupier, and any other serious is known against him. The landlord is sure of his rent, owing to the operation of the law of hypothec, and, therefore, he is often more careless in his inquiries as to the character and reputation of the tenant than English landlords are under our system of yearly tenancy. Two results follow—Firstly, a large proportion of farms are over-rented; and, secondly, a comparatively small proportion of tenants renew their leases. Readers of this journal will doubtless ask, as I did, How does the system survive under these circumstances? Common report states that, in a large number of cases, the landlord is obliged to reduce the rent of an over-rented farm after a few years of the lease have expired. Be this as it may, I can only say that nothing in Scotland impressed me so much as a drive through a number of East Lothian farms, in company with Mr. Hope, Pentonbarns—a vigorous advocate for the lease system—who showed me, with admirable honesty and impartiality, how small a proportion of farmers in his district did contrive to renew their leases." First, then, as to the law of hypothec. I do not mean to discuss the question; I merely remark that in regard to it Mr. Jenkins has sprung a mine of East Lothian good service to one party in Scotland. I do not know if it is the party he would wish to benefit, or from

whom he may have got his information. He, like the Lord Advocate in the House of Commons on a late occasion, has called the attention of the English Society to the fact that their law of restraint is analogous to our law of hypothec; and we need not feel sore to be told that with our system of leases we are labouring under the law of hypothec, when we are at the same time told that in England they labour under the same disadvantage where the system of leases does not prevail and is not approved. Then, as to the second point raised, I hold it is not correct to say that, as a broad general rule, when a farm is to be let, it is put up to public competition, and the highest bidder gets it unless anything serious is known against him. No doubt, when a farm is actually put up to public competition it is generally, but frequently not, the case that the highest bidder becomes the tenant. This, however, does not imply that our landlords are more careless in regard to the capital and reputation of the tenant than those in England and Scotland. Why many are landlords both in England and Scotland, and they just pursue the same course in regard to the selecting of tenants, whether it be in England or Scotland. And, from pretty extensive personal knowledge, I can say the rent is not the primary element in the selection of tenants; nor is it correct to say that in a large number of cases landlords in Scotland are obliged to reduce the rent after the farms are let. It may be so in a few cases, but the exception proves the rule, that rents are not reduced after the farms are let. Now let us come to the main point. I say it is not the fact that the general rule is to advertise or put up the farms to general competition as they fall out of lease; neither is it the fact that it is only a small proportion of farmers that contrive to renew their leases. In the original article it was that very contrived to "sit out" their leases. Well, "sit out" is more like a Scotch than an English expression. However, my excellent friend Mr. Hope had it corrected to "renew." We all know Mr. Hope to be generous, honourable, and genuine man, and that, while he holds strongly public opinions, he does not, like some, parade them in an offensive manner. Mr. Hope, we also know, stands high as an authority in agricultural matters, so that anything he says on that subject has great weight. Now, from what I know of Mr. Hope personally, and from a talk I had with him on this subject, I can quite understand how, from his point of view, looking back 50 years, and passing through a particular district, all as spoken by him would be strictly correct. I believe this; but, at the same time, how does the case appear to one reading the article referred to? Why, is it not that, in East Lothian, from over-renting and putting up the farms to public competition, comparatively few farmers contrive to renew their leases? We all know farming is not such a money-making business as many other professions—

Mr. HARPER: Would you permit me for a moment to interpose? It occurred to me that Mr. Smith is making statements, and entering into matters, which are likely to lead to a long discussion, and on which many in this room differ in opinion. Those who hold different opinions on some of these subjects do not fear discussion—we rather court it—but I think it would be better for Mr. Smith to postpone this matter till next meeting, when every member will have time and opportunity of replying to statements which he may make.

Mr. SMITH: I am not objecting to that. After I am done, you can move an adjournment.

The CHAIRMAN: Mr. Smith asked and obtained the consent of the meeting to make a certain statement—

Mr. HARPER: Of course; but I never dreamed Mr. Smith was to enter so generally into the discussion of questions on which so many of us differ. If we are to enter on a discussion of the law of hypothec, there will be no notice, and I would suggest to Mr. Smith if the proper way would not be to adjourn this matter till next meeting.

Mr. SMITH: Well, adjourn any discussion until next meeting after I am done.

The CHAIRMAN: As I understand it, the meeting is not asked to come to any conclusion upon this matter. Mr. Smith only asks the liberty of making a correction—

Mr. HARPER: If we are not held pledged to Mr. Smith's statement by reason of remaining silent, then I have no objection; but otherwise, if no reply is made to that statement, then we will be held as concurring in it.

Mr. SMITH: I will be done shortly, and then you can move an adjournment.

The CHAIRMAN: You may look upon Mr. Smith's statement merely in the shape of a letter.

Mr. HARPER: I merely mean to say that the statement Mr. Smith is making at the present moment are not all concurred in by the members of this Club.

The CHAIRMAN: I think the whole thing is this—Mr. Smith wishes to contradict a statement to the effect that, generally speaking, leases in East Lothian are not frequently renewed. Now, I can testify to the fact—

Mr. SMITH: You had better not discuss it just now. I will be done immediately—

The CHAIRMAN: I say I can testify to the fact that

a great many leases are renewed. Mr. Smith merely wishes to prove this.

Mr. SMITH: I think it is agreeable to rule in all discussions that when a speaker gets the chair once, he is entitled to keep it, unless he is speaking out of order; and that if any other gentleman has any remarks to make, he must wait till the possessor of the chair is done. Well, I was saying that farming is not so lucrative a business as many other professions. But the East Lothian farmers have no great cause to complain, and some who have left for England would just be as well had they remained; while others, who went to England, have actually returned, and farmed in East Lothian again. I come now to the renewal of leases. What is the fact as regards East Lothian? On going over the list of tenant-farmers, as in "Neill's Register for 1871," I find that about a half of the whole have actually renewed their leases, including Mr. Hope and Mr. Murray, whose farms are so properly taken notice of by Mr. Jenkins. I find also that it is only a small percentage who have become bankrupt, or could not get a renewal of their leases; and that it is not on account of the high rents that the majority of those whose leases have not been renewed failed in getting a renewal, but from natural causes, such as death, &c. Further, I maintain that it is not the broad general rule in Scotland that farms are put up to public competition. Here, again, there may be instances, no doubt, but then the exception proves the rule. It is not the practice on the largest, or most important estates, but, on the contrary, the broad general rule is to deal with the old tenants. Why, it was only lately I saw in the papers that on one of the Right Hon. the Earl of Seafeld's estates, where my brother happens to be factor, and where the tenantry may number from 700 to 800, including crofters, the leases of almost the whole came to an end in 1867, and have since been renewed without the farms being put up to public competition. On another of his lordship's estates, where there may be about 300 tenants, the leases fell out fully 12 years ago, and there, too, the sitting tenants got their farms again—at a rise of rent, no doubt, but one which, as a whole, they have been able since to pay. And there is another estate on which I had a farm about 25 years ago, where there will be about 100 tenants, and the leases generally fell out at that time, and were renewed. These leases came again to a close a few years ago, and the tenants, or their heirs, always managed to come back to renew their leases a second time. That has occurred in my day; and I believe on these estates it has been the same from generation to generation. But these are not exceptional cases. I have only mentioned them as being somewhat personally connected with them. And I say, as regards the principal estates, which represent the great bulk of Scotland, as a broad general rule the farms are let to the sitting tenants, without being put up to public competition, save in some natural causes, such as non-residence, death, old age, a wish to retire, or to take a better or larger farm, bankruptcy, and so on. It is also the case, as a rule, that high rent is not the primary element in selecting a tenant. I have only one word more to say, and that is about high rents. High rents are not good things. On the other hand, how is it in regard to low rents? We know that life-renters, and those who have had land at low rents, have proved to be the worst farmers in the country, and that they have done nothing either to benefit themselves, nor to do good to the country at large. I think you will join with me in this, that a good fair rent is the best thing. I believe that the feeling of the proprietors—and it is their interest that it should be so—is to negotiate by all means with the sitting tenants, and to encourage them. It is a pleasant and agreeable thing, and I think it must be a most beneficial thing for proprietors to see their tenants and their tenants' sons rising up about their estates and mixing with them. With reference to many estates in the North, it is the case that generation after generation have been upon the same farms, and I wish the same could be seen throughout the whole of Scotland.

Mr. STEVENS referred to the hardship shown to crofters in many cases, by turning them out of their crofts, and giving them to other tenants just when they had begun to benefit by the labour they had bestowed in bringing the ground into order.

Mr. HARPER said that, along with a great deal of good feeling, there were things in Mr. Smith's remarks which he could not agree with; but he would rather defer anything he had to say if the matter would be adjourned.

Mr. SMITH: No, no; no adjournment.

Mr. HARPER: I think it is only fair.

Mr. Hope said that he had been mixed up so far with this matter, that he might be allowed to explain his position. He said he had been a tenant in the country, and he (Mr. Hope) had gone with him to various places in the country. In the course of their drives they talked a great deal about tenant-right, and such subjects; and in going along, he (Mr. Hope) said he had seen five or six tenants on this farm and the other; on one he had seen seven, and in other cases two and three; and upon an average, he calculated he had in his time, within 55 years, seen three tenants on the farms pointed out. He had also said that he did not think there were above 20 tenants in the country

who had been in the same farms since he recollected. He had no idea at the time that the matter was to be put into print. He had no objections to it, however; and he was glad to learn from Mr. Smith that renewals were now the rule. There was no doubt there had been far more renewals of late than say 20 years ago, for in 1828 and 1829 there had been almost a total sweep of the old tenants.

Mr. HARVEY: A total sweep of the old tenants.

Mr. HOPE: It was under these circumstances the thing took place; and I trust that the very proper view of the matter taken by Mr. Smith will have due weight with landlords, and that the satisfactory change will go on as Mr. Smith hopes.

The CHAIRMAN said that although he thought Mr. Smith's statement would have been better made in a letter in the Journal in which Mr. Jenkins' paper appeared, still, it was right that these statements should be refuted, because they were not true of Scotland as a whole. Mr. Hope had stated the real facts of the case, without any desire to mislead Mr. Jenkins; but that gentleman had so far misunderstood Mr. Hope as to make too general an application of particular facts extending over a lapse of time. Why should renewals not be the rule in place of the exception? When gentlemen of ability, and possessed of capital, and every characteristic that can enhance the profit and pleasure of a proprietor, take farms, it was at once natural and right that their claim should be recognised when the lease expired. He knew that one of his proprietors—Sir David Kinloch—made it a point to recognise this principle; and if a tenant had cultivated his land well, and no misunderstanding arose, he was only too happy to renew the lease. There should be such a thing as co-operation between landlord and tenant—not that the landlord was not entitled to the full marketable value of the land, but the renewal of leases showed a kindly feeling which was very desirable between parties standing in the mutual relation of landlord and tenant. The case of crofters was not an analogous one. They were not in the same position as tenants at all; but merely allowed, at nominal rents, to occupy the land until it was fit to be let for farming. The Chairman afterwards said he hoped the meeting would now allow the matter to drop.

Mr. HARPER: I object to some parts of Mr. Smith's statement.

The CHAIRMAN: I hope not. I think we are all agreed on one subject—that a kindly feeling between landlord and tenant should exist.

Mr. DURIE objected to the discussion of so important a subject at the far end of an afternoon, and moved an adjournment.

The CHAIRMAN: I will take a vote before I adjourn the discussion.

Mr. SMITH: There is one word of explanation. I never meant for a moment to discuss the question.

Mr. HARPER: But you did discuss it.

Mr. SMITH: I never gave an argument for or against the law of hypothec. I am not going to enter upon it now, because I don't think that the question of hypothec has been brought up at all.

The CHAIRMAN: The whole thing is that Mr. Jenkins misunderstood Mr. Hope—

Mr. HOPE: In what respect.

The CHAIRMAN: That leases were not renewed in East Lothian—

Mr. SMITH: Let the thing stand as it is. I believe Mr. Hope is quite correct, and I never challenged him. Let the matter stand on its own merits.

Mr. HARVEY said that Mr. Smith was a comparatively young man; and he (Mr. Harvey) corroborated Mr. Hope's statement that within his recollection renewals were the exception in the country.

Mr. BELFRAGE proposed the health of the Chairman, which was heartily responded to, and had the effect of terminating the discussion.

WISBEACH.

Wool.—The following are extracts from a very elaborate paper on wool read by Mr. TURNER at the last meeting of the Wisbeach District Chamber of Agriculture:—

The most valuable wools are the Yorkshire and Lincoln in the long wool class, Staffordshire and Shropshire in the half-bred class, and Hampshire in the Down class. Of the three classes long wool is the most valuable, half-bred the next, and the Down is the least valuable. Up to the year 1848 (about) the proportionate values were exactly inverted, the short wool being the most valuable and the long wool the least.

Up to that time (1848) goods were made entirely of wool, and the desirable quality was fineness; and as it is an universal rule in wool that the longer the staple the coarser the fibre, it follows that the short stapled wools are finer, and were at that time consequently more in request. The time came, however, when it was found advantageous to use cotton for the warp, and the whole of the Bradford trade is now the manufacture of worsted stuff goods, which is understood to mean a mixture of wool and cotton, and as long wool makes a more suitable yarn for mixing with cotton, it gradually took the place of short. For the cloth trade the requirement of fineness of hair is still too good, and this brings us to notice the second reason for the

deterioration in the price of short wool, which is the large importation of colonial wool.

The third reason—which is, perhaps, as strong as any—arises from the overruling power of fashion. When Sir Titus Salt introduced the manufacture of alpaca and mohair, the success of which was mainly founded on its bright and lustrous qualities, it naturally followed that the bright sorts of English wool should find an increased demand, and as the quality is only to be found among the long wool, the brightest of these wools—Lincoln, Leicester, Nottingham, and Yorkshire—have consequently experienced an increase of value. The term lustre is often confounded by producers of wool with colour, whereas it is quite a distinct quality. It is an intrinsic silvery brightness of hair, which is not lost in process of manufacture. You may take a Norfolk half-bred fleece and place it alongside a Lincoln fleece; both shall be washed as clean and white as it is possible to wash them, and there is as much difference between the two in point of lustre as there is between a polished silver plate and a wooden trencher.

Practical Hints.—Before I proceed to give you an account of the different processes of manufacture, I should like to make one or two practical remarks on the subject of the getting up of wool before it leaves the farmers.

The first thing I would notice is the washing. In some parts of the Wisbeach districts, and throughout the whole of Lincolnshire, more especially as regards the hogs, a great deal of the wool during the past year has been made a bad colour, owing to being improperly washed.

I would call attention to the fact that the yolk or natural grease, which exudes from the skin of the sheep into the wool, is composed almost entirely of potash, and in this there is a soap which, when used, is provided by Nature for the proper washing of the sheep, as it is always found in greater abundance about the time of washing. A mistake seems to me to be made by some agriculturists in not taking advantage of this natural soap. Sheep are often washed in running water, or in a large body of water, so that the valuable scouring properties of the yolk are lost. My opinion is that the wool might be got a great deal cleaner and better colour if the sheep were well washed and then put into a small body of water and be wrung about in a larger body of water or a running stream to rinse them out. By this means it would be found that in a small pit or tub made to hold five or ten sheep the greasier the water got the whiter would be the wool, and that the third or fourth lot of sheep so washed would be much cleaner than the first. Most of the colonial wool is washed in this manner. The wool going to wool would call attention is the habit which some people have of letting their sheep run too long after they have been washed before they begin to clip. This is often the result of mere shiftlessness on the part of the farmer, but often the idea is plain enough to be seen, and is, indeed, often answered in the most unblushing manner, that the object is to make the wool weigh heavier, or, in other words, to sell so many tons of grease at the same price as the wool. But I may here say that when the buyers see the wool the farmer always loses by this practice. From week to week, day after day, according to the season, is the longest sheep should be allowed to run after being washed.

The next point is clogging. That this point should be properly attended to is a matter of great importance. I imagine that if any farmer about this neighbourhood were obliged, by the misconduct of those with whom he had to deal, to give £140 per ton for his manure, there would be a slight noise in the community. There would be no end of petitions to Parliament, and meetings of Chambers of Agriculture on the subject, and no doubt your worthy secretary would have a fine opportunity of writing a paper on the monopoly of manure; and yet this is the practical effect of the conduct of some farmers, whether that conduct arises from idleness, carelessness, or wilfulness. As I consider in a paper read to a society like this it is the plain duty of the essayist to be thoroughly candid, I must say that Norfolk and Lincolnshire are among the worst counties in England in this respect. As an illustration of this I may say that when we sell the half-breds grown in the strip of country between here and Spalding, we take care not to call them Norfolk or Cambridge, as that would at once prejudice them in the eyes of the buyer.

One of the most provoking features in connection with this part of the subject is that we often find the worst farmers generally the most determined in their contempt, and that, too, by men holding influential positions among farmers, and who ought to know better. A year or two ago the Bradford Chamber of Commerce issued a circular calling attention to these defects and urging their abatement. The circular caused some discussion, and among other places was the subject of some remarks at an important annual gathering; and as those who have least good to say of themselves generally do the most, the gathering was in a neighbouring county. The beautiful air of innocence of one of the speakers, as reported in the *Norwich Mercury*, struck me so forcibly that I preserved the speech and will give you it. I will not give you the gentleman's name, as I replied to the remarks at the time, and I hope he has come to a better state of mind. He said: "He had seen a remark made in the

papers in reference to wool, and he was surprised such a remark could be made as a general onslaught on the farmers. He had been mixed up in the matter as much as any, and he could say that they were much more careful now than in his early days, both in washing and clipping the sheep. There might be a clog

fall in with a fleece, but was it not perfectly ridiculous for any man of common sense to take undue notice of such a thing? The speaker then went on to try to shift the responsibility for this on to the wool trade, insinuating that, as the wool did not go direct from the farmer, they were not responsible for its condition. I should not have taken any notice of the speech, and I should not allude to it now, but for the fact that such remarks are often made, whether in the sweet simplicity and innocence of heart which arises from blissful ignorance, or whether prompted by a less praiseworthy desire to gloss over their own defects I will not say.

But how stand the facts? A few days after reading this speech I was standing in a room of our warehouse where some of our men were throwing out of the sheets a lot of half-bred hogg wool. As some of the fleeces made a rattling noise when thrown on the floor, we opened one or two down, and found on the very first fleece a pound weight of dung adhering to the breech. You will notice that this did not fall in with the fleece, but was on when it was clipped, and every farmer, as well as every shepherd, knows perfectly well that it ought to have been cut off before it was wound. I sent one or two of these pieces of the tail to the *Norwich Mercury* office for inspection by the farmers of Norfolk, and for fear there might be some gentlemen here who have never seen such things, I have brought a sample with me. One word more, and I shall have finished on this part of my subject. It is not an uncommon thing for us to find a pound of dirt and dung on such fleeces, and this does not cost a few pence, but thousands in a year, and you will easily see what an immense difference it makes to us. Take, for instance, half-bred hogs at four fleeces to the lot, this makes a difference of 4 lb. or (at 1s. 6d. per lb.) 6s. per lot.

It must be seen that this will make a great difference in the price, as the acknowledged ability of the Yorkshire spinners is not yet equal to making yarn out of manure.

Another point which requires some attention is winding. In the olden time wool used to be wound by what were called sworn winders, that is, men who made it a business, and who were sworn before a magistrate to put nothing of an inferior character into the fleece, and I am not sure that a return to the old practice would not be beneficial. It is of great advantage to those who sort and deal in wool that the fleeces should be carefully wound, as you will see when I come to the sorting.

With regard to false winding, putting washed locks, cots, and greasy, inside fleeces: as these faults arise solely from the dishonesty of individuals, it is needless for me to give any advice to a company like this. Suffice it to say that there is a good deal of this done, although not so much as some years ago. Everyone knows that these practices are fraudulent, and it cannot be too widely known that we have now our remedy in the county court, which makes it a very certain and easy thing to the offender. The last point is the practical nature to which I would advert is the presence of straw and chaff in wool. This is not the result of mere carelessness, as the amount of chaff in some fleeces is very large. It arises either from what the sheep are fed on and the manner of their feeding, or from their being kept up in a straw-yard. I am not quite competent to say what is the cause; I can only say that the effect is very bad. When the fleeces are troubled with straw, it is mostly down the back, and when with chaff it is in the neck. I have brought samples of both kinds, and also a sample of wool which has been both washed and combed, in which the chaff still remains; and I should like nothing better than for the farmer who grew that wool to have a shirt made of it, to be worn next the skin, after the manner of the ancient monks, so as to constantly remind him of his sins of omission.

In considering this portion of my subject, I would earnestly implore upon you that good wool can only be produced by constant care, and that regular treatment of the animal is indispensable. If the sheep is too well fed the wool is heavy and coarse; if it is badly fed it is tender and weak in the staple, and mean-looking; if it is sometimes well-kept and sometimes badly, there are sure to be a large number of cots. Care, I again repeat, is what the sheep requires, and I do not think that any animal is so well worth care and attention. It supplies us with our mutton, it supplies us with our clothing, from the broadcloth of the duke down to the wooleys of the cottager; of its feet we make sizing, to render more easy the process of weaving; and last, though not least, on its skin we make our wools.

I think, perhaps, this is the proper place to say that I do not think it is too much for the manufacturers to ask of the farmer, that the animal he will bring to the care in the endeavour that English wool shall be as free from faults as any in the world. The manufacturers are obliged to use all their vigilance in their department, as their goods would be passed over by the buyers and the orders given to their neighbours, as the capabilities of manufacture are practically unlimited; it is not so, however, with regard to the production

of English wool, and particularly of bright wool. Although I am a freetrader myself, I have not come into the farming districts for so many years without finding out that there is no such thing as free trade in farms. There are a certain number of acres under cultivation, and practically you cannot increase them, and the men who manage those acres can grow bad wool if they like, and the manufacturers are the principal sufferers by it. They cannot pass the wool by and say, "We will not buy it, it is not up to the mark," because the supply is limited, and there comes a time every few years when the bad wool is bought up simply because we cannot get better. It is this fact which is making the Chambers of Commerce which are interested in the wool trade use such efforts to find out whether long wool cannot be grown in the colonies and other parts of the world.

I feel sure that this view of the case only requires to be brought to the understanding and considered by the agriculturists of England to induce them by all means within their power to improve the growth of English wool, and thus to unite with the manufacturing interest in their efforts for the commercial welfare of our country.

Farmers' Clubs.

WINIFRETH.

On Securing Hay and Corn.—MR. F. SPICER lately brought this subject before a meeting of this Club. He described it as a subject which, at first sight, appears to leave little room for discussion, as one would imagine most farmers must agree as to the management of these two ventures; but he ventured to assert there is scarcely anything on which they differ so widely—that is to say, as regards the details.

Making Hay.—Coming first in the natural order is haymaking, and I think the experience of the last few years has taught us that it is of equal importance to secure our hay in as good order as our corn. What little experience I may have in haymaking is chiefly of water meadow; I shall, therefore, direct my remarks more especially to that mode of making hay. Some of the great reforms have been made in agriculture, especially in substituting machinery for manual labour, yet I do not think we have a machine that will cut water-meadow grass in a satisfactory manner, however well they may answer in dry-mead, so that we must still depend on the scythe. There are, of course, parts in most meadows which might be cut in a decent manner with a machine, exclusive of the edges of the floats and drains; but, looking at it from a practical and economical point of view, I think you must agree with me that it is preferable to use the scythe. Supposing, then, the grass to be cut in this manner, the next process would be to tid it. Some persons have this done as soon as it is cut, whilst others prefer waiting a day, and this appears to me the wiser plan, as it allows time for the ground to dry between the swathes. It is obvious if the ground be wet the grass will be longer drying. Here again the nature of the ground prevents the use of a machine with advantage, as it is necessary to go across the swathes with it. If this were done in water meads, half of the grass would be thrown into the drains, &c., because in nearly all cases the swathes run parallel with them. So, taking one thing with the other, I think it the best plan to use the fork. But I should certainly prefer the machine for turning, as it does the work better, and at the same time much faster, which is not always the case. I believe it to be as good as any made for this purpose, and the green colour should be preserved, and the hay made dry at the same time. To achieve this, the hay should be constantly kept on the move with the machine, and two women, one at each end of the pens, to turn up what hay has been missed by the machine in turning. If allowed to remain too long without this process, it would get scorched, which should, if possible, be avoided. The hay being dry, the next thing is to stack it. To prepare for this it must either be put in pools or rows. I scarcely know which is the best plan.

If it is pooled, an extra hand would be required to every two pitchers, in proportion to what would be necessary if put in rows; but perhaps it would be gained by the extra quantity put on the waggon. As to the size and shape of the stacks, they of course vary according to circumstances; but, supposing a large quantity to be required at one place, I certainly should not consider it the best method of securing it to make very large stacks, as the hay must be exposed to the air, or it is liable to get spoiled by heating. Some people are of opinion that too much hay cannot be put together provided it is dry, as they argue that it would improve in stack. This may be the case, but, at the same time, I can't see how grass, having once lost its natural properties (which it would do if over-dried), could regain them by such means. On the other hand, if stacks are made too small, there is a larger amount of waste hay, which, if it is not sold to the air, is of inferior quality. We naturally wish to get as little of this as possible. In avoiding it we should not go to the other extreme, and perhaps sacrifice the heart of the stack for the sake of a little outside. The shape is almost a matter of taste, but it should be remembered that a circular stack will enclose, in proportion to the outside, more than any other shape. I think it a good plan, if possible, to put a little straw on the roof before

thatching, as the top hay is frequently damaged; but I am afraid very few of us will be able to put this in practice next haymaking, as there will not be much space in this neighbourhood. I have said nothing about the cost of cutting and making hay, as the price must vary according to the crop. I have, however, made a rough estimate, and I think it would cost about 15s. per acre, including everything, supposing it to cut two loads.

There is very little to say respecting dry mead hay, as it is cut by a machine, turned by a machine, and collected by a machine; so that, compared to water-mead haymaking, it is quite a pastime—only make it when the sun shines. I'll just say a few words on Clover hay, which, I suppose, I ought to have taken first. This is now generally cut by the machine, but I doubt whether this is the best method of securing it, as it is thus spread over a much larger space of ground than when cut with the scythe; consequently, in turning and pooking, the Clover leaves are more liable to fall off than when kept in swathe, and this is what particularly hurts to prevent.

Harvesting Corn.—I now come to the other part of my subject—viz., corn. In the good old days the harvest was looked forward to as a very serious business, and generally lasted from a month to six weeks; but in this, "the age of intellect," by the aid of machinery, it is reduced to about half that time, although there is nearly double the quantity of corn grown. On farms where a large portion of straw is consumed by the stock as fodder, Wheat should be cut before it gets too ripe. The reaping-machine has now almost wholly superseded the scythe and hook, and not only is the work done in much less time, but in a much better manner. The machines mostly used in this neighbourhood are Samuelson's, and I think it almost impossible to get any that would give greater satisfaction. There are two kinds of machines by the same maker, one of which self-delivers the sheaves at the side, and is supposed to be worked by two horses, whilst the other, intended to be worked by one horse, is called the "Eclipse," requires a man to deliver the sheaves at the back. Many object to that account to this machine; but, for my own part, I prefer it to the other. I shall not, however, discuss the merits or demerits of either, as they do not come within the scope of our subject to-night.

Wheat, and, in fact, any kind of corn, should neither be cut nor tied up whilst wet, and it should be aisled as soon as tied. There is a difference how Wheat is best aisled as regards withstanding the wind and keeping out the rain. I think the strongest way is to make the aisles round, only when they get wet, or should the Wheat not be quite ripe, it takes so much longer for the wind to penetrate than it does when made the long way. I cannot say how long Wheat should be allowed to remain in aisle, as it depends upon the state of ripeness when cut, or the weather, and a variety of circumstances, which would be different on different farms. The size of the stack should depend on the manner in which it is intended to thresh it; if by steam, then about as much as would occupy a day would, I think, be a very good size, but if required to be moved to barn before it is threshed, I think then a preference would be given to smaller ones, because in uncertain weather they can be moved in less time.

Next in importance comes Barley. It used to be the common opinion that Barley should remain on the ground, after being cut, long enough to have the benefit of dew, and turned each day; if such was now the practice, and with the seasons we have had of late years, I fancy it would get darker instead of brighter. Barley can be cut with the machine when the Clover is not too high; but when such is the case, it is best cut with the scythe, as the fingers of the machine are too wide apart to cut it. Barley is not often sheared like Wheat; but when it is cut by machine, I think it the cheaper and, certainly, the most expeditious way. This method is not very general in the south of England; but in the northern counties and Scotland, where it is later and so long as the weather is so rainy, it is considered the best means to secure it. Whether either way would have any effect on the quality of corn, I must leave to more experienced men to say. Barley should not be cut until quite ripe, or it will be streaked. It has been a very difficult matter this year to remove the hales from the Barley. I question whether this is not occasioned by its being cut too soon, as no amount of rain or turning made the slightest difference.

Oats are often cut first and stacked last, or at any time when not occupied with corn of more importance. Such being the case, it is our interest to use the best means to secure it, till such times as we are at liberty to stack it, as well as to its ultimate security. This would, I think, be best obtained by its being treated in the same way as Wheat; and as Clover is seldom sown with Oats, the machine may here be used to the best advantage. I have said nothing about the different sorts of corn, as it has little to do with my subject; and if it had, it would be a difficult matter for one farmer to say what sort would best suit his neighbour, as the difference in the nature of the soil would prevent the adoption of the same rule on different farms.

securing of our corn in a fit state often depends on the means we have of conveying it with the greatest speed from the field to the homestead, or any place where we intend to stack it. And this leads me to make a few remarks, in conclusion, on the different modes employed in this and other counties of doing it. We wish to ascertain is the most economical way of applying our horse-power. We, in this and the neighbouring counties, use the wagon and two or more horses. Whether this is because it is the best, or because it is the custom, I cannot say; but, in the north of England and Scotland one-horse carts are substituted for wagons, and many practical men are in favour of the change. They certainly appear to have reason on their side, especially if they can carry, as they say they can, nearly as much on their carts with one horse as we can on our wagons with two. Our interest should lead us to avoid wasting our horse-power by using implements of extravagant dimensions; and, while we are inquiring into the best means of cutting our corn, I don't think the time would be wasted if we gave a little consideration to the relative advantages of one-horse carts and wagons. A farm is not like a factory, concentrating its power at one place; but its operations are so varied and scattered, so often required at different places at the same time, that frequently we are unable to employ our labour, both horse and manual, to the best advantage.

Notices of Books.

On Local Rating in England, Scotland, and Ireland; and How to Enlist the Co-operation of Owners and Occupiers, both large and small, in advancing Primary Education. By Captain F. L. Dashwood, Kirtlington, Oxford. W. Ridgway, 169, Piccadilly, W.

This is a reprint of a paper, read in April, 1869, before the London Farmers' Club, which then stated the argument on which much of Mr. Goschen's Bill (since withdrawn) was built, and described in general terms the muddle which that Bill was intended to remedy. Mr. Goschen's Bill has been squeezed out of the work of this Parliamentary session by the pressure of other urgent measures; but Captain Dashwood knows, as do all of us, that it, or something like it, will be re-introduced, and so he has done well to republish his paper, adding to it particulars which show within what limits pauperism may be kept where all classes are induced to unite in the careful administration of the law. There can be little doubt that he is right in anticipating good of this kind, and of other kinds connected with education and other social questions, from a measure which shall give landowners a direct interest and a share in the work and responsibility of Poor-law administration. We quote the appendix to this pamphlet, in which the effect of careful administration of the law is shown:—

"If the land in England (where are the loudest complaints) is unfairly taxed to local rates, as many think, will not the proper time to go to the country for redress be, after the co-operation of all classes has been enlisted by the system of half-rating?—and why says these rates ought to be raised in part from other sources, as long as the local rate-payers have the power to save so largely in the outdoor relief, which in most agricultural districts is from 2s. to 2s. 6d. per acre yearly?—charges inflicting great injustice and misery by lowering wages, crowding dwellings, and demoralising the people.

"Would not the local rate-payer be the better able to effect this saving under the half-rating system than under the present?

"I give, as an example, the best managed agricultural Union I know of,—namely, Aitcham in Shropshire, and in contrast that of Woodbridge in Suffolk.

FROM THE POOR-LAW RETURNS.

Name of Union.	Cost of Paupers for year ending Lady Day, 1869.		Number of Paupers on January 1, 1869.		Population, 1861.	Number of Paupers in Population.
	In-door.	Out-door.	In-door.	Out-door.		
Aitcham.	£ 1512	£ 650	156	125	19,314	1 in 68
Woodbridge.	1476	6099	163	1330	22,754	1 in 15
				of these 31 men and 12 children		
				of these 333 men and 410 children.		

The above relief cost per head of population.	Aitcham.		Woodbridge.		The average Agricultural Unions are, say,	
	s. d.	s. d.	s. d.	s. d.	The Agricultural Unions average, 1 pauper in 14 of population.	
Relief cost per head of population.	2	3	6	7	1	0
Relief cost per head of population.	0	3	1	0	1	0
Relief cost per head of population.	0	42	1	10	1	8
Relief cost per head of population.	0	11	1	5	1	3

"Are not the results of granting out-door relief most unsatisfactory?—With 333 males and 410 children in receipt of out-relief in a population of 22,754, as in the

Woodbridge Union, what is the prospect for the future of the poor of the district?

"Sir Baldwin Leighton, Bart., was the able chairman of the Aitcham Union, and I regret I did not know of his good management till after his death.

Farm Memoranda.

WOODHORN, NEAR MORPETH.—We take the following account of the farm in the occupation of Mr. Jacob Wilson, Member of the Council of the Royal Agricultural Society, from the *North of England Farmer*:—

Woodhorn is a large parish on the Northumberland coast, 60 miles east of Morpeth. The soil of this "country-side" is generally a strong loam or loess clay. Turnips are therefore not generally grown, and up to the present time fields that have been sown with this crop, which is so delicate in its younger stages, and so difficult to manage on heavy land when fully matured, have been as much injured perhaps as [to balance] the value of the roots produced for stock feeding. Nevertheless, modern farming has required that some green food should be produced for use in the fold and homestead, and this has been done even when horse-power was the only method by which the surface was broken at an insufficient depth, and perhaps at irregular seasons. Now, however, the aid of steam-power has placed heavy land farmers in quite another position as regards cultivation and cropping.

Leaving North Seaton Railway Station, and taking the road to Newbiggin-by-the-Sea, the neat village of North Seaton is soon reached. Here a branch road leads to the farm, within a mile or less Woodhorn Manor Farm is approached. This occupation is well-known to agricultural readers, from its being in the hands of Mr. Jacob Wilson, whose name has long been before the public in connection with the Royal Agricultural and other societies. We are not about to enter into an elaborate description of the farm of this energetic and highly skilled agriculturist. But in crossing such an occupation no one with the eye of a farmer could fail to observe points that are worthy of a note in an agricultural journal.

To return, then, briefly, to the work of the season, we may say we took the opportunity of watching the process of sowing Turnips on a field of the heavier quality of the clay of the district. This had never been of Turnips before. But in the autumn it was cultivated or dug with the steam digger at a good depth, and so left exposed to the frost and other changes of the winter season. Recently it was cultivated and harrowed by steam in readiness for the ridging or "drill" plough, which operation was being performed when we were there. Better work we never saw made on such soil.

For it is a maxim with Mr. Wilson, as a pioneer in, and experienced hand at, steam cultivation, to deal in the spring and summer with the frosted soil only. The surface which last autumn was a collection of lumps and smaller clods of clay, was this week a good depth of fine pulverised muds. This land was simultaneously being ridged, manured with a mixture of farmyard and Newbiggin manure, and a dressing of compost, when it was re-ridged and drilled with stone Turnips and white Turnips. This is treatment that cannot fail to alter the character of this tenacious soil materially, for in addition to the aération and disintegration thereby effected, there will be a large accumulation of roots of the Turnips for decomposing and preventing this soil from running together into the crude condition in which it was found when the steam-plough was first employed. Other fields of a somewhat lighter quality and texture, we observed, treated in a similar way as regards cultivation. But these were sown with Swedes, and were in most admirable condition. Here we observed a mode of sowing the seed—or rather of leaving the soil after the seed was sown—that did not appear to be perfect practice. But, on inquiry, the explanation received was quite satisfactory. We refer to leaving the ridge exactly as it is left by the drill coulter.

This, we were informed, was done at Woodbridge two years ago, and a dressing of compost, which is of the surface pasting if a rain should fall, and the second being the shelter so afforded to the plants by the edges of the groove in which they stand when they first appear above ground. If the harshness of the air which we experienced this week be general at this part of the east coast, and if the effect it has on the lungs of the young plants be as striking as it happened to be to our lungs under the condition they were in, we are quite sure that the young Turnips cannot do so much good against the changes of a hot sunny day, and the effect of an eastern or sea blast. Although, therefore, we have generally said that no sowing of Turnips ought to be left without a fair pressure of a roller, and after harrowing to roughen the surface to prevent encrustation, we are quite satisfied that this plan of leaving a groove at Woodhorn is one of the correct local practices which may be termed the curiosities of agriculture.

Glancing at the corn fields, we could not but notice the admirable practice in regard to drilling, which is not general in the northern counties. Here a for-steering drill had been used, and each row was as straight as a tightened cord, and as regular as layers of brick-work. The advantage of this was frequently seen, for by this uniformity a Garrett's horse-hoe could be freely used for the destruction of Poppies, Charlock,

and other annual weeds that had been brought up by the deeper cultivation which steam-power has made practicable. This hoeing of Oats, Wheat, and Barley had been admirably done, and with the present price of labour and the scarcity of husbandmen for spring and summer work, this is the only plan whereby annuals can be kept down within the limits that are not greatly injurious to the spring growth of cereals and the summer productiveness in such crops as pulse. The fields of Beans, indeed, were in equally good form for the passage of the horse-hoe over them, and better plants than were to be seen taking deep root in the steam cultivated soil were never inspected. The kind growing is the Heligoland variety.

Raising on to "seed" and the pastures, the former consisted partly of the best crops of Trefoil that we have seen in the North of England. The sea air, in addition to the strong soil, evidently agrees with this valuable plant for early spring feed. The pastures show in many cases the effect of cake and corn which the cattle grazing on them have had. There are many fine rich old pastures that are worth twice if not three times as much per acre as they are, and they are broken for culture. This is the two-fold reason that they will feed stock well as they are, and but little of the present inadequately expensive wages of husbandry will suffice. While we were passing and looking, 3-year-old Shorthorns of fine quality and large growth were receiving their afternoon meal of cake and corn in small troughs upon an already rich pasture, which then had upon it a good bite for the beasts. Such a sight as this might be seen "soling" and "covered yard" advocates and other agricultural ranters to the blush; but it would afford them a lesson by which they and their listeners might profit if they would. The oxen being so fed, and the large number of 2-year-olds and yearlings at other parts of Woodhorn Manor and the adjoining occupation, are mainly bought in Cumberland, where there is the finest class of Shorthorns for heavy flesh and quality of meat that we have seen in any county.

Raising from Newington by another road, Spittal, the other farm in Mr. Wilson's hands, is passed through much about in the same way as Woodhorn Manor is, the land lying right and left of the road to which we have previously referred. Here the soil is similar, and the treatment of it by steam-power has also been equally well done. Close upon the sandy coast is a clay field that has never been of Turnips before. Now it is as fine as a garden, and the produce is every prospect of a fine plant and good crop of Swedes.

These two occupations consist of about 1000 acres, and a fine stretch of coast land pasture and arable they are. The arable land till recently required twelve pairs of horses to do the work in the ordinary manner in which heavy land can be treated by horse-power. Now these are reduced to six pairs, and the work is done with ease at the right season, and to the most effect. The depth of the soil of these farms is thus being increased, while the consumption by horses of the hay, Oats, and Beans grown is less, as will be perceived, by one-half. This food, therefore, can now be turned into beef and mutton. Thus, again, we may say, we have the animal food of the country being considerably increased, and in the practice demonstrated at Woodhorn we have a great example to show how great are the resources in store in clay lands for being developed by steam cultivation.

The Week's Work.

JUNE 24.—Rye-grass and Clover Stubble, when to be fallowed and seeded with Wheat, plough up as soon as the hay is removed. In this case the handcocks should be carted home, and the trampcocks built around the stack stand, so as to clear the ground. The short summer fallow neutralises any bad effects from lying in a consolidated state during the winter months. If not too hard for the skin-coulter, it is better to bury the stubble effectually, especially if it can be done immediately after a shower, as this will ensure its healthy decomposition, thereby enriching the land, whereas when much of it is left on the surface, dry rot takes place, and little or no good is done to the soil. The bare soil, when brought up and exposed to the atmosphere and summer showers, will mellow and become a fine seed-bed.

Vetch Stubble plough close up to the folding or soling. Cabbages not unfrequently follow winter Vetches, and although now getting late for hearting Cabbages, yet heavy crops of the non-hearting varieties may be grown, if good plants are got in with plenty of sap and manure to force them forward. Folding is seen from a sufficient manuring for a Cabbage crop. Some manure heavily in the stubbles, others give the land a thorough fallow first. In either case, the farmyard manure should be well soaked in the hill before it is carted out, and it should be spread and ploughed in with the sap. Some defer the planting until rain falls, others use the watering pan freely to start the plants. In the latter practice, the ground about each plant should be thoroughly soaked down to the bottom of the staple, and care taken to clear the soil of small dribble on the surface in dry weather is worse than none. Spring-sown Vetches are more frequently followed by Wheat, when the practice is the same as for Clover stubble.

Cabbages, the early planted crops of, horse and hand hoe; frequent stirring and keeping the earth loose and well up to the plants is greatly in favour of their growth. As they begin to cover the ground and heart, set up close with the double-mouldboard plough.

Meadow Hay continues to be the principal crop grown in England, as Rye-grass with Clover grown together is the principal crop in Scotland. Some of the natural grasses flower in April, others in May, June, July and August, so that some sacrifice of the early and late sorts must be made. The old rule, "cut when the bulk of the crop is in flower," still applies. In the field there is seldom much difficulty experienced when to begin haymaking, if the weather is good. When cut with the mowing machine, as the greater breadth now is, the hay-making machine follows as close as the condition of the grass and state of the weather will permit. In the afternoon, or on the approach of rain, the half-made hay is gathered into windrows by the horse-rake for cocking before night. Next morning the small cocks are shaken out into loose windrows, which may be turned by the reverse action of the tedding machine as the day requires; and so on the work proceeds until the hay is fit for carrying. Two extremes should be avoided as much as possible, viz., roasting in sunshine, and blanching in rainy weather.

Hay-stacking is seldom done with sufficient care. Every forkful pitched on to the stack should be shaken out and trampled evenly, as upon this depends the success of successful heating. And when green hay is made, as is the invariable practice with Rye-grass and Clover Hay, the same rule applies, otherwise the stack will not settle down evenly.

Thatching should be done as soon as the stack will permit. Rye-grass and Clover-hay may be thatched as soon as the stack is up, and this should always be the rule when the weather is unsettled, but if fine and no appearance of change, the work may be deferred until the stack settles down. Meadow hay requires the best to be neatly out of the stack. In both cases the better plan is to stack in hay-barns, and then thatching is not required.

The Fly now requires watching early and late by the shepherd, so as to afford immediate relief to any sufferer that is "struck." On no account should the shepherd leave his flock during the day, and at night every sheep should be carefully examined before he leaves for home. When the fly becomes very troublesome before the flock is shorn, it may be advisable to clip earlier than would otherwise be the case, washing the sheep after shearing and protecting them as directed above. Dirt is the nidus of all the "blue-bottle" gentry, and a stinking state of the skin and fleece they scent a long way off, and make for their victims; hence the practice of prevention is simply cleanliness. It follows that when newly shorn sheep are struck there is reason to conclude that the skin is either dirty or in an unhealthy state, very generally both. The practice, therefore, should be to wash and not smear the wounded skin with what makes bad worse, and consequently that portion of the skin not smeared is a more attractive nidus than before. The bright sun and cold nights of the current season have both been unusually trying, more especially to southern flocks. W. B.

Obituary.

On the 16th inst., in his 19th year, to the grief of his bereaved parents, drowned while bathing in the river Usk, HUNGERFORD CHANDOS, the only son of CHANDOS WREN HOSKINS, Esq., M.P., of Harewood, Herefordshire.

Markets.

HAY.—Per Load of 36 Trusses.

SMITHFIELD, Thursday, June 22.

Prime Meadow Hay, 132s. to 140s.	Clover, old	117s. 145s.
Inferior do.	Inferior do.	110s. 130
New Hay	Inferior do.	115s. 140
Inferior do.	Inferior do.	110s. 120
Straw .. .. .	.. .. .	36 44

CUMBERLAND MARKET, Thursday, June 22.			
Sup. Meadow Hay	150s. to 160s.	Inferior Clover	120s. to 134s.
Inferior do.	120 135	Prime 2d cut do.	— —
New do.	70 115	New do.	— —
Inferior do.	— —	Straw	44 50
Superior Clover	144 154	JOSHUA BAKER.	

JOSHUA BAKER.

METROPOLITAN MEAT MARKET, June 22.

Best Fresh Butter	15s. per dozen lb.
Second do.	13s. "
Small Pork, 4s. 4d. to 4s. 10d.; Large Pork, 3s. 4d. to 3s. 6d. per 8 lb.	

METROPOLITAN CATTLE MARKET.

MONDAY, June 19.

The supply both of English and Foreign Beasts is very much shorter than on Monday last, trade is not very brisk, yet prices have advanced a little, and a fair clearance is effected. The number of English Sheep is

also much shorter, and the choicest qualities are rather dear, there are a few more foreign than last week, but there is a demand for them. Choice Lambs are rather dearer. There is a slow move for Calves, at lower rates. Our foreign supply consists of 1720 Beasts, 12,100 Sheep, 440 Calves, and 20 Pigs; from Scotland there are 130 Beasts; from Norfolk and Suffolk, 1000; and 635 from the Midland and Home Counties.

Best Cots, Here-	s. d. s. d.	Best Long-wools	s. d. s. d.
fords, &c.	5 6to5 10	Do. Shorn	5 6-5 10
Best Shorthorns ..	4-5 8	Ewes & 2d quality ..	4-5 8
2d quality Beasts ..	4 0-5 0	Do. Shorn	3 6-5 0
Best Downs and ..	6-7 0	Lambs	6 4-7 0
Half-breds	6-7 0	Calves	3 4-5 4
Do. Shorn	6-7 0	Pigs	3 6-7 0

Beasts, 3485; Sheep and Lambs, 28,785; Calves, 468; Pigs, 145.

THURSDAY, June 22.

We have a larger number of Beasts than on Thursday last, the increase being chiefly foreign. Choice English are scarce, and command high rates. There is a larger supply both of English and foreign Sheep; the demand for them is, however, good, and Monday's quotations are rather exceeded. Choice Lambs and Calves are more in request. Our foreign supply consists of 350 Beasts, 5000 Sheep, 630 Calves, and 15 Pigs.

Best Cots, Here-	s. d. s. d.	Best Long-wools	s. d. s. d.
fords, &c.	5 8to6 0	Ewes & 2d quality ..	5 8-6 0
Best Shorthorns ..	5 8-5 10	Do. Shorn	4 8-5 10
2d quality Beasts ..	4-5 4	Do. Shorn	4 8-5 10
Best Downs and ..	6-7 0	Lambs	6 4-7 0
Half-breds	6-7 0	Calves	3 4-5 4
Do. Shorn	6 0-6 4	Pigs	3 6-7 0

Beasts, 713; Sheep and Lambs, 15,350; Calves, 728; Pigs, 80.

MARK LANE.

MONDAY, June 19.

The supplies of English Wheat to this morning's market were very short; rather more disposition was shown to purchase than on Friday, and with a fair moderate amount of business was transacted in both English and foreign, at a decline of 1s. per qr. on the prices of this day's night. Grinding Barley was 6d. per qr. lower. Beans and Peas unchanged in value. Oats were 6d. to 1s. per qr. cheaper. Flour was a slow sale at a reduction of 6d. per barrel and 1s. per sack.

PRICE PER IMPERIAL QUANT.				
WHEAT, Essex, Kent, Suffolk, White	47-60	Red	55-60	
— fine selected runs	50-65	Red	59-62	
— Talavera	62-66			
— Norfolk	48-62	Red		
— Foreign	48-65			
BARLEY, grist & dist. 30s. to 34s. Cher.	43-46	Malt	36-41	
— Foreign, grinding and distilling	29-33	Malt	35-43	
OATS				
— Scotch and Lincolnsh. Potato	26-28	Feed		
— Irish	26-28	Feed	20-23	
— Foreign	25-27	Feed	20-23	
RYE	34-36	Foreign	33-36	
RYE-MEAL, Foreign				
BEANS, Mazagan	37s. to 47s. 1/2	Tick	49-50	Harrow
— Pigeon	51s. to 59s. 1/2	Windsor		Longpod
— Foreign	Small 44s. 1/2	Egyptian	44-44	
PEAS, White, Essex, and Kent	38-40	Suffolk	40-42	
— Maple, 4s. to 44s.	36-40	Foreign	36-40	
MAIZE		Foreign	33-36	
FLOUR, best quality, delivered	42-50			
— 2d ditto	ditto	36-42	Country	36-42
— Foreign	per barrel 25-29	Per sack	36-60	

WEDNESDAY, June 21.

Considerable inactivity pervaded the Corn Exchange to-day, and prices were exceedingly weak. There were short supplies of English Wheat on sale, but from abroad a good quantity came to hand. For all qualities the demand was slow, and prices had a further downward movement. Barley sold quietly at about late rates. Malt was dull, on former terms. Oats were in large supply and limited request, at drooping values. Beans and Peas were purchased quietly, at previous quotations. Flour experienced a dull sale, at prices tending towards further reduction.

ARRIVALS OF GRAIN, &c., INTO LONDON BY WATER CARRIAGE.

	Wheat.	Barley.	Oats.	Flour.
English & Scotch ..	Qrs. 340	Qrs. —	Qrs. —	Sacks. —
Irish	—	—	—	—
Foreign	26,280	1100	48,900	{ 780 20,870 bbls.
	26,620	1100	48,900	

LIVERPOOL, June 20. There was a good attendance of millers. Wheat a moderate business, at 1s. 2d. to 2s. 2d. per cent decline since Friday, but hardly so much pressure to force sales as on that day. Flour a dull sale, and 1s. cheaper. Beans, Oats, and Oatmeal without change. Indian Corn in good consumption, demand, at 9d. per qr. reduction. Prime mixed, 31s. 3d. to 31s. 6d.

AVERAGES.

	Wheat.	Barley.	Oats.
May 13	38s 7d	37s 10d	26s 11d
.. .. .	38 10	37 10	26 11
.. .. .	39 11	36 3	27 2
June 3	60 0	36 11	27 7
.. .. .	59 10	36 6	25 11
.. .. .	59 7	35 11	26 10
Average	59 5	37 2	27 0

COALS.—June 21.

Hastings Hartley, 76s. 6d.; Walls End Hetton, 187s. 6d.; Walls End, 165s. 6d.; Walls End East Hartlepool, 18s.; Walls End Original Hartlepool, 18s. 6d.; Walls End Tees, 18s. 3d.—Ships at market, 9s. sold, 9s. at sea, 30s.

RUSSIA MATS, for Covering Garden Frames.—**J. ANDERSON'S TAGANROG MATS** are the cheapest and best. Price list, which gives the size of every class of Mat, forwarded post free on application.
JAS. T. ANDERSON, 7, Commercial Street, Shoreditch, London.

RUSSIA MATS.—A large stock of Archangel and Archangel, for Covering and Packing. Second sized Archangel, 100; 1st size, 120; 2nd size, 140; 3rd size, 160; and 5th; packing Mats, 200, 300, and 500 per 100; and every other description of Mats at equally low prices.
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4 1/2 Scrims, from 2d. to 5d. per yard, advancing 1/2d.
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HOOPER AND CO., Covent Garden, London, W.C.

TANNED GARDEN NETTING, for Preserving Seed Beds, Fruit, Strawberries, from Frost, Blight, Birds, &c., and as a Fence for Ponds, &c.—One yard wide, 1d. 2, two yards, 2d. 3; three yards, 3d. 4; and four yards, 4d. per yard run, in any quantity.
May be had of **CHARLES DUNN**, 140, St. Pancras, Carriage, Newark-on-Trent. To be had only at the above address. No Agents.

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Any of the above Nets may be had in width from 1 to 12 yards.

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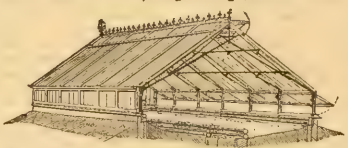
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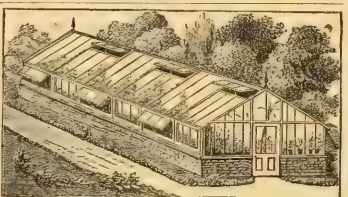


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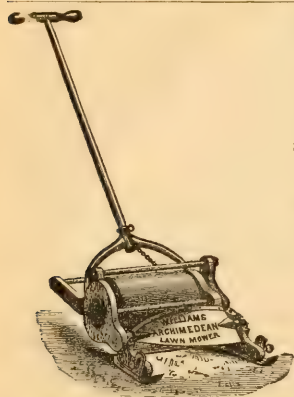
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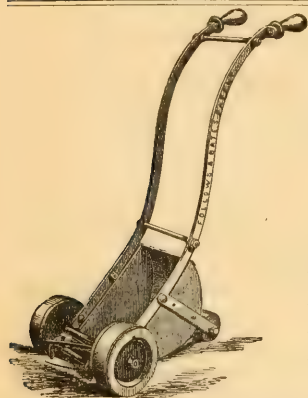
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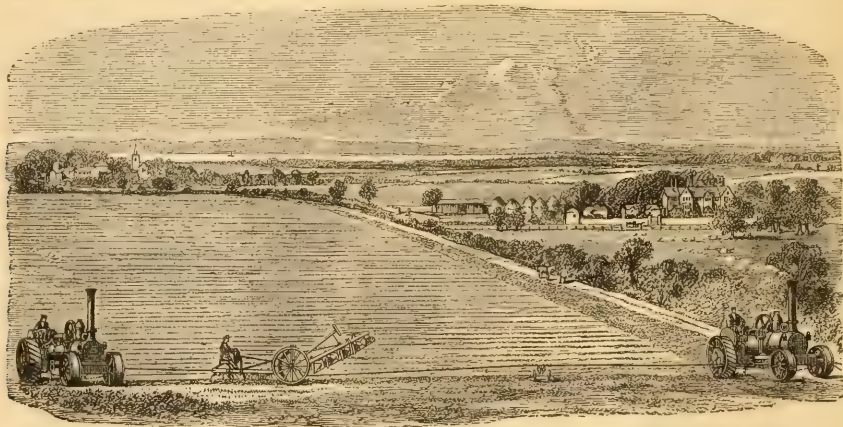
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